Teachers' Beliefs about Children and their Behavior:

Furthering our Measurement and Understanding of How Preschool Teachers' Beliefs Relate to their Interactions with Young Children

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A Dissertation

Presented to the Faculty of the Curry School of Education

University of Virginia

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

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August 2016

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APPROVAL OF THE DISSERTATION

This dissertation, "Teachers' Beliefs about Children and their Behavior", has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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DEDICATION

This work is dedicated to my husband, Trace, and my son, Milo.

To Trace, thank you for engaging in countless discussions with me about child disruptive behavior and teacher-child relationships, for always believing in me, and for holding my hand through every page of this life chapter.

To Milo, my early bird, thank you for teaching me the most valuable life lesson I have learned so far – the importance (and joy) of living fully in the present moment.

ACKNOWLEDGEMENTS

This dissertation would not be possible without the guidance and support of my research advisor, Amanda Williford. Over the past four years, you have helped me to become a stronger researcher and clinician through your mentorship, thoughtful feedback, and encouragement. Thank you for showing me that it is possible to be both a knowledgeable and compassionate clinician and a scientific and 'statistically-savvy' researcher.

Thank you to my dissertation committee, Jennifer Locasale-Crouch, Ron Reeve, and Tina Stanton-Chapman. I truly appreciate your support, thoughtful recommendations, and guidance. I would also like to thank my CASTL colleagues for your feedback. I have learned so much about education, research, and statistics through our Monday meetings.

I am very grateful to my research advisors before I began the Curry program, Bob Selman and Bridget Hamre. Dr. Selman, working in your Voices lab was my first experience in research. Thank you for teaching me the 'ins and outs' of qualitative research and for always being a source of support. Dr. Hamre, my work with you on the Gates project was instrumental in my development of a solid understanding of educational research, the CLASS, and ways to maintain fidelity in a large study. Your patience and wisdom are truly an inspiration.

Thank you to the National Center on Quality Teaching and Learning and the Preschool Relationships Enhancement Project for funding my time at the Curry School of Education. I am beyond grateful for this support.

This dissertation was supported by a grant awarded to Amanda Williford by the Institute of Education Sciences, U.S. Department of Education, through Grant R324A100215 respectively to the University of Virginia. The opinions expressed are those of the authors and do not represent views of the U.S. Department of Education.

To the Preschool Relationships Enhancement Project lab – there are so many people in this group that helped make this dissertation possible. To my undergraduate coders, thank you for your careful attention to detail. To members of the PREP team, thank you for your feedback and guidance as I developed and completed my dissertation. To Elise, you were a life-saver – both because of your statistical knowledge and because we became new moms at the same time. To Jamie and Ginny – thank you for all of your time, knowledge, and patience. To Karyn, thank you for patiently teaching me how to use Mplus and for being a calm presence in our office. To Catherine, I could not have made it through these four years without you. Thank you for being such a good listener and friend. I would also like to thank Jaclyn, Sadie, Krishtine, Dr. Jason Downer, and others that have helped me through the many stages of this work.

To my cohort, Joanna, Jordan, Catherine, and Hillary, I am so grateful that I was able to learn next to each of you over the past four years. Thank you for all of your help and support.

Lastly, I would like to thank my parents, Donna and Ed Merkle, and my sister, Brittany Merkle. To my mom, thank you for showing me what it means to be a great teacher. To my dad, thank

you for teaching me how it important it is to never stop learning. To both of my parents, thank you for nurturing my love of reading and for always encouraging me to take the next step in my education. And to my sister, having you at UVA was amazing. You have become my best female friend, and I will truly miss you when you are out saving the world. I am so proud of you.

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Overview of Three-Manuscript Dissertation

This dissertation presents a line of research that examined a teacher's beliefs about children and their behavior and how these beliefs relate to the ways in which a teacher interacts with young children – both at the classroom level and at the individual child level. My first study investigated the reliability and validity of a measure for assessing preschool teachers' behavior attributions, the *Preschool Teaching Attributions* measure. Results demonstrated a two-factor structure, solid internal reliability, and good concurrent validity with theoretically aligned measures. My second study examined the psychometric properties of a standardized, observational measure designed to assess teacher and child interactive behaviors - the *Teacher Child - Structured Play Task* measure. This measure demonstrated solid inter-rater and internal reliability, as well as concurrent and divergent validity with theoretically aligned measures. With reliability and validity of my measures established, my third study explored the links between teacher beliefs, including authoritarian beliefs and negative behavior attributions, and teacher-child interactions, both at the classroom and individual child level. Results indicated that teacher beliefs were associated with teacher-child interactions at both levels and in unique ways. This dissertation follows the Curry School of Education Guidelines for Manuscript Style Dissertations. In accordance with these guidelines, this document includes 1) a conceptual linking statement that provides theoretical and empirical justification for this line of work, 2) Study 1: *Reliability and Validity of a*

Measure of Preschool Teachers' Attributions for Disruptive Behavior (accepted and published at *Early Education and Development*), 3) Study 2: *Using a Standardized Task to Assess the Quality of Teacher-Child Dyadic Interactions in Preschool* (under review at *Early Education and Development*), and 4) Study 3: *Teacher Beliefs: Developing a Deeper Understanding of the Links between Teacher Beliefs and the Quality of Teacher-Child Interactions* (under review at *Early Education and Development*).

Linking Document:

Teacher Beliefs about Children and their Behavior

A positive and supportive relationship between a teacher and young child provides a secure base from which a child learns critical academic, behavioral, and socio-emotional skills (e.g., Mashburn et al., 2008; Pianta, 1999). This is particularly important for children at risk, as evidence demonstrates that a high-quality teacher-child relationship operates as a protective factor against multiple maladaptive outcomes, including grade retention, low academic achievement, and an increase in behavior problems (e.g., Burchinal, M., Peisner-Feinberg, E., Pianta, R., & Howes, C., 2002; Howes, 2000; Ladd & Burgess, 2001). A high-quality teacher-child relationship is characterized as having high levels of warmth, sensitivity, attunement, and emotional connection and low levels of conflict, negativity, and dependency (Pianta, 1999; Spilt, Koomen, Thijs, & Van der Leij, 2012). Understanding and improving teacher-child relationships is critical during the early school years, as these years have been described as a "window of opportunity," in that a high-quality teacher-child relationship during this time period has the potential to positively shift a child's developmental trajectory (Pianta, 1999, p.16). This is due, in part, to the established links between a positive relationship

during a child's preschool year and development of school readiness skills, including academic, behavioral, and social-emotional skills (e.g., Mashburn et al., 2008). The acquisition of these skills predicts higher success rates in later years of school, providing evidence for the lasting importance of this relationship (Baker, 2006; Hamre & Pianta, 2001).

Unfortunately, relationships between teachers and children who display disruptive behaviors, such as hyperactivity, impulsivity, or aggression, are often negative and characterized by conflict (Doumen, et al, 2008; Howes, 2000; Ladd & Burgess, 2001; Spilt & Koomen, 2009). The quality of a teacher-child relationship for a child with disruptive behavior has been shown to predict increased disruptive behavior in the current classroom environment, as well as an increase in child disruptive behavior in subsequent school years (Howes, 2000). Prekindergarten children are expelled over 3 times more than children in K-12, with the main reason being disruptive behavior (Gilliam, 2005). In addition to expulsion, children who display these behaviors are at risk for several maladaptive outcomes, including an unsuccessful transition to kindergarten (Rimm-Kaufman, Pianta, & Cox, 2000), developing a negative relationship with other adults (Howes, 2000; Ladd & Burgess, 2001), psychological and school maladjustment (Ladd & Burgess, 2001), and school failure and long-term social adjustment problems (Conyers, Reynolds, & Ou, 2003). Thus, it is critical to determine effective ways to improve the relationship between a teacher and child with disruptive behavior, in order for it to serve as a protective factor for these children.

Relationships Comprised of Interactions

The quality of the teacher-child relationship is built, in part, on the daily, reciprocal interactions that occur between the teacher and child, which provide feedback to each participant that helps to establish and maintain the relationship. Over a decade of research supports that sensitive and supportive teacher-child interactions nurture a child's academic, behavioral, and social-emotional skills (e.g., Mashburn et al., 2008; Pianta, 1999). However, providing high-quality support to all children in a classroom is not an easy task. Many factors, such as the percent of children displaying disruptive behaviors or the lack of administrative support, make it more challenging for a teacher to provide highly responsive and sensitive interactions to each child in the classroom.

Measuring teacher-child interactions. Teacher-child interactions can be studied and assessed at different levels, such as at the classroom level or at the individual child level. Much attention has been paid to measuring teachers' interactions with children at the classroom level with assessment systems that have sound psychometric properties, such as the *Classroom Assessment Scoring System* (CLASS; Pianta, LaParo, & Hamre, 2008) or the *Early Childhood Environment Rating Scale – Revised* (ECERS-R; Harms, Clifford, & Cryer, 1998). Although important to study interactions at this level, it is also important to study the interactions that occur between an individual child and his or her teacher, particularly since teachers display different levels of sensitivity towards different children in the classroom and individual children elicit unique responses from teachers (e.g., Howes, 2000; Rimm-Kaufman et al., 2002; Spilt et al., 2012).

Furthermore, designing a study that examines interactions at both levels may provide information about whether the factors that contribute to the quality of teacher-child interactions are similar at the classroom level versus the child level. For example,

Williford and colleagues (2013) conducted a study that examined the quality of interactions at both levels – the classroom and individual child. In this study, results showed a link between the two. In classrooms where teachers provided high quality interactions, the gap between the expressive language outcomes of children with high levels of engagement as compared to those with typical levels of engagement had closed. Additionally, evidence existed that the quality of interactions at both the classroom and individual level predicted children's school readiness skills.

Measuring the quality of interactions at the individual teacher-child level may be more difficult than at the classroom level though for several reasons (i.e., logistics, availability of valid and reliable measures). However, the primary difficulty lies in the interpretation of the results. The majority of measures do not have standardized tasks for the teacher and child to engage in (i.e., *Dyadic Teacher-Child Interaction Coding System (DTICS)*, McIntosh, Rizza, & Bliss, 2000). Thus, it is more difficult to determine if differences in scores between teacher-child dyads are due to the teacher's skills, the individual child, or the activities with which the teacher and child are engaged. There is a need for a standardized observation task at the teacher-child dyadic level that includes a common, structured activity for all teacher-child pairs to engage in. This will help increase our confidence that differences in teacher-child dyads are not best explained by environment or activity.

Variables associated with teacher-child interactions. Many factors exist which may affect each partner's (child, teacher) ability to engage in positive interactions. With regard to the teacher, factors such as low self-efficacy, depression (Hamre, Pianta, Downer, & Mashburn, 2007), and adult-centered ideas and beliefs about children (Pianta,

et al. 2005) have been found to relate to lower quality teacher-child interactions. This dissertation extends this area of research by more fully exploring how one psychological variable, a teacher's beliefs, relates to the quality of interactions with children. Although a teacher has beliefs about many topics related to education, child development, and behavior management, this series of studies focus on two beliefs based on evidence of their importance in the parenting and educational literature: teachers' authoritarian (i.e., child versus adult centered) beliefs and teachers' negative attributions about child disruptive behavior.

Teacher Beliefs and Interactions

Our opinions and beliefs about other individuals have the potential to impact the way in which we respond and interact with them, including a teacher in her classroom (Bandura, 1986; Clark & Peterson, 1986). A teacher's beliefs about children, such as whether a teacher endorses an adult-centered, compared to a child-centered perspective, and a teacher's negative attributions, such as what she believes is the cause of disruptive behavior, may make a critical difference in the way she interacts with children – both at the classroom level and at the individual child level.

Authoritarian beliefs. One way that researchers conceptualize an adult's beliefs about children is with a continuum of beliefs that span from adult-centered (authoritarian) to child-centered (progressive). Teachers with authoritarian beliefs are more likely to believe that a teacher should be obeyed or that a teacher should be in control of the classroom. Teachers with child-centered beliefs are more likely to feel that children should have a right to hold and express their own point of view or that children learn best by doing something. Research suggests that where a teacher is on this continuum is

important in the ways in which she interacts with children (e.g., Driscoll & Pianta, 2010; Pianta et al., 2005). For example, teachers with more adult-centered beliefs were less likely to engage in supportive interactions at both the classroom (Pianta et al., 2005) and individual child level (Driscoll & Pianta, 2010). These studies provide preliminary support for the connection between teachers' beliefs and interactional quality – both at the classroom and individual child level.

Authoritarian beliefs may be particularly important for a teacher's quality of interactions with a child that displays challenging behaviors. A teacher with authoritarian beliefs may be more likely to enter a power struggle with a child or may be less likely to use certain strategies (e.g., offering choices). Research from the parenting literature suggests this is the case for parents. When a parent holds more authoritarian beliefs, they were more likely to blame the child for disruptive behavior, engaged in interactions focused on behavior compliance (Hastings & Rubin, 1999), and showed greater levels of anger towards the child (Coplan et al., 2002). A greater understanding of an early childhood teacher's beliefs about children and what this means for how they engage in interactions with children in their classroom, especially those with disruptive behavior, would provide important information about one of the mechanisms for improving these interactions.

Behavior attributions. Weiner's interpersonal attribution theory suggests that a teacher's beliefs about child disruptive behavior, or how she understands the source and rational for the behavior of others would impact how the teacher responds to the behavior (Weiner, 1985). For example, if a teacher believes that a child has control over his behavior, then she may attribute his behavior as having greater intention than if she

believes his behavior is out of his control. This in turn may lead to a teacher choosing different behavior management practices. Research provides support for two types of behavior attributions: *Causal*, which refers to whether the behavior is caused by internal or external factors to the child and the degree of stability of the behavior, and *Responsibility,* which refers to whether the child has control over their behavior and deserves blame and discipline for it (Carter, Williford, & Locasale-Crouch, 2014; Williford et al., 2009; Wilson, Gardner, Burton, & Leung, 2006).

Despite the prevalence of behavior attribution studies in the parenting literature, few studies have looked at the impact of teacher attributions. The research that has been conducted within this topic demonstrated a link between a teacher's negative behavior attributions and a teacher's reported use of behavior management practices (Andreou & Rapti, 2010; Bibou-Nakou, Kiosseoglou, & Stogiannidou, 2000). However, observational measures were not used in this study, so it cannot be confirmed that teachers' attributions were linked with behavior management practices. In addition to a teacher's report of inappropriate strategies, negative behavior attributions have been associated with lower levels of emotional support and teacher-child relationship quality (aggregated to the teacher level) (Carter, Williford, & Locasale-Crouch, 2014). Further work needs to done to examine behavior attributions and interactions at the child level.

Three Studies: Teacher Beliefs about Children and their Behavior

The three studies in this dissertation begin to fill a gap in the educational psychology research base on the links between teachers' beliefs and the quality of interactions with children by: (1) providing a valid and reliable measure for preschool teachers' behavior attributions, (2) providing a valid and reliable measure for assessing

teacher-child interactions at the individual child level with a standardized, observational task, and (3) establishing the link between teacher beliefs and quality of interactions at both the classroom and individual child levels. Each of the three studies address critical gaps in the literature regarding how we measure and understand teachers' beliefs about children and their behavior, as well as how these beliefs are tied to the quality of interactions teachers engage in with young children. Given the paucity of measures available to assess teacher beliefs about a child's disruptive behavior (behavior attributions), the aim of study 1 was to establish the reliability and validity of a tool that measures a preschool teacher's behavior attributions for child disruptive behavior. In a similar vein, given the lack of measures to study individual teacher-child interactions in a standardized manner, Study 2 explored the reliability and validity of a measure designed to evaluate the quality of a teacher's interactions with a child during a structured play task. Finally, with the confidence of reliable and valid measures for both the predictor and outcome variables, study 3 tested whether teacher beliefs about children and their behavior related to how a teacher interacts with children at the classroom level and at the individual child level, specifically with a child with disruptive behavior.

Study 1

The first study, *Reliability and Validity of a Measure of Preschool Teachers' Attributions for Disruptive Behavior,* presented a new measure to assess a teacher's beliefs about child disruptive behavior, the *Preschool Teaching Attributions* (PTA) measure. Results from this study indicated that the PTA is a reliable assessment, given that it followed the same two-factor structure (Causal and Responsibility) as the parenting attributions measure on which the PTA is based. Additionally, subscales created based

on the confirmatory factor analysis results demonstrated good internal consistency. Results also demonstrated that the PTA is a valid instrument, as it was significantly associated with other theoretically-aligned measures in the expected directions, including beliefs about children, a teacher's report of inappropriate behavior management strategies, teacher-child relationship quality, and quality of teacher-child interactions at the classroom level. Bivariate and partial correlations illustrated the importance of each subscale in understanding teachers' beliefs about children and their behavior.

Study 2

My second study, *Using a Standardized Task to Assess the Quality of Teacher-Child Dyadic Interactions in Preschool,* established the reliability and validity of a measure that assesses the quality of a teacher's interactions with a child during a structured play task. Reliability results from this measure demonstrated good to fair inter-rater reliability and good internal consistency. Additionally, paired t-tests were conducted to demonstrate significant differences between the two activity settings of the structured play task. Validity results demonstrated alignment between the teacher interactive behaviors and the quality of teacher-child interactions in the classroom and teacher-child relationship quality. Child interactive behaviors were significantly associated with a child's observed interactions in the classroom, with a composite related to positive interactions with teachers more strongly associated with children's positive teacher engagement in the classroom and a composite related to active engagement more strongly related to children's observed task engagement.

Study 3

Study 3, *Teacher Beliefs: Developing a Deeper Understanding of the Links between Teacher Beliefs and Quality of Teacher-Child Interactions,* established the association between beliefs and teacher-child interactions at two levels: the classroom and the individual, teacher-child dyad. At the classroom level, a teacher's beliefs about children and their behavior were significantly associated with the quality of teacher-child interactions, specifically authoritarian beliefs and causal attributions were associated with less sensitive and supportive interactions. At the individual child level, a teacher's beliefs about children, specifically authoritarian beliefs, were significantly associated with the quality of interactions between a teacher and child with disruptive behavior in a structured play task and within the classroom setting. The level of child disruptive behavior moderated the relation between a teacher's beliefs about child disruptive behavior and quality of individual teacher-child interactions in different ways for causal and responsibility attributions.

This dissertation extended previous work on teacher beliefs and practices in two ways: (1) by providing two reliable and valid measures to the educational and developmental psychology fields, and (2) by establishing if there were links between teachers' beliefs and interactions with children at the classroom and individual child level. Additionally, it sought to more fully understand how teacher beliefs lead to teacher practices. Knowledge from the results of these three studies creates a fuller picture of how teachers' beliefs relate to the ways in which teachers interact with children at the classroom level and with individual children with disruptive behavior. This information creates a platform for future research in the area of beliefs, specifically the stability and malleability of authoritarian beliefs and attributions, and professional development

designed to change teacher belief patterns. This may be an important step in improving the teacher-child relationship, especially for a child with disruptive behavior.

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Reliability and Validity of a Measure of Preschool Teachers' Attributions for Disruptive Behavior

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(Published in *Early Education and Development,* 2014)

Carter, L.M., Williford, A.P., Locasale-Crouch, J. (2014). Reliability and validity of a measure of preschool teachers' attributions for disruptive behavior. *Early Education and Development, 25*(7), 949-972.

Abstract

This study examined the quality of teacher attributions for child disruptive behavior using a new measure, the *Preschool Teaching Attributions* measure. A sample of 153 early childhood teachers and 432 children participated. All teachers completed the behavior attributions measure at the beginning of the year, as well as measures regarding demographics, beliefs, self-efficacy, child behavior, and the quality of the teacher-child relationship with selected children. Confirmatory factor analysis demonstrated that a two-factor model fit significantly better than a one-factor model, with the two factors being *Causal* and *Responsibility.* Each sub-scale had solid internal reliability, as measured by Cronbach's alpha coefficients. Significant bivariate and partial correlations with teacher practices and beliefs provide preliminary support for the measure's construct validity. Findings from this study suggest the importance of including a measure for teacher attributions in studies that explore a teacher's beliefs, practices, and relationships with children.

Keywords: preschool, early childhood, disruptive behavior, teacher attributions

Reliability and Validity of a Measure of Preschool Teachers' Attributions for Disruptive Behavior

Approximately 10 to 20% of preschool children display high levels of impulsivity, hyperactivity, oppositionality, and aggression (Egger & Angold, 2006; Powell, Fixsen, & Dunlap, 2003). Children who display these behaviors are at risk for a host of maladaptive outcomes, including unsuccessful transition to kindergarten (Rimm-Kaufman, Pianta, & Cox, 2000), negative relationships with adults (Howes, 2000; Ladd & Burgess, 2001), and psychological, social, and school maladjustment (Conyers, Reynolds, & Ou, 2003; Ladd & Burgess, 2001). A young child's behavioral outcomes are dependent in part on how important adults respond to the child's displayed behavior (Bowlby, 1969; Hamre & Pianta, 2001; Hinshaw, 2002). The quality of the adult's responsiveness to a child's disruptive behavior depends upon variables that are both internal, such as beliefs, cognitions, and attributions, and external, such as the environment and school expectations.

One of these internal variables, an adult's attributions for a child's behavior, has theoretical support for how it may affect an adult's responsiveness in Weiner's interpersonal attribution theory. Weiner theorized that an individual responds to behavior based on what he or she understands as the source and rationale for the behavior (Weiner, 1985). Although this theory has empirical support in the parenting literature (e.g., Black, Heyman, & Slep, 2001; Johnston & Ohan, 2005), there have been few studies conducted with another important adult in a young child's life: his/her teacher. Given that children

who attend full-day preschool spend on average 30 hours per week with their teacher(s), it is important to understand teacher attributions for child disruptive behavior more fully (Blau & Currie, 2006). In this study, we examined early childhood teachers' attributions for child disruptive behavior using a newly developed measure, the *Preschool Teaching Attributions* measure.

Disruptive Behavior in Preschool Children

Preschool children who display disruptive behaviors such as impulsivity, hyperactivity, oppositionality, and aggression are at risk for several externalizing behavior diagnoses, including Attention-Deficit/Hyperactivity Disorder and Oppositional Defiant Disorder (APA, 2013), if these behaviors are not addressed early. Well before a diagnosis is warranted, these behaviors are the primary reason that children are expelled from preschool and childcare, which occurs at a rate that is 3.2 times higher than children and youth in grades K-12 (Gilliam, 2005). One likely reason for these expulsions is that children with disruptive behavior tend to have conflictual, tense interactions with their teachers (Doumen, Verschueren, Buyse, Germeijs, Luyckx, & Soenens, 2008; Howes, 2000; Ladd & Burgess, 2001; Spilt & Koomen, 2009). The teacher's contribution in these conflictual teacher-child interactions may depend, in part, on the classroom environment or context that he or she sets in which children learn and grow. Recent work done by Raver and colleagues provides evidence that with support from a mental health consultant, an early childhood teacher can create a classroom environment and interact with children in a way that allows all children, even those with disruptive behavior, to be successful (Raver, Jones, Li-Grining, Zhai, Metzger, & Solomon, 2009). However, a teacher's willingness to openly reflect upon and change his or her practices in

the classroom may depend, in part, on how the teacher understands the source and rationale for a child's disruptive behavior (Andreou & Rapti, 2010; Bibou-Nakou, Kiosseoglou, & Stogiannidou, 2000).

Behavior Attributions

Theoretical support. According to Weiner's interpersonal attributions theory, the way that an individual understands the source and rationale for the behavior of others, or their behavior attributions, impacts how that individual responds to these behaviors (Weiner, 1985). Dix and colleagues (1986) built on this theory with a social-cognitive model for understanding the role that attributions play in an individual's response to behavior. The premise of this model was that the nature of the adult's attributions for disruptive behavior are semi-stable characteristics that serve as a mediator in the relation between the child's behavior and the adult's reaction to the behavior. In the classroom environment, this theory would suggest that a teacher has a semi-stable understanding and belief system for the cause of misbehavior that he/she typically applies to all children. This is important because, in part, it helps to explain why a teacher reacts to behavior in a particular manner. For example, if a teacher believes that a child can control his/her behavior rather than the behavior being out of the child's control, then the teacher may be more likely to blame the child for the behavior.

Dix and colleagues' social-cognitive model (1986) was not entirely linear. They suggested a bidirectional relationship between the individual and his/her attributions, meaning that an individual may be capable of reflecting on his/her own attributions and may even seek to understand a child's behavior in a new way, particularly when the

behavior is negative or unexpected. This model provides theoretical support for the self-report style of measuring attributions commonly used in attribution literature.

Weiner suggested that behavior attributions theoretically split into three types: *locus,* or whether the cause of behavior is internal or external, *stability,* or whether the behavior is stable over time, and *control,* or whether the individual behaving has the ability to control his/her behavior. Earlier research in parent attributions provided some empirical support for the presence of these three dimensions (Bugental & Johnston, 2000; Joiner & Wagner, 1996). However, more recent work provides support for two attribution factors: *Causal,* a blend of *locus* and *stability* and *Responsibility,* which includes both the dimension of *control* and whether the child deserves blame and discipline for the behavior (Williford, Graves, Shelton, & Woods, 2009; Wilson, Gardner, Burton, & Leung, 2006). Although many studies provide empirical support for both of these theories in parent attributions (see Johnston & Ohan, 2005 for a review), few studies attempt to study a teacher's attributions for child behavior, particularly in early childhood.

Teacher behavior attributions. The limited amount of research in teacher behavior attributions primarily focuses on one dimension of attributions, a teacher's *Causal* attributions (Andreou & Rapti, 2010; Bibou-Nakou et al., 2000). Additionally, this research has been conducted with older children, primarily those in elementary school. *Causal* attributions are an adult's ideas regarding why a child behaves the way that he/she does and if the behavior is stable over time and location. Bibou-Nakou and colleagues (2000) found that elementary school teachers attributed the cause of misbehavior mostly to internal student-related causes, such as disobedience or being off-

task. Additionally, they discovered that a teacher's attributions were significantly related to her reported choice of behavior management practices (2000). Andreou and Rapti (2010) provided additional support for the link between behavior attributions and an elementary school teacher's reported choice of management practices. These studies suggest that behavior attributions are at least, in part, important to the behavior management practices that a teacher reports that he/she would choose to use.

Thijs and Koomen (2009) explored the mediating role of kindergarten teachers' behavioral appraisals and the moderating role of both their *Causal* and *Responsibility* behavior attributions. Findings supported an interaction between a teacher's behavioral appraisals, or the extent that a teacher believes the child's behavior to be problematic for social and emotional functioning, and *Responsibility* attributions for the reported closeness in the teacher-child relationship. This suggests that for teachers with more negative attributions for a child's behavior control, the behavioral appraisals have a stronger relationship with the quality of the teacher-child relationship. This study provides further support that behavior attributions may, in part, play a role in the manner that a teacher perceives and responds to a child's disruptive behavior in the classroom.

At the time of this review, we found no published work examining how early childhood teachers attribute disruptive behavior of three- and four-year-old children. Furthermore, there is not an existing measure with sound, psychometric properties to assess an early childhood teacher's attributions for child disruptive behavior. Given the research base that supports the importance that parental behavior attributions have in a parent's response to a young child, it is important to extend this exploration into the early childhood classroom environment (e.g., Black, Heyman, & Slep, 2006). For many

children, preschool is a child's first experience in school; how a teacher responds to the child and his/her behavior likely has significant and lasting implications for the child's developmental trajectory, particularly given the malleability of a child's trajectory at this time (Kazdin & Weisz, 2003). The purpose of the present study was to take a first look at a new measure developed specifically to examine early childhood teacher attributions for disruptive behavior, the *Preschool Teaching Attributions* measure (PTA). This paper presents initial reliability and validity findings. In order to support the construct validity of the PTA measure, we expected teacher attributions about child disruptive behavior to be linked with other aspects of a teacher's belief systems, teaching practices, self-report of the relationship with disruptive children, and report of the level of children's disruptive behavior. Below we describe our hypothesized associations between teacher attribution and these related constructs.

Predicted Variables Associated with Attributions

Teacher beliefs.

Authoritarian beliefs. The connection between a caregiver's authoritarian beliefs, which are adult-centered, traditional beliefs about controlling a child's behavior, and their attributions for child behavior has been demonstrated by several studies with parents and their young children. Teachers with an authoritarian belief system agree with items such as *Children should always obey the teacher*, *Children must be carefully trained early in life or their natural impulses will make them unmanageable*, and *Children should be treated the same regardless of differences among them*. Hastings and Rubin (1999) showed that mothers with an authoritarian belief system were more likely to blame their toddler-age child for aggression and misbehavior. The interactions

between these mothers and their children focused on compliance to authority. Coplan and colleagues (2002) provided additional evidence that authoritarian mothers were less likely to attribute child's aggression and misbehavior to external sources and more likely to show greater levels of anger towards the child when he/she misbehaved. We found no evidence of studies that examined the relations between a *teacher's* authoritarian beliefs and his/her attributions for child behavior; however, we would expect similar associations to the parent attributions.

Self-efficacy. Another element of a teacher's beliefs is his/her self-efficacy, or whether or not the teacher believes that he/she is capable of managing and teaching her classroom effectively. Andreou and Rapti (2010) found a significant, negative correlation between an elementary school teacher's perceived efficacy for classroom management and her disagreement that school-related factors were the cause of disruptive behavior. Additionally, they found that perceived efficacy and a teacher's *causal* attributions worked together to predict a teacher's reported choice of behavioral intervention in the elementary school setting. Based on these findings, we would expect teacher self-efficacy and attributions to be correlated; we hypothesize that greater teacher self-efficacy would be associated with less negative behavior attributions.

Teacher practices. Parenting research, and to a lesser extent educational research, has demonstrated that a relationship exists between an individual's behavior attributions and chosen practices for managing a child's behavior. Parents with more negative *Responsibility* attributions for child behavior (i.e., greater intent on the part of the child) are more likely to use harsh disciplinary practices, particularly those that are physical and punitive (Bugental & Johnston, 2000; Laskey & Cartwright, 2009).

Although negative attributions have not necessarily been associated with harsh, punitive practices in the classroom, educational researchers have provided evidence that a teacher's attributions are correlated with a teacher's reported discipline practices (Andreou & Rapti, 2010; Bibou-Nakou et al., 2000). Based on the directionality provided by the parenting literature, we would expect that teachers with more negative attributions would report using negative behavior management strategies more often than positive or proactive strategies.

Additional studies from the parenting literature have provided evidence that negative attributions are correlated with a lower quality of parent-child interactions as displayed by dysfunctional relationships and more parental anger (e.g., Black, Heyman, & Slep, 2001; Coplan et al., 2002). Although we found no studies that examined a teacher's attributions and the quality of her interactions with children, we would expect similar findings to those in the parenting literature. Thus, we would expect that teachers with more negative attributions would have a lower quality of teacher-child interactions, specifically with regard to emotional support.

Teacher-child relationship quality. The quality of the relationship a child has with his/her early childhood teacher(s) has been proven to be important in protecting a child from negative behavioral outcomes by providing a child with the support needed to develop academic, behavioral, and social-emotional skills (e.g., Mashburn, Pianta, Hamre, Downer, Barbarin, Bryant, Burchinal, Early, & Howes, 2008; Pianta, Stuhlman, & Hamre, 2002; Rimm-Kaufman, Pianta, & Cox, 2000). This is particularly true for young children with disruptive behavior (Hamre & Pianta, 2001; Pianta, Stuhlman, & Hamre, 2002). Hamre and Pianta (2001) have shown that children who have a negative

relationship with their teacher in kindergarten are more likely to develop along a negative trajectory in school, as evidenced by poor behavioral and academic outcomes through eighth grade.

However, there are few studies that explore the connection between teacher-child relationship quality and a teacher's behavior attributions. Thijs and Koomen (2009) recently demonstrated that for teachers with more negative *Responsibility* attributions, a stronger correlation existed between the teacher's appraisals of child behavior and the teacher's perceived closeness in the relationship. A direct link was demonstrated between parents' negative attributions and decreased quality of the parent-child relationship (e.g., Black, Heyman, & Slep, 2001). Thus, we would expect that more negative attributions, particularly *Responsibility* attributions, would be correlated with more negative teacher-reported teacher-child relationship quality.

Level of child behavior problems. Early work in the parenting literature demonstrated that a parent of a child with disruptive behavior who also has negative behavior attributions is more likely to report a child's negative behavior as enduring and pervasive over time (Johnston & Freeman, 1997; Sobol, Ashbourne, Earn, & Cunningham, 1989). However, the directionality of this is unclear. We would expect that a teacher who has negative behavior attributions would also be more likely to report a child's negative behavior more negatively than a teacher with more positive behavior attributions. Thus, we would expect a significant association between negative attributions and a child's level of disruptive behavior. Given the multi-method nature of the present study's dataset, we have the unique opportunity to explore the link between a teacher's behavior attributions and a direct observation of the child's behavior. Since the

behavior attributions and reported level of child disruptive behavior are both teacher-report, we would expect that this relationship would be stronger than a relation between behavior attributions and direct observation. Additionally, parenting literature provides evidence that individuals with negative behavior attributions tend to perceive even ambiguous child behavior as negative (see Johnston & Ohan, 2005), thus, we would expect that teachers with negative behavior attributions may perceive and report a child's behavior as more negative than it is objectively observed by others.

A Reliable and Valid Attribution Measurement Tool

Given the importance of understanding teacher attributions about young children's disruptive behavior and the associations with the quality of their interactions, there is a need for a reliable and valid measure assessing this construct. Measuring an individual's thoughts, beliefs, or attributions is a difficult feat considering the internal nature of these variables. Nevertheless, research from parenting literature suggests that what an individual can identify about their understanding of a child's behavior through vignettes proves to be important in their resulting behavior towards the child (e.g., Black, Heyman, & Slep, 2001; Johnston & Ohan, 2005; Williford et al., 2009). Educational research that examines early childhood teachers' attributions for disruptive behavior can help uncover how teachers understand disruptive behavior and how this understanding connects with their responsiveness and practices, particularly with students who are likely to display these negative behaviors. A deeper understanding of teacher attributions may help explain, in part, the mechanism through which teacher behavior occurs, allowing it to be a more precise target for intervention. This is particularly important for

interventions that target the conflictual and negative interactions between teachers and children with disruptive behavior.

Research Aims and Hypotheses

The purpose of this study was to establish the initial reliability and validity of a new measure that explores early childhood teachers' attributions for child disruptive behavior, the *Preschool Teaching Attributions* measure. With regard to reliability, we explored if the PTA followed a similar factor structure as the parent measure and if the resulting composites demonstrated internal consistency. We hypothesized that teacher attributions would follow the same factor structure of the measure from which it was adapted, the *Attributional Style Measure for Parents* (ASMP: O'Brien & Peyton, 2002). As in the parent measure, we expected that teacher data for the present study would load onto two factors: *Causal* and *Responsibility* (Williford et al., 2009).

In terms of validity, we examined if the PTA would be significantly associated with theoretically-aligned measures, including teacher practices and teacher beliefs. We hypothesized that the PTA would be significantly associated with teacher beliefs, teacher practice in the classroom, and teacher-reported level of child disruptive behavior. More specifically and based on evidence from parenting literature, we hypothesized that negative attributions (*Causal* and *Responsibility*) would be positively linked with more authoritarian beliefs and negatively associated with teacher self-efficacy. Additionally, we expected that *Responsibility* attributions would be negatively correlated with teacher-child closeness and positively correlated with teacher-child conflict. Further, we expected that negative attributions would be positively correlated with a teacher's report of inappropriate behavior management strategies and would be negatively correlated with

the quality of teacher's practice in the classroom, specifically a teacher's emotional support. Finally, we hypothesized that teachers with more negative attributions would perceive children's disruptive behavior as more extreme in level and so we expected teacher attributions to be positively associated with teacher report of children's disruptive behavior but not to be significantly correlated with observed disruptive behavior.

Method

Participants

Data for the present study were collected within a larger intervention study. All data in the present study were collected at the beginning of the year, prior to intervention implementation. The sample for the present study included 153 early childhood teachers and 432 children, with approximately 3 children nested within each teacher's classroom (see Table 1 for classroom, teacher, and child demographics). Teachers worked within a variety of early childhood programs: State-funded Pre-K (14.1%), Private (45.7%), and Head Start (24.8%). Teachers were mostly female (96.1%) and on average 43 years old (range 22-69). Teachers were primarily Caucasian or African American (49.4% Caucasian, 34.7% African American, 0.6% Asian, 0.6% Native American, 1.2% Hispanic, 2.4% Multi-racial, and 1.2% Other). Nearly half of teachers had a bachelor's degree (47.6%) and about an equal amount of teachers had a master's (12.4%), 2-year degree (13.5%), or some college but no degree (12.4%). Additionally, there was a considerable range of teacher experience, from 0-38 years (M=9.217 years).

432 preschool children (M age=4.1 years) participated. 65.4% of children were male. The sample represented an ethnically-diverse group of children, with 37.6% Caucasian, 41.9% African American, 1.7% Asian, 0.4% Native American, 7.8%

Hispanic, 10.0% Multi-racial, and 0.4% Other. Children came from a range of socio-economic backgrounds but were primarily from low-income households with the mean family income-to-needs ratio being 1.898 (SD=1.534).

Procedures

Preschool centers were recruited from three geographical sites (all urban or semi-urban) of the southeast. After permission was obtained from the director of each center, lead teachers in preschool classrooms serving predominantly 3-4 year olds were invited to participate in the study. After attending an initial meeting in the fall and providing informed consent, teachers assisted with the parental consent process and completed a personal and classroom demographic survey. All parents received a letter that explained the study, an informed consent form, and a short demographic survey. Seventy-six percent of parents consented to having their children included in the study. Teachers rated all children in their classroom on two disruptive behavior rating scales (ADHD Rating Scale-IV, DuPaul, Power, Anastopoulos, & Reid, 1998; ODD Rating Scale, Hommersen, Murray, Ohan, & Johnston, 2006). Three children in each classroom, for whom the teacher rated as having the highest overall disruptive behavior based on a total score from these rating scales, were selected to participate in the study. In order to ensure a sample representation of both male and female students, two male children and one female child were chosen from each classroom. At the beginning of the school year, teachers also completed a variety of other measures, including measures that assessed a teacher's beliefs, practices, and the teacher-child relationship. In addition, observations of the teacher's classroom interactions and each child's classroom behavior were conducted across multiple days.

Measures

Teacher ratings of behavior attributions. ***The Preschool Teaching Attributions Measure.*** The PTA was adapted from the *Attributional Style Measure for Parents* (ASMP; O'Brien & Peyton, 2002). The ASMP, a vignette-style measure, has been used in several research studies to assess the quality of parental attributions about child disruptive behavior (e.g., Tsethlikai, Peyton, & O'Brien, 2007; Williford et al., 2009). In this measure, a mother considers four-six different behavior scenarios and responds to each by rating a series of statements using a six-point Likert scale. Each statement maps onto one of eight dimensions of attributions (*internal-external locus, controllability, stability, globality, purposefulness, motivation, blame* and *negative intent*). Scores are typically aggregated across all scenarios to create a total score for each attributional dimension (Williford et al., 2009).

Similar to the ASMP, the PTA (presented in Appendix 1) asked the teacher to think about a recent time that a child in his/her classroom misbehaved in each of the following five ways: noncompliance to teacher requests, aggression towards peers, aggression or disrespect towards the teacher, interruption, and noncompliance with the routine. In order to encourage a teacher to remember a situation where this actually occurred in the classroom and ideally access more internal, automatic beliefs, the measure asked the teacher to answer some preparatory questions about the child and the situation. As the intent is to assess a teacher's general, behavior attributions, the teacher may choose the same or a different child for each scenario. The teacher then used a 6-point scale (ranging from 1: *strongly disagree* to 6: *strongly agree*) to rate statements for each behavior scenario across the same eight dimensions as the ASMP: *internal-external*

locus (6=something about the child), *controllability* (6=completely within the child's control), *stability* (6=not likely to change), *globality* (6=happens often in my classroom), *purposefulness* (6=definitely intentional, on purpose), *motivation* (6=selfish concerns), *blame* (6=deserves to be disciplined), and *negative intent* (6=did to annoy me). Scores were then aggregated across the five scenarios so that there was one score for each attributional dimension. Each teacher completed this measure once at the beginning of the school year.

Teacher beliefs.

Authoritarian beliefs. Modernity Scale* (Schaefer & Edgerton, 1985*). Teachers completed the Modernity Scale, which is a 16-item, Likert-scale questionnaire that yields information regarding a teacher's beliefs about interactions with children - the extent to which a teacher endorses an authoritarian or adult-directed perspective compared to a child-centered perspective. Teachers with high scores on this measure strongly agree with items, such as *Children should always obey their teacher* and strongly disagree with items, such as *Children have a right to their own point of view and should be allowed to express it.* This scale had good reliability in the current study ($\alpha = 0.79$) and has shown construct validity in prior studies with significant correlations to a teacher's emotional support and classroom practices (Driscoll & Pianta, 2010; Pianta, Howes, Burchinal, Bryant, Clifford, Early, & Barbarin, 2005). This questionnaire was completed by each teacher once at the beginning of the year. A total score was created for each teacher; higher scores suggested stronger, more adult-centered, authoritarian beliefs.

***Self-efficacy. Teacher Self-Efficacy Scale* (TSES; Bandura, 1997).** In order to measure teacher's self-efficacy, each teacher completed an abbreviated version of the

Teacher Self-Efficacy Scale (Bandura, 1997). This 7-item, Likert-scale measure assesses a teacher's self-efficacy regarding discipline, instruction, positive environment, and decision-making in the school environment. This scale had excellent reliability with a Cronbach's alpha of 0.86 in the current study. Each teacher completed this questionnaire at the beginning of the school year. A total score was created for each teacher; higher scores indicated greater levels of believed efficacy in the areas of discipline, instruction, positive environment, and decision-making.

Teacher practices.

Reported behavior management strategies. Teaching Classroom Management Strategies Questionnaire. **(Teaching Strategies; Webster-Stratton & Reid, 2003).** Teachers completed this 59-item, Likert-scale questionnaire that measured a teacher's reported use of strategies related to four areas: managing classroom behavior, specific teaching techniques, working with parents, and planning and support. The current study used the Inappropriate Strategies sub-scale (9 items, α=0.62) and included a teacher's report of the frequency of the following types of behaviors: commenting on bad behavior, singling out a child or group for misbehavior, using physical restraint, using comments in a loud voice, sending a child home, etc. A total score was created for each teacher for the Inappropriate Strategies scale; higher scores indicated more frequent use of inappropriate management strategies.

Observed teacher interaction quality. Classroom Assessment Scoring System **(CLASS; Pianta, LaParo, & Hamre, 2008).** The *CLASS* is an observational instrument that measures classroom quality across ten dimensions using a 7-point scale: *positive climate, negative climate, teacher sensitivity, regard for student perspectives, behavior*

management, productivity, concept development, instructional learning formats, quality of feedback, and *language modeling*. Previous factor analyses demonstrated that data supported three domains of classroom quality – emotional support, classroom organization, and instructional support (Hamre, Pianta, Mashburn, & Downer, 2007). Multiple studies demonstrate this measure's validity (e.g., Mashburn et al., 2008). In the current study, the CLASS demonstrated excellent reliability with Cronbach's alphas of .89 for emotional support, .84 for classroom organization, and .87 for instructional support.

Raters for the present study completed the standardized, CLASS-training process and demonstrated reliability above 80% within and across dimensions prior to rating classrooms in the field. Additionally, raters attended weekly calibration meetings and proved continued reliability at 80% as measured by weekly calibration tests. A domain score was created for each of the three domains: emotional support, classroom organization, and instructional support by aggregating all appropriate dimension codes for the beginning of the year data collection cycle.

Teacher-child relationship quality. *The Student-Teacher Relationship Scale* (STRS; Pianta & Hamre, 2001). The STRS is a widely used measure of a teacher's perception of the quality of her relationship with a specific child (Pianta & Hamre, 2001; Pianta, La Paro, Payne, Cox, & Bradley, 2002). For the current study, the 15-item, 5-point short form was used, which had good psychometric properties including a Cronbach's alpha coefficient of .83 for the *Closeness* subscale and .87 for *Conflict* subscale. In this measure, the teacher rated a series of 15 statements that relate to the level of conflict and closeness in her relationship with a specific child on a scale of 1 to 5

(5=definitely does apply). The authors have demonstrated strong evidence for the validity of this scale (Pianta & Hamre, 2001). Each teacher completed the STRS for each of the selected children prior to the child receiving the intervention. A composite was created for each of the two subscales: *Conflict* and *Closeness* for each selected child. Then, a total aggregated score was created for each teacher to represent the level of *Conflict* and *Closeness* she perceived in her relationships with the three selected children in his/her classroom.

Level of child behavior problems.

***Teacher-reported child disruptive behavior. Sutter-Eyberg Student Behavior Inventory-Revised* (SESBI-R; Eyberg & Pincus, 1999).** Teachers completed the SESBI-R, which asked teachers to report the frequency of problem behaviors for each of the selected children. The SESBI-R had excellent reliability in the current sample, as measured by a Cronbach's alpha coefficient of .97. Using a 38-item questionnaire, teachers rated a child's behavior on a 7-point intensity scale. Preliminary evidence of convergent and discriminate validity of this measure has been demonstrated (Rayfield, 1998). Each teacher completed this questionnaire for each child at the beginning of the school year. A total score for child disruptive behavior was calculated, including individual scores for aggression, defiance, impulsivity, and hyperactivity. In order to compare to teacher-level attributions, an aggregate of the selected children's disruptive behavior scores was created for each teacher.

***Direct observation. Individualized Classroom Assessment Scoring System (inCLASS;* Downer, Booren, Lima, Luckner, & Pianta, 2010).** The inCLASS is an observational instrument that measures young children's competence during daily

interactions with teachers, peers, and tasks in the preschool environment. For each observation, ten dimension scores were obtained: *positive engagement with the teacher, teacher conflict, teacher communication, peer sociability, peer conflict, peer assertiveness, peer communication, engagement within tasks, self-reliance,* and *behavior control*. Each dimension was rated by coders on a 7-point scale; coders were guided in their ratings by detailed descriptors of behaviors that demonstrate low, medium, and high quality. Higher ratings suggested more positive behaviors or interactions (with teacher, peers, or task), with the exception of teacher conflict and peer conflict in which higher ratings reflected higher levels of conflict.

In an initial validation study, Downer and colleagues conducted an exploratory factor analysis, which supported four domains: interactions with teachers, interactions with peers, interactions with tasks, and negative classroom engagement (Downer et al., 2010). In a more recent study, Bohlmann and colleagues found that an additional dimension, Behavior Control, should be reverse-coded and included in the fourth domain of negative classroom engagement (Bohlmann, Downer, Maier, Booren, Williford, & Howes, 2012). Several studies have demonstrated the inCLASS's construct, criterion-related, and predictive validity (Downer et al., 2010; Maier, Downer, Vitiello, & Booren, 2012; Williford, Whittaker, Vitiello, & Downer, in press).

A diverse group of raters (e.g., age, gender, ethnicity) for the present study were trained using the standardized, inCLASS training and demonstrated reliability above 80% within and across dimensions. Children's scores for baseline data collection were aggregated across cycles and up to the four domain levels. Inter-rater agreement (ICCs) during live observations for the inCLASS domains scores ranged from .71 to .84 and

internal consistencies from .74 to .83. For the current study, we used the domain of Negative Classroom Engagement in which higher scores indicated greater negative engagement.

Data Analytic Plan

In order to assess the PTA's level of reliability, a series of confirmatory factor analyses were conducted using M*plus* Version 6.1 (Muthén & Muthén, 1998-2011). The purpose of these analyses was to determine if the two-factor model of *Causal* and *Responsibility* attributions previously established with parents of children who displayed disruptive behaviors using the ASMP (Williford et al., 2009) adequately fit the existing teacher data collected using the PTA. Both estimates and measures of fit were examined to determine goodness-of-fit. In order to determine if a 1-factor or 2-factor model fit best, both models were fit to the data while allowing factors to correlate freely, and a chi-square difference test was calculated to assess if a 2-factor model fit significantly better. Once the factors were identified, subscale scores were calculated using simple aggregates (consistent with how the ASMP subscales are created). Scale reliability statistics were calculated using Cronbach's alpha coefficients in order to provide measures of consistency for each subscale score once established using the CFA.

In order to assess the PTA's content-related validity, bivariate Pearson's correlations were run to examine the associations between the established attribution subscales and teacher beliefs, teacher practice, and children's level of disruptive behavior. Due to a high correlation between the attribution subscale scores, partial correlations were run in order to disentangle the unique variance that each subscale contributed to a correlational relationship.

Results

Descriptive Statistics

Descriptive statistics provided evidence that teachers reported attributions along the full range of the six-point scale with the majority of scores falling in the middle to middle-high range of the scale (see table 2 for descriptive statistics for each dimension). The scale with the lowest average was *Negative Intent* with a mean of 1.83, indicating that teachers reported less negative attributions for the statement, "This child did this behavior in order to annoy me." The scale with the highest mean was *Globality* with a mean of 4.34, meaning that teachers reported the most negative attributions for the statement, "This child does this behavior across different settings."

Reliability

Confirmatory factor analysis. A series of confirmatory factor analyses were conducted in order to determine if teacher behavior attributions followed a two-factor structure (with factors as *Causal* and *Responsibility*). After the initial CFA showed an inadequate fit for the 1-factor and 2-factor models (see Table 3 for fit statistics), we conducted a careful review of both the scenarios and the items. This revealed two issues: (1) The second behavior scenario was conceptually different compared to the other four (child's disruptive behavior with peers rather than the teacher) and statistically the items from this scenario did not hang together in the same way as the items within the other four scenarios. Thus, we did not include this scenario when calculating the dimension and subscales. (2) The dimension of *controllability* loaded onto both factors, *Causal* and *Responsibility*. Due to this, and the fact that *Control* is proposed as a separate factor in

Weiner's interpersonal attribution theory, we dropped this dimension (Weiner, 1985; 2010).

We then fit a second set of confirmatory factor analyses using four scenarios and 7 dimensions to both a 1-factor and 2-factor model. The one-factor model was an acceptable fit; RMSEA=0.093, CFI=0.879, TLI=0.819, and SRMR=0.062, while the two-factor model demonstrated a good fit; RMSEA=0.073, CFI=0.931, TLI=0.889, and SRMR=0.050. (See Table 3 for detailed information of fit statistics for our initial and final analyses) Factors were allowed to correlate freely (correlation between two factors = 0.742). A chi-square test of difference was calculated in order to compare the one-factor with the two-factor model; results demonstrated that the two-factor model is a significantly better fit ($\chi^2 = 8.163$, $df=1$, $p<0.005$). All items loaded onto one of two factors with an estimate of at least 0.44, with most items loading above 0.62 (see Figure 1 for a visual path model of the final CFA results).

Two composite subscales were subsequently created based upon the CFA by averaging the dimensions associated with each factor: *Causal* (Globality, Stability, Internal/External Locus) and *Responsibility* (Purposefulness, Motivation, Blame, and Negative Intent). The two subscales were moderately correlated (0.502). Subscale scores ranged from 1.13 to 5.44. Teachers reported slightly more negative *Causal* attributions ($M=3.843$) than *Responsibility* attributions ($M=2.997$). Additionally, Cronbach's alpha coefficients were calculated on the two subscales, and they demonstrated good internal consistency (*Causal* = 0.77 and *Responsibility* = 0.85).

Validity

Bivariate correlations. To establish construct validity, bivariate Pearson correlations were conducted in order to compare a teacher's *Causal* and *Responsibility* attributions with his/her ratings on several established measures (see Table 4 for bivariate and partial correlations).

The *Causal* attribution subscale was significantly correlated with a teacher's report of her use of inappropriate strategies in the expected direction; more negative attributions about the cause and stability of misbehavior was associated with a teacher's reported use of more inappropriate behavior strategies. *Causal* attributions were also correlated with a teacher's classroom quality, specifically the emotional support in the expected direction; more negative attributions were linked with lower emotional support. Additionally, a teacher's *Causal* attributions were significantly related to a teacher's reported closeness with selected children in the expected direction; more negative attributions were correlated with lower reported closeness. However, *Causal* attributions were not correlated with a teacher's authoritarian beliefs or self-efficacy. Additionally, a teacher's *Causal* attributions were not correlated with a teacher's report of student behavior but were negatively correlated with a student's observed conflict behavior (more negative *Causal* attributions were associated with less observed child conflict).

The *Responsibility* composite was positively correlated with a teacher's report of her use of inappropriate teaching strategies; more negative attributions were related to a teacher reporting greater usage of inappropriate behavior strategies. A teacher's authoritarian beliefs were also significantly, positively correlated with her *Responsibility* attributions in the expected direction; more negative attributions were related to more authoritarian beliefs. A teacher's *Responsibility* attributions were not correlated with the

quality of teacher's interactions in the classroom, teacher-child relationship quality, or her self-efficacy. Additionally, *Responsibility* attributions were not related to either a teacher's report of child disruptive behavior or observed disruptive behavior.

Partial correlations. Due to the moderate correlation between the *Causal* and *Responsibility* attribution subscales ($r = 0.502$), partial correlations were conducted in order to explore the correlations that each attribution subscale had with related variables, while controlling for the other subscale (see Table 4). When controlling for *Responsibility* attributions, *Causal* attributions remained significantly correlated with a teacher's emotional support and a teacher's report of closeness with selected children. Due to controlling for the variance of *Responsibility* attributions, the *Causal* attributions were no longer correlated with observed child behavior or a teacher's report of inappropriate management strategies. While controlling for *Causal* attributions, *Responsibility* attributions remained significantly correlated with a teacher's authoritarian beliefs. Controlling for the variance of *Causal* attributions removed the association between *Responsibility* attributions and a teacher's reported use of inappropriate strategies.

Discussion

The purpose of this study was to establish initial reliability and validity for a measure of early childhood teachers' self-reported attributions of young children's disruptive behavior, the *Preschool Teaching Attributions* measure (PTA). Adapted from a previously developed attribution measure used with parents of young children (O'Brien & Peyton, 2002; Williford, et al. 2009), the PTA is a vignette-based measure where teachers read a series of vignettes and are asked to think about a time when they recently

experienced a similar situation in their classrooms. For each vignette, teachers rate their level of agreement with a series of statements that map onto eight dimensions of behavior attributions. Our results provide initial support for the reliability and validity of the PTA and findings will be discussed in more detail below.

Reliability

Consistent with our hypotheses, a 2-factor model of *Causal* and *Responsibility* attributions fit the PTA data well and significantly better than a 1-factor model. Teachers who endorse high *Causal* attributions believe that a child will display disruptive behavior across contexts, that the behavior is stable, and that the behavior is caused by internal factors. Teachers who endorse high *Responsibility* attributions believe that a child's behavior is purposeful, that a child is motivated by selfish reasons, that the child deserves to be disciplined for their behavior, and that the child engages in negative behavior in order to negatively affect the adult (i.e., annoy). The current CFA results mirrored the 2-factor structure of parent behavior attributions from which the PTA was developed and this replication of factor structure with early childhood teachers provides support that the PTA reliably measures a teacher's attributions. The better fit for the 2-factor model suggests that each factor of the model, *Causal* and *Responsibility,* represents a separate, distinct aspect of teachers' behavior attributions. The correlation between the factors was moderate indicating that, on average, teachers reported similar levels of *Causal* and *Responsibility* attributions but that that the correspondence is not exact. That is, teachers may hold high *Causal* attributions but low *Responsibility* attributions or vice-versa.

Validity

Correlation results establish initial evidence for the validity of the PTA although not all results were in the expected direction. Validity results suggest that the PTA measured an important aspect of teacher beliefs. Comparison of the bivariate and partial correlation results help to understand the combined and unique ways that *Causal* and *Responsibility* aspects of a teacher's attributions are related to other aspects of a teacher's practices and beliefs related to teaching. Below we describe associations between the teachers *Causal* and *Responsibility* attributions and related constructs in more detail.

With regard to a teacher's beliefs, we found mixed support for our hypotheses that both *Causal* and *Responsibility* attributions would be correlated with teacher's authoritarian beliefs about children and efficacy regarding teaching. Only a teacher's *Responsibility* attributions were positively associated with teacher authoritarian beliefs. This is consistent with the pattern found by Hastings and Rubin with mothers and their young children (1999); teachers who believed that children should obey the teacher and that children should be treated the same were more likely to believe that children who displayed disruptive behavior were behaving intentionally and deserved blame (i.e., more negative *Responsibility* attributions). In contrast, teachers' authoritarian beliefs were unrelated to whether they felt children's negative behavior was stable and due to factors internal to the child.

Contrary to our hypotheses, we did not find evidence that *Causal* or *Responsibility* attributions were associated significantly with teachers' self-efficacy regarding their teaching. This may be due to the fact that our teacher self-efficacy scales included a teacher's perceived efficacy across a variety of factors, including discipline, instruction, positive environment, and decision-making, rather than just a teacher's

perceived efficacy in classroom management strategies (such as what was used in Andreou & Rapti, 2010)**.** Alternatively, a teacher's efficacy about teaching children may be separate from the attributions they hold about children's negative behavior. Teacher attributions, thus, may be more related to the practices that they use to handle misbehavior in the classroom.

In relation to teaching practices, teachers' *Causal* and *Responsibility* attributions were significantly and positively associated with teachers' reported use of inappropriate discipline strategies in the classroom. That is, teachers who believed children's negative behaviors were stable and internal to the child and that the child deserved blame and punishment for such behaviors were more likely to endorse using negative and punitive discipline strategies in the classroom, such as commenting on or singling out a child for negative behavior or sending the child home for misbehavior. When comparing the bivariate and partial correlations, we see that *Causal* and *Responsibility* attributions remain associated with a teacher's reported use of inappropriate discipline strategies, even when controlling for the other subscale. Thus, teachers negative attributions may account for this association more generally rather than *Causal* or *Responsibility* attributions differentially. This is concurrent with previous findings that a teacher's negative, behavior attributions are associated with his/her reported choice of discipline practices in the classroom (Andreou & Rapti, 2010; Bibou-Nakou et al., 2000). It also aligns with literature that demonstrates that negative parent attributions are correlated with the use of harsh, or inappropriate, disciplinary practices (e.g., Bugental & Johnston, 2000). This finding suggests that when a teacher holds negative attributions for disruptive behavior (both negative *Causal* and *Responsibility*), the teacher reports

responding to misbehavior in a more negative, inappropriate manner. Parenting literature would suggest that this would imply that a teacher with negative attributions would respond to misbehavior in a more negative, punitive manner as well. However, further testing must be conducted in order to determine this.

We found mixed support for the link between observed teacher classroom practices and teacher attributions. The quality of teachers' independently observed classroom practices was not associated with teachers' reports of their *Responsibility* attributions as hypothesized. However, as expected, the quality of teachers' emotionally supportive practices in the classroom was negatively linked with their report of *Causal* attributions. Specifically, teachers who believed a child's behavior to be stable, internal to the child, and to occur across contexts also tended to interact in ways that were less sensitive and responsive to children's needs in the classroom. This may be due, in part, to teachers providing less support to children whose behavior they perceive as an enduring and pervasive part of that child's experience in the classroom. This finding is similar to parenting studies which demonstrate that parents with more negative behavior attributions are more likely to demonstrate insensitive behaviors, such as displaying anger (Black, Heyman, & Slep, 2001; Coplan et al., 2002).

This negative link between a teacher's *Causal* attributions and emotionally supportive practices may suggest something about the way in which a teacher's attributions are associated with the level of emotional support she provides for all children in the classroom. Our measurement of the quality of a teacher's interactions was assessed at the classroom level and consequently weighed a teacher's interactions with all children. This measure did not specifically look at a teacher's interactions with the

selected children with disruptive behavior. It is possible that teachers may be differentially supportive to certain children based upon their attributions of that child's behavior. Or a child with disruptive behavior may seek a great deal of emotional support from the teacher, allowing for a lower level of emotional support for the average child in the classroom, consequently leading to a lower emotional support score.

Based on the literature regarding the negative, conflictual relationships between a teacher and children with disruptive behavior, we expected that the quality of the teacher-child relationship would be significantly associated with both negative *Causal* and *Responsibility* attributions. We found that only *Causal* attributions were significantly associated with teacher-child closeness in the expected direction. This finding is consistent with the parenting literature, which shows that negative attributions are significantly associated with more dysfunctional relationship patterns (Black, Heyman, & Slep, 2001; Coplan et al., 2002). Contrary to our expectations, *Responsibility* attributions were not significantly related to either closeness or conflict within the teacher-child relationship, which was unexpected given prior research supporting the link between negative attributions and dysfunctional relationship patterns (e.g., Black, Heyman, & Slep, 2001) and research demonstrating that *Responsibility* attributions served as a moderator between a teacher's behavioral appraisals and her reported closeness with a child (Thijs & Koomen, 2009).

Another surprising finding was that *Causal* attributions were significantly associated with *less* observed conflict but not with a teacher's behavior ratings, while there was not a significant link for either teacher-report or observed behavior with *Responsibility* attributions. The missing link between a teacher's behavior rating and

either *Causal* or *Responsibility* attributions was unexpected given the support in the parenting literature for a link between negative attributions and higher reported disruptive behavior (e.g., Johnston & Freeman, 1997). It is possible that this finding may be related to the previous unexpected finding, that more negative *Causal* attributions were related to a teacher's report of lower closeness in her relationship with a child. If a teacher is reporting a significantly lower amount of closeness with a child, the teacher and child may be interacting with each other less in general – both in positive and negative ways.

Measuring the two subscales separately. Interestingly, a comparison of the bivariate and partial correlations provides support for the validity and importance of measuring *Causal* and *Responsibility* attributions separately. Although the subscale scores were moderately correlated with each other, the subscale scores differentially linked to certain aspects of teacher beliefs, teacher practice, the teacher-child relationship, and children's behavior problems. These unique links may help us to better target aspects of teacher attributions for professional development. For example, a professional development tool that has the goal of improving a teacher's emotional support may also want to include elements that address a teacher's *Causal* attributions. Or a professional development tool that has the goal of addressing a teacher's authoritarian beliefs may also want to examine a teacher's *Responsibility* attributions.

Limitations

The results of this study add to the literature on teacher attributions by providing a reliable and valid measure for assessing an early childhood teacher's attributions for child disruptive behavior. However, there are several limitations of the current study that must be acknowledged. Since this is a correlational study, we cannot make causal claims. Due

to the fact that all measures were collected concurrently, we also cannot make predictive claims about the directionality of a teacher's attributions with regard to future practices or beliefs. Another limitation of being collected at baseline is that all measures are assessed at the beginning of a school year, which may be prior to the teacher and child developing a familiar relationship or before a teacher has had an adequate chance to assess the child's behavior across settings. With regard to the PTA measure itself, we assessed a teacher's attributions of disruptive behaviors using teacher self-report, thus a teacher may have provided more positive attributions in order to increase desirability. The meaningful variability in responses, though, suggests that teachers are providing responses across the range, including those, which endorse more negative attributions. Additionally, a teacher may not have been able to fully reflect upon the internal process of her attributions. However, we attempted to elicit this internal process in the use of vignettes that teachers personalized by thinking of a time when misbehavior occurred in their classroom.

Future Directions

This study sets the stage for future research in the area of teachers' attributions of children's disruptive behavior. Specifically, replication of the present study would provide important confirmation of the reliability and validity of the PTA as a measure of an early childhood teachers' attributions. Further, future work could explore if early childhood teachers' attributions are different or similar across types of classrooms, teacher or children's ethnicities and cultures, or with different levels of teacher experience. Additional studies of teachers' behavior attributions of children across different age groups may provide important information for how teachers understand

behavior in the context of age and development. The correlations between attributions and emotional support, teacher beliefs, and teacher-reported practices provide evidence for the importance of collecting data about a teacher's attributions in studies that explore teacher beliefs, practices, or the teacher-child relationship.

Conclusion

The purpose of this study was to add to the literature regarding the importance of and ability to measure an early childhood teachers' attributions for child disruptive behavior. Findings demonstrated initial reliability of the measure with good fit for a two-factor structure, similar to parent attributions, and solid internal consistency of each factor. Validity results suggest that the PTA measure assesses an important aspect of a teacher's internal beliefs, his/her attributions for disruptive behavior. The bivariate and partial correlations provide additional evidence for the validity of each attribution subscale, as well as the importance of including both *Causal* and *Responsibility* attributions when assessing a teacher's attributions. This study provides preliminary evidence that the way an early childhood teacher understands the source and rationale for child disruptive behavior may, in part, contribute to how the teacher responds to the behavior and the child. With replication, this finding may provide valuable evidence for the inclusion of a teacher's behavior attributions in interventions that target a teacher's beliefs, practices, and relationships with children.

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Table 1

Descriptive Statistics of the Sample

Classroom Demographics	Valid %			
Type				
% Public agency	14.1			
% Non-profit agency	38.3			
% Profit agency	7.4			
% Head Start	24.8			
Teacher Demographics	**Mean**	**Std Dev**	**Minimum**	**Maximum**
Age (in years)	42.763	11.731	22	69
Years pre-K experience	9.217	7.679	0	38
	Valid %			
Gender				
% Female	96.1%			
Ethnicity				
% Caucasian	49.4%			
% African-American	34.7%			
% Asian	0.6%			
% Native American	0.6%			
% Hispanic	1.2%			
% Multiracial	2.4%			
% Other	1.2%			
Education				
% HS diploma	0.6%			
% Some college, no degree	12.4%			
% HS diploma + training	3.5%			
% 2-year degree	13.5%			
% Bachelor's degree	47.6%			
% Master's degree	12.4%			
Child Demographics				
Age (in years)	4.1			
Income-to-Needs Ratio	1.898	1.534	.20	6.15
	Valid %			
Gender	65.4%			
% male				
Ethnicity				
% Caucasian	37.6%			
% African-American	41.9%			
% Asian	1.7%			
% Native American	0.4%			
% Hispanic	7.8%			
% Multiracial	10.0%			
% Other	0.4%			

Table 2

Descriptive Statistics of Attribution Dimensions (means for each scenario and overall mean)

Dimension	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Overall Mean
Purposefulness	4.06	3.88	3.64	4.15	4.26	3.97
Globality	4.59	4.24	4.27	4.42	4.24	4.37
Stability	2.79	2.82	3.04	3.09	2.81	2.90
Motivation	2.88	3.38	3.22	3.35	3.54	3.26
Internal-External Locus	4.18	4.21	3.88	4.25	4.38	4.18
Blame	2.89	3.90	2.12	2.78	3.70	3.08
Negative Intent	1.95	1.50	1.60	2.11	2.21	1.83
Controllability	4.26	3.90	3.96	4.20	4.09	4.07

Note. [*]Final Analysis included the PTA measure without the *Controllability* scale and without behavior scenario 2.[**]Scale loadings are standardized model results.

Table 3

Confirmatory Factor Analyses of the Preschool Teaching Attributions Measure

Initial Analysis	One Factor	Two Factor
RMSEA	0.135	0.123
CFI	0.783	0.828
TLI	0.696	0.746
SRMR	0.079	0.067
Final Analysis*	One Factor	Two Factor
RMSEA	0.093	0.073
CFI	0.879	0.931
TLI	0.819	0.889
SRMR	0.062	0.050
Scale Loadings**		
ATTRIBUTIONS – One Factor		
Purposefulness	0.690	
Globality	0.540	
Stability	0.553	
Motivation	0.730	
Internal-External Locus	0.578	
Blame	0.462	
Negative Intent	0.432	
Two Factor		
CAUSAL		
Globality	0.639	
Stability	0.622	
Internal/External Locus	0.652	
RESPONSIBILITY		
Purposefulness	0.729	
Motivation	0.771	
Blame	0.462	
Negative Intent	0.438	
CAUS with RESPONSIBILITY	*r* = .742	

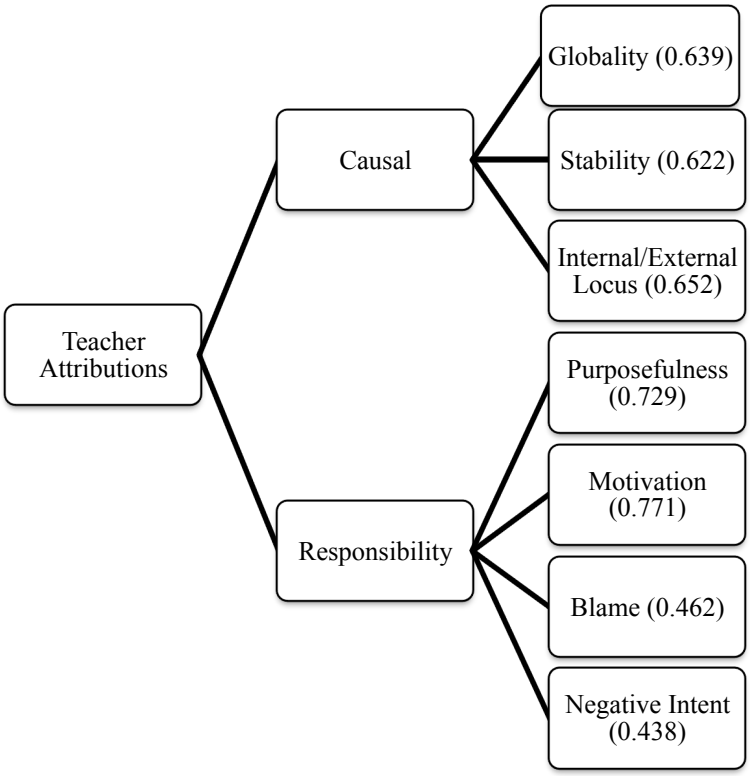

Figure 1. Visual representation of final confirmatory factor analysis results for the *Preschool Teacher Attributions* measure.

Table 4

Bivariate and Partial Correlations for PTA Factors and Related Measures

Related Measure	Causal Bivariate	Causal Partial	Resp Bivariate	Resp Partial
Teacher Beliefs (Modernity Scale)	0.078	-0.046	0.233**	0.224**
Teacher Efficacy (Teacher Self Efficacy Scale)	-0.169	-0.095	-0.156	-0.101
Teacher Strategies (Inappropriate)	0.195*	0.100	0.222**	0.146
Classroom Quality – Emotional Support (CLASS-ES domain)	-.213*	-0.276**	0.050	0.186
Classroom Quality – Classroom Organization (CLASS-CO domain)	-0.095	-0.108	-0.003	0.052
Classroom Quality – Instructional Support (CLASS-IS domain)	-0.083	-0.124	0.048	0.104
Behavior Ratings (SESBI-R)	0.113	0.091	0.069	0.014
Observed Conflict (inCLASS-Conflict composite)	-0.17*	-0.154	-0.075	0.012
Teacher-Child Closeness (STRS)	-0.216*	-0.229**	-0.036	0.086
Teacher-Child Conflict (STRS)	0.089	0.119	-0.027	-0.083

Notes. *$p \leq .05$ **$p < .01$

CLASS: Classroom Assessment Scoring System; SESBI-R: Sutter-Eyberg Student Behavior Inventory-Revised; inCLASS: Individualized Classroom Assessment Scoring System; STRS: Student Teacher Relationship Scale

Appendix 1

Preparatory Questions

	Question
	The age and sex of the child _____ What happened _____ What you did _____ And why you think the child didn't do what you asked _____

Behavior Scenarios

Type of Misbehavior	Scenario
Noncompliance to teacher requests	Think about a time recently when a child in your classroom didn't do something you wanted done (such as picking up toys at the end of an activity, staying in line during hand washing, etc.), even after you asked several times.
Aggression towards peers	Think about a time recently when a child in your classroom hit, pushed, yelled at, or otherwise behaved aggressively with another child.
Aggression towards teacher	Think of a time recently when a child in your classroom was disrespectful of you (talked back to you, lashed out physically as if to hit or kick you, etc.).
Interruption	Think about a time recently when a child in your classroom interrupted you and demanded your attention when you were busy with something else (talking on the phone, speaking with another child's parent, working on a project with other children, etc.).
Noncompliance with routine	Think of a time recently when a child in your classroom refused to go along with a daily routine (settling down to eat lunch, getting ready to go outside, lying quietly at rest time, etc.).

Sample Items for Scenario 1

Dimension	Item
Purposefulness	The child didn't do what I asked on purpose rather than unintentionally
Globality	The reason the child didn't do what I asked is something that comes up often with this child
Stability	The reason the child didn't do what I asked is not likely to change
Motivation	The child didn't do what I asked because he or she is motivated by selfish rather than unselfish concerns
Internal/External Locus	The child's behavior (in not doing what I asked) is due to something about him or her (for example, the mood he or she was in, his or her personality)
Blame	The child deserved to be disciplined for not doing what I asked
Negative Intent	The child didn't do what I asked mainly just to annoy me
Controllability	The child was able to control whether or not he or she didn't do what I asked

Using a Standardized Task to Assess the Quality of Teacher-Child Dyadic Interactions in Preschool

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Abstract

Research Findings

This study explored the quality of teacher-child interactions within the context of a newly developed standardized task, *Teacher Child-Structured Play Task (TC-SPT)*. A sample of 146 teachers and 349 children participated. Children that displayed the highest disruptive behaviors within each classroom were selected to participate. Teacher-child dyads (n=349) participated in a play session that included a free-play and clean-up. We adapted two coding schemes to assess the quality of teachers' interactive behaviors and children's interactive behaviors. Both coding schemes exhibited internal and inter-rater reliability. Significant bivariate correlations with classroom-observed teacher-child interactions and children's observed engagement provide support for the measure's construct and discriminant validity. Findings from this study suggest that it is feasible to administer a standardized structured play task within the classroom environment, that teachers' and children's interactive behaviors during a structured task can be reliably coded, and that these coded behaviors may provide important information about the dyadic nature of teacher-child interactions within a standardized context.

Practice and Policy

Examining teacher-child interactions by holding the context consistent across dyads will allow researchers to better understand the child and teacher factors that influence the quality of those interactions. Thus, use of this task in future field-based research may help to assess the impact of early interventions and professional development efforts that target improvement in the quality of teacher-child interactions.

Keywords: preschool, early childhood, teacher-child interactions

Using a Standardized Task to Assess the Quality of Teacher-Child Dyadic Interactions in Preschool

Clear and consistent evidence from experimental and well-controlled quasi-experimental studies supports high-quality teacher-child interactions as being critically important for a young child's development (e.g., Mashburn et al. 2008; Sabol & Pianta, 2012). Teachers' sensitive and responsive interactions foster children's social-emotional, behavioral, cognitive, and academic skills, especially for children who are most at risk for negative outcomes (e.g., Hamre & Pianta, 2001; Pianta, Stuhlman, & Hamre, 2002).

The quality of teacher-child interactions is dependent upon aspects of the teacher (e.g., training, education, psychological functioning; Hamre & Pianta, 2004; Yoon, 2002), the child (e.g., demographic characteristics and interpersonal styles; Blair, 2003; Birch & Ladd, 1997; Howes, 2000; Rudasill, 2011; Saft & Pianta, 2001; Van Acker, Grant, & Henry, 1996), and features of the context (e.g., activity settings, types of activities, time of day; Cabell, DeCoster, LoCasale-Crouch, Hamre, & Pianta, 2013; Downer, Booren, Lima, Luckner, & Pianta, 2010; Vitiello, Booren, Downer, & Williford, 2012). Multiple tools have been designed to assess the global quality of teacher-child interactions (e.g., the *Classroom Assessment Scoring System (CLASS)*: Pianta, La Paro, & Hamre, 2008; *Early Childhood Environment Rating Scale-Revised (ECERS-R):* Harms, Clifford, & Cryer, 1998), as well as tools that focus on a specific child's interactions with his/her teacher in the classroom (e.g., *Individualized Classroom Assessment Scoring*

System (inCLASS): Downer et al., 2011; *Dyadic Teacher-Child Interaction Coding System (DTICS)*, McIntosh, Rizza, & Bliss, 2000). Although these tools have been found to reliably and validly assess teachers' and children's interactions within the classroom context, it is difficult to disentangle how context - for example, the activities the teacher provides for children to engage in - influences the quality of these interactions. Studying interactions using a standardized task allows for the isolation of contextual variables known to affect the quality of interactions, which would enable researchers to more confidently determine that the differences found across teacher-child dyads are due to interaction quality. In this study, we describe the development of a standardized teacher-child interaction task and corresponding coding schemes of teachers' interactive behaviors and children's interactive behaviors. This task has been adapted from a laboratory-based, mother-child interaction scheme in order to better understand how the quality of interactions differs across teachers and children while keeping contextual variables constant.

Theoretical Perspectives on Teacher-Child Interactions

Teachers' interactions with children, particularly in early childhood, have a significant influence on children's behavioral and social outcomes (Roorda, Koomen, Split, & Oort, 2011). Much of the research on teacher-child interactions is based in attachment theory, which holds that a child's secure relationship with an adult promotes active exploration, positive affect, and socially competent interactions with others (Davis, 2003; Mashburn et al., 2008; Sabol & Pianta, 2012). Research on children's attachment suggests that at an early age, children begin to develop internal working models of the social world based on the quality of their relationship with a primary caregiver (Bowlby,

1982; Main, Kaplan, & Cassidy, 1985; Verschueren & Koomen, 2012). Children who are securely attached to their caregivers are more sociable and positively oriented (Pastor, 1981; Stupica, Sherman, & Cassidy, 2011), show better ability to form friendships, and are more agreeable (Brown, Mangelsdorf, Neff, Schoppe-Sullivan, & Frosch, 2009; Verschueren, Marcoen, & Schoefs, 1996). Studies indicate that parent-child attachment is critical to children's school adjustment. Additionally, once children enter school, adult caregivers other than parents can function as attachment figures (Verschueren & Koomen, 2012) and impact children's school functioning (Baker, 2006; Birch & Ladd, 1997; Hamre & Pianta, 2001). During early childhood especially, teachers are theorized to serve a regulatory function with regard to children's development. This is supported by research showing that teacher-child relationships characterized by higher closeness and lower conflict and dependency, as reported by the teacher, are linked with children's greater emotion regulation and social and behavioral competence (e.g., Bergin & Bergin, 2009; Stuhlman & Pianta, 2001). Thus, it is theoretically and practically important to have valid and reliable ways of measuring teacher-child interactions.

Existing Measures of Teacher-Child Interactions

Many classroom-level measures of teacher-child interactions have been developed and used to assess the quality of teacher-child interactions (Halle, Whittaker, & Anderson, 2010; Harms & Clifford, 1998; Pianta et al., 2008). The most widely used currently is the *Classroom Assessment Scoring System* (Pianta et al., 2008) designed to be used by an objective observer to assess classrooms on three domains of teacher-child interactions: Emotional Support, Classroom Organization, and Instructional Support. The quality of teacher-child interactions, as assessed by the CLASS, has been found to be

associated with children's academic, social, and self-regulatory skills (Gosse, McGinty, Mashburn, Hoffman, & Pianta, 2014; Hamre et al., 2014; Mashburn et al., 2008). However, assessing the quality of children's early education experience at the classroom level does not account for the fact that children *within* the same preschool classroom have different experiences and engage with learning opportunities in different ways (Bulotsky-Shearer, Fantuzzo, & McDermott, 2008; Hamre & Pianta, 2001).

Several measures have been developed to assess individual children's behavior in the classroom (e.g., Downer et al., 2010; Jacobs et al., 2000; Ritchie, Howes, Kraft-Sayre, & Weiser, 2002). Most are designed to capture either specific elements of children's disruptive behaviors or overall classroom experiences. For example, the *Revised Edition of the School Observation Coding System* (REDSOCS; Jacobs et al., 2000) uses partial interval time sampling during structured learning time to assess a child's noncompliance, off-task behavior, and inappropriate behavior. The *Snapshot* also uses time sampling to capture a child's level and amount of interaction with adults, level of engagement in tasks, and the type of task (Ritchie et al., 2002). The *Individualized Classroom Assessment Scoring System* (inCLASS; Downer et al., 2011) is an observational, time sample assessment conceptually aligned with the CLASS observation that was developed to assess an individual child's interactions within the classroom environment. Coders observe each child for multiple 10-minute cycles and code their interactions with teachers, peers, and tasks across a typical morning.

All three of these child-level measures show evidence of reliability and validity (Downer et al., 2010; Jacobs et al., 2000; Ritchie et al., 2002; Williford et al., 2013). Notably, they capture children's experiences of the classroom naturalistically and

therefore provide a meaningful picture of children's daily experiences. However, since they are collected during typical classroom activities, scores are partially dependent upon what is taking place in the classroom at the time of the observation. Individual children may experience the classroom context differently, and, in fact, be provided with and/or elicit different experiences within the classroom setting (Booren et al., 2012; Vitiello et al., 2012). Although all of these classroom and child observations assessed teachers' and children's interactions within the classroom context, it is impossible to isolate the qualities of what the teacher and child bring to the interaction, or to compare interactions across children, because of their dependence on the changing nature of the classroom context. The use of a standardized interaction task would allow for the better understanding of how quality differs across teachers and children.

Studying Interactions Using Standardized Tasks

A long-standing history exists for using standardized, lab-based tasks to study interactions between children and parents. Pianta and Egeland (1990) led a longitudinal study that examined the association between maternal stress and the quality of mother-child interactions in a structured play task. Maternal behavior was rated using a 7-point scale called the *Teaching Task Rating Scale* (TTRS) (Egeland & Heister, 1993). This scale included a number of dimensions to measure maternal behaviors, such as supportive presence and respect for autonomy, as well as several dimensions to assess child behaviors, like persistence and enthusiasm. Many other studies have used an adaptation of the TTRS to study mother-child interactions in the lab setting (e.g., Carlson, Egeland, & Sroufe, 2009; Dallaire & Weinraub, 2005; Kochanska & Aksan, 1995; Larkina & Bauer, 2010). These studies have found that the quality of maternal-child interactions

was associated with the quality of children's memory skills, behavioral compliance, and future mental health (e.g., separation anxiety).

Thus, the purpose of the present study is to describe the development of a standardized task and associated coding schemes that were used to measure the quality of teachers' and children's interactive behaviors. We adapted the structure of the task from a widely-used play task in the mother-child literature and then applied codes used with the *Teaching Task Rating Scale* (Pianta & Egeland, 1990) with adaptations to make the codes appropriate for teachers, as compared to mothers. This new task, the *Teacher Child-Structured Play Task* (TC-SPT) and associated coding schemes, were designed to assess the quality of teachers' and children's interactive behaviors in a teacher-child dyad using a standardized, structured play task with two parts: a 7-minute play session followed by a 3-minute clean-up session.

We first present descriptive information about the process by which we developed the TC-SPT and introduced a traditional lab-based task into a classroom setting. Then, we describe psychometric properties of the teacher interactive and child interactive behavior coding schemes, including reliability and validity. Finally, we demonstrate whether teacher and child interactive behaviors vary across the two parts of the structured play task.

Method

Participants

Data for the present study were collected within a larger study examining the impacts of an intervention designed to improve the quality of teacher-child relationships for children at risk for developing disruptive behavior problems. The impact of the

intervention was not of interest in the current study but was controlled for in the analysis. A full description of the intervention and its results are described elsewhere (Williford et al., 2015).

The sample for the present study included 146 early childhood teachers and 349 children, with approximately 2 to 3 children nested within each teacher's classroom (*M*=2.6 children per teacher). Teachers worked within a variety of early childhood programs: state-funded pre-K (14.1%), private (45.7%), Head Start (24.8%), other (15.4%). Teachers were mostly female (96.1%) and on average 43 years old (range 22-69). Teachers were primarily Caucasian (49.4%) or African American (34.7%). Nearly half of teachers had a bachelor's degree (47.6%) with the majority of the remaining having a master's (12.4%), 2-year degree (13.5%), or some college but no degree (12.4%). Teachers had a considerable range of experience, from 0-38 years (*M*=9.23 years).

Three hundred and forty-nine preschool children participated (*M*=4.1 years; 65% male). From each classroom, 2 males and 1 female were selected, in order to maintain a gender distribution in a sample of children with disruptive behavior. Children's race/ethnicity was as follows: 37.6% Caucasian, 41.9% African American, 7.8% Hispanic, 10.0% Multi-racial, and 2.5% other. Children and their families came from a range of socio-economic backgrounds but were primarily from low-income households as measured by the family income-to-needs ratio (*M*=1.90, SD=1.53).

Procedures

Preschool centers were recruited from three geographical sites (all urban or semi-urban) within two mid-Atlantic states. After permission was obtained from the director

of each center, lead teachers in preschool classrooms serving predominantly 3-4 year olds were invited to participate in the study. Teachers who consented to participate assisted with the parental consent process and completed a personal and classroom demographic survey. All parents received a letter that explained the study, an informed consent form, and a short demographic survey. The majority of parents (76%) consented to have their child participate in the study. Six weeks into the school year, teachers rated all children in their classroom on two disruptive behavior-rating scales (ADHD Rating Scale-IV, DuPaul, Power, Anastopoulos, & Reid, 1998; ODD Rating Scale, Hommersen, Murray, Ohan, & Johnston, 2006). The two boys and one girl who had the highest teacher ratings of disruptive behavior (ADHD and ODD combined) *and* who also had caregiver consent participated in the remainder of the study.

For the intervention trial, teachers were randomly assigned to one of three conditions: intervention, time-control, and business as usual. The intervention, *Banking Time*, involved teachers spending one-on-one time with selected children using intervention-specific techniques. For the time-control condition, teachers spent an equivalent amount of time with selected children but were not instructed how to use the time. Children were randomly assigned into one of three intervention and assessment windows during the year (although children in business-as-usual classrooms did not receive intervention, they were assigned to a window for assessment purposes). Data were collected at four points during the year: (1) baseline/before Window 1 (2) between Window 1 and Window 2, (3) between Window 2 and Window 3; and (4) end-of-year/after Window 3. A child's post-intervention assessment was conducted at the end of his or her intervention window.

The data used in the current study were collected at baseline and post-intervention window. Teacher and child demographic data were collected at baseline. After each assessment window, each teacher completed a survey that assessed their perceptions of relationship quality with the selected child, as well as the child's level of disruptive behavior. At both time points, observations of teacher-child interactions in the classroom were conducted, and at post-window, teachers and the selected children for that window completed the *Teacher Child-Structured Play Task,* which was videotaped for later coding.

Observation training. All data collectors attended two-day, intensive training sessions for each of the two observational measures (one child-level measure of children's engagement [inCLASS; Downer et al., 2011] and one classroom-level measure of teacher-child interactions [CLASS; Pianta et al., 2008]; see measures section for a description of these observation tools). Trainings included a detailed review of all content/dimensions, as well as watching, coding, and discussing five training clips. At the end of training, data collectors were required to code five reliability clips independently and score within one point of a master code on 80% of the dimensions in order to be certified as reliable to conduct observations. If data collectors did not meet this standard of reliability, they received individual consultation and then repeated reliability with new clips prior to live data collection. Raters that did not achieve 80% reliability did not conduct observations for the current study. Finally, data collectors were required to complete a "live" coding session in a preschool classroom with a master trainer, using both observation measures. Data collectors maintained reliability via weekly calibration meetings where they were required to independently watch and code

CLASS and inCLASS reliability clips and discuss (via group conference call) how their scores compared with master codes.

Observation protocol. Observations were scheduled prior to and after each of the three windows. During this time, teachers and children were observed in the classroom setting. Each observation day lasted 3-4 hours from the start of the day until lunch-time and occurred over multiple days. Data collectors observed the selected children in a series of alternating cycles starting at the beginning of the school day; each cycle consisted of observing a child for ten minutes and then coding the observation for five minutes. Data collectors shifted their observation across the selected children (i.e., they observed child 1, child 2, child 3, classroom/teacher and began again with child 1; on the next day children were observed in a different repeating order, such as teacher, child 2, child 3, then child 1), with the goal of collecting at least eight cycles per child and four cycles for each classroom/teacher. At each window, the child participants in the current study were observed for approximately 8 cycles (M=8.40, SD=1.54) and teachers were observed for approximately 5 cycles (M = 4.88, SD = 1.78) across three days (M=2.68, SD=0.81).

Interaction task training. Data collectors received a training manual to review prior to training. Data collectors then attended a half-day training on the administration of the *Teacher Child-Structured Play Task*, which included watching a previously recorded administration of the task (created by one of the task developers). After training, data collectors video-recorded their administration of the interaction task with a preschool teacher and child, which were then evaluated by the trainer. After each interaction task was completed, data collectors self-reported their fidelity to the

procedures via a checklist. In addition, a portion of each data collector's interaction tasks were reviewed for fidelity of administration during each window and feedback was given to data collectors if they needed to improve their administration of the task or the quality of their video recordings.

Interaction task protocol. At the end of each window, the child selected for that window and his or her teacher engaged in a structured interaction task in a quiet place within the school (e.g. an empty classroom, an office) that was administered by the data collector and video-recorded for later coding (see Measures section for additional information).

Measures

Standardized teacher-child interactions at the teacher-child dyad level. The *Teacher Child-Structured Play Task* (TC-SPT) task was adapted from the mother-child interaction task developed by Egeland and Hiester (1993). The play task consisted of two parts: free-play using specific toys (7 minutes) and clean-up (3 minutes). First, the teacher and child were instructed by a trained data collector to play together with a specific set of toys (Tinkertoys™ and Lincoln Logs™) that the data collector emptied from a bin and spread out on the floor. The data collector said "Here are some toys on the floor for you both to play with. Please play with these toys however you would like." Teachers and children were given seven minutes to play with the toys. At this time, the data collector initiated the clean-up portion of the task by saying, "OK [Child's name], now it's time to clean-up. Please sort these toys into the right containers. Place all of the Tinkertoys in this container and all of the Lincoln logs in this container. I'll be back in a few minutes to collect everything." Children and teachers were given three minutes for

clean-up. The clean-up portion was included as a task that might induce stress upon the dyad, similar to situations in the classroom in which teacher-child conflict may occur (e.g., child given a directive with which he/she may not want to comply).

The coding schemes measured the quality of teacher interactive behaviors and child interactive behaviors. Teacher interactive behaviors were rated across eight dimensions using a 5-point scale: *sensitive and responsive presence, positive affect, teacher confidence, teacher encourages stimulating environment, teacher directiveness, teacher support for child autonomy, teacher negativity,* and *affective mutuality/felt security*. Child interactive behaviors were rated across eleven dimensions using a 5-point scale: *child enthusiasm, experience of the session, affection towards teacher, reliance on teacher for help, persistence, compliance, child negativity towards teacher, avoidance, child's negative emotions, behavior control,* and *affective mutuality/felt security*. See Table 1 for a description of each dimension.

Four teams of undergraduate coders (two teacher interactive behavior teams and two child interactive behavior teams) that were blind to study condition and were never field-based data collectors for this project (and so did not conduct classroom observations or video record the play tasks) were trained on the TC-SPT teacher interactive behavior or child interactive behavior codes. Training consisted of two full days of discussing the coding manual and watching examples that exemplified different codes. Training also included practice coding and comparing codes to master codes. Master codes were derived from independent coding and a follow-up discussion of at least two of the following individuals: the project coordinator, first author, second author, and/or third author. In addition, coders recorded the start and stop times of the free-play and clean-up

tasks (which were used to calculate task time), whether or not the data collector read the script verbatim (yes or no), and the quality of the video footage (easily codable, fair, not codable). During the time they were actively coding videos, coders attended an hour-long calibration meeting each week held by the second author in order to maintain reliability. At this meeting all coders and a master coder rated the same video and met to discuss the master codes. For teacher behaviors, all free-play videos were double-coded, and 20% of clean-up videos were double-coded. For child behaviors, all free-play and clean-up videos were double-coded. Inter-reliability is included in the results section.

Children's observed interactions in the classroom. The quality of children's observed interactions within the classroom context was assessed interactions using the *Individualized Classroom Assessment Scoring System* (inCLASS*;* Downer et al., 2010)**,** at the end of each assessment window. The inCLASS is an observational instrument that measures young children's competence during daily interactions with teachers, peers, and tasks in the preschool environment. For each observation, ten dimension scores were obtained: *positive engagement with the teacher, teacher conflict, teacher communication, peer sociability, peer conflict, peer assertiveness, peer communication, engagement within tasks, self-reliance,* and *behavior control*. Each dimension was rated by coders on a 7-point scale; coders were guided in their ratings by detailed descriptors of behaviors that demonstrate low, medium, and high quality. Dimensions were grouped into four domains of child interactions: positive engagement with teachers (*positive engagement* and *communication with teachers*), positive engagement with peers (*sociability, assertiveness*, and *communication with peers*), positive engagement with tasks (*engagement and self-reliance with tasks*), and negative classroom engagement (*conflict*

with teachers and peers, behavior control) (Downer et al., 2010; Bohlmann et al., 2012). For this study, we used three out of the four domains: positive engagement with teachers, positive engagement with tasks, and negative classroom engagement. Inter-rater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same child. Intra-class correlations (ICCs) were as follows: positive engagement with teacher = .80, positive engagement with tasks = .71, negative classroom engagement = .75. Additionally, internal consistency was solid (positive engagement with teachers = .82, positive engagement with tasks = .80, and negative classroom engagement = .86. The inCLASS has been found to have construct validity, criterion-related validity (Downer et al., 2010), and predictive validity, with children's observed engagement predicting school readiness outcomes in language and literacy skills and self-regulation (Maier, Downer, Vitiello, & Booren, 2012; Williford et al., 2013).

Teachers' observed interactions with children at the classroom-level. Observations of classroom-level teacher-child interactions for the current study were collected using the *Classroom Assessment Scoring System* (CLASS; Pianta et al., 2008), at the end of each assessment window. The CLASS is an observational instrument that measures classroom quality across ten dimensions using a 7-point scale: *positive climate, negative climate, teacher sensitivity, regard for student perspectives, behavior management, productivity, concept development, instructional learning formats, quality of feedback,* and *language modeling*. Previous factor analyses demonstrated that data support three domains of classroom quality – emotional support (α=.89), classroom organization (α=.79), and instructional support (α=.82) (Hamre, Pianta, Mashburn, &

Downer, 2007). Multiple studies demonstrate this measure's validity (e.g., Mashburn et al., 2008). In the current study, the CLASS demonstrated excellent internal consistency with Cronbach's alphas of .89 for emotional support, .84 for classroom organization, and .87 for instructional support. Inter-rater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same classroom. Intra-class correlations (ICCs) were .82 for Emotional Support, .76 for Classroom Organization, and .73 for Instructional Support.

Teachers' perceptions of their relationships with children. The *Student-Teacher Relationship Scale* (STRS*; Pianta & Hamre, 2001*) is a widely used measure of a teacher's perception of the quality of her relationship with a specific child (Pianta & Hamre, 2001; Pianta, La Paro, Payne, Cox, & Bradley, 2002). For the current study, the 15-item, 5-point short form was used, which had good psychometric properties including a Cronbach's alpha coefficient of .83 for the *Closeness* subscale and .87 for *Conflict* subscale. In this measure, the teacher rated a series of 15 statements that relate to the level of conflict and closeness in her relationship with a specific child on a scale of 1 to 5 (5=definitely does apply). The authors have demonstrated strong evidence for the validity of this scale (Pianta & Hamre, 2001). A composite was created for each of the two subscales: *Conflict* and *Closeness* for each selected child. Then, a total aggregated score was created for each teacher to represent the level of *Conflict* and *Closeness* she perceived in her relationships with the three selected children in his/her classroom. This data was collected for each child after his/her assessment window.

Data Analytic Plan

Descriptive statistics for each coding scheme (teacher interactive behaviors and child interactive behaviors) of the TC-SPT were calculated, including means, standard deviations, and ranges, using SPSS Version 22. In order to ensure that dimension scores for each activity setting should remain distinct (as opposed to combining across free-play and clean-up), a paired samples *t*-test was conducted to determine if there were significant differences between the means for each dimension and composite across the two parts of the task, free-play and clean-up.

In order to assess the reliability of the TC-SPT teacher interactive behavior and child interactive behavior coding schemes, several statistical tests were used. For inter-rater reliability, intra-class correlations were conducted for the dimensions and composites. Additionally, in order to assess internal consistency, dimension codes were aggregated up to a composite level based on how codes have been aggregated in prior mother-child research, and the Cronbach's alpha coefficient was calculated.

In order to assess the validity of the TC-SPT's teacher interactive behavior and child interactive behavior coding schemes, bivariate Pearson's correlations were run to examine the associations between dimensions and the established subscales and theoretically-aligned measures, including teacher-child interactions at the classroom level, teacher-child interactions at the individual level within the classroom, and teacher-child relationship quality. Discriminant validity was assessed by comparing Pearson's correlations for the teacher interactive behavior and child interactive behavior coding schemes.

Results

Descriptive Statistics

With regard to general administration, the free-play task had a duration of about seven minutes (M = 7.69, SD = .83) and for clean-up, about three minutes (M = 3.32, SD = .79). Coders indicated that data collectors usually followed the script verbatim (97.5 % for free-play and 90.3% for clean-up) and that the quality of footage was generally good (92% of videos were easily coded and .7% were uncodable for free-play; 96% were easily coded and .1% was unable to be coded for clean-up). Descriptive statistics for each dimension and composite of the teacher interactive behavior and child interactive behavior coding schemes are presented in Table 2. For both the teacher and child interactive behavior scales, a subset of dimensions showed more restricted ranges during free-play than clean-up (*teacher support for child autonomy*, *teacher negativity*, *child's experience of the session*, *child negativity towards teacher*, *avoidance of the teacher*, *child's negative emotions*, *child active engagement*).

Teacher interactive behaviors. For the teacher interactive behavior dimensions, across both settings, the dimension with the lowest mean was *teacher negativity* (free-play: 1.04; clean-up: 1.33) and the dimension with the highest mean was *teacher confidence* (free-play: 4.01; clean-up: 3.88). *Teacher negativity* evidenced a very limited range during free-play (SD = .17, with 96% of codes receiving a score of "1" and 4% receiving a score of "2"), indicating little to no *teacher negativity*. A paired samples *t*-test demonstrated that, for the majority of dimensions, teachers' interactive behaviors were significantly different across the two settings, with the means for free-play generally being higher (see Table 2). Two dimensions were not significantly different across the activity settings: *teacher confidence* and *teacher directiveness*.

Child interactive behaviors. For the child interactive behavior dimensions, across both activity settings, the dimension with the lowest mean was *child's negative emotions* (free-play: 1.08; clean-up: 1.20). The dimension with the highest mean was *child compliance* (free-play: 4.71; clean-up: 4.29). Paired samples *t*-test showed that most of the dimensions were significantly different across the two activity settings, with the exception of *child's experience of the session*, *child affection toward teacher*, and *affective mutuality/felt security*. *Child enthusiasm*, *child reliance on the teacher for help*, and *compliance* were all higher during free-play compared to clean-up. In contrast, *child persistence*, *child negativity towards teacher*, *avoidance of the teacher*, *child's negative emotions*, and *behavior control* were all higher during clean-up compared to free-play.

Creation of Composite-Scale Reliability

Based on theoretical foundations and previous uses of a similar scale with maternal and child behaviors, we created two composites for each of the rating scales (e.g., Carlson, Egeland, & Sroufe, 2009; Dallaire and Weinraub, 2005; Kochanska & Aksan, 1995; Larkina & Bauer, 2010; Pianta & Egeland, 1990).

Teacher interactive behavior composites. For both free-play and clean-up, Composite one—Positive Teacher Interactions, included *sensitive and responsive presence, positive affect, teacher confidence, teacher encourages stimulating environment, teacher support for child autonomy*, and *affective mutuality*. The internal consistencies (Cronbach's alphas) for this composite were 0.91 during free-play and 0.90 during clean-up. The mean of this composite was significantly higher in free-play than in clean-up (M = 3.92 v. 3.44; t=11.589, p <0.001).

Composite two—Negative Teacher Interactions, was composed of only one dimension for free-play, *teacher directiveness* (because, as noted above, *teacher negativity* was rarely observed during free-play), and two dimensions for clean-up, *teacher negativity* and *teacher directiveness*. Higher codes for this composite indicated more negative behaviors. The internal consistency for Negative Teacher Interactions during clean-up was demonstrated by a bivariate correlation of 0.500. Negative Teacher Interactions was significantly lower in clean-up as compared to free-play (2.07 vs. 2.88; t=-2.78, p<0.01).

Child interactive behavior composites. The dimensions of the child interactive behaviors scale were aggregated into two composites. Composite One—Child Active Engagement, included dimensions that focused on the child's positive and adaptive behaviors (*child enthusiasm, child's reliance on teacher for help* (reverse scored), *child persistence, compliance, child's negative emotions* (reverse scored), and *behavior control*). The internal consistencies, as measured by Cronbach's alphas, were 0.73 for free-play and 0.85 for clean-up. This composite had similar means across the free-play and clean-up settings (4.03, 4.06; t=.667, p=.51), but there was more variability in clean-up (SD = 0.75, as compared to 0.47).

Composite two—Child Positive Interactions with Teacher, included dimensions that focused on the verbal and nonverbal exchanges between the teacher and child that occur during the segment (*child experience, child affection towards teacher, child negativity towards teacher* (reverse scored), *avoidance of the teacher* (reverse scored), and *affective mutuality/felt security*). Internal consistencies, as measured by Cronbach's alphas, were 0.87 for free-play and 0.72 for clean-up. Similar to the first composite, the

means for this subscale were similar across the free-play and clean-up settings (M = 3.77, 3.75, respectively; t=-.*707*, p=.48), but there was more variability in clean-up (SD=0.70 as compared to 0.51).

Inter-Rater Reliability

Intra-class correlations (ICC's) were run in SPSS Version 22 for all dimensions and composites for each activity setting using a two-way random model of absolute agreement (see Table 3). For the teacher interactive behavior dimensions, all videos were double coded for free-play but only 20% were double coded for cleanup (Teacher interactive behaviors for clean-up were coded first. Although the composite ICC's were acceptable, the individual dimension level ICC's were lower than desirable so we chose to subsequently double code 100% of tapes in order improve reliability). Thus, the single and average measure ICCs are reported for free-play and the single measure ICC is reported for clean-up. For free-play, inter-rater reliability was good (*Positive Teacher Interactions* = 0.85, *Negative Teacher Interactions* = 0.82), and for clean-up, the composite inter-rater reliability was good for *Positive Teacher Interactions* (0.80) and fair for the *Negative Teacher Interactions* (0.63).

With regard to the child interactive behaviors scale, 100% of videos were double coded, thus the average measure ICC was used to estimate reliability. For free-play, the inter-rater reliability coefficients for the two composites were good (*Child Active Engagement* = 0.78, *Child Positive Interactions with Teacher* = 0.78). For clean-up, the reliability statistics were very good (*Child Active Engagement* = 0.91, *Child Positive Interactions with Teacher* = 0.85).

Validity

Convergent validity. ***Teacher interactive behavior composites.*** Bivariate, Pearson correlations were conducted to examine the validity of the teacher and teacher interactive behavior composites across the two activity settings (see Tables 4 and 5 for bivariate correlations*).* *Positive Teacher Interactions* – free-play and clean-up – were moderately and positively associated with each other. *Positive Teacher Interactions* during free-play and clean-up were positively associated with the quality of observed classroom-level teacher-child interactions (CLASS domains), with the highest positive association being with CLASS Emotional Support, and with teachers' report of their relationship closeness (STRS). Additionally, *Positive Teacher Interactions* were positively related to children's observed individual positive teacher-child engagement (inCLASS Positive Engagement with Teachers) and with *Child's Positive Interactions with Teachers* for both free-play and clean. *Negative Teacher Interactions* during free-play and clean-up were positively correlated with each other. *Negative Teacher Interactions* during the clean-up were negatively associated with observed classroom-level teacher-child interactions, specifically teachers' Emotional Support and Classroom Organization. *Negative Teacher Interactions* during free-play, or *teacher directiveness*, was positively associated with teachers' self-reported relationship closeness and negatively associated with children's observed individual task engagement in the classroom (inCLASS Positive Task Engagement).

Child interactive behavior composites. The two composites, *Child Active Engagement* and *Child Positive Interactions with Teacher* were also positively associated with one another across free-play and clean-up. *Child Active Engagement* during free-play and clean-up were moderately and positively associated with one another. In both

the free-play and clean-up settings, *Child Active Engagement* was positively associated with children's observed individual task engagement in the classroom and negatively associated with children's observed individual negative classroom engagement (inCLASS Negative Classroom Engagement).

Child Positive Interactions with the Teacher during free-play and clean-up were strongly and positively associated with one another. *Child Positive Interactions with the Teacher* during free-play and clean-up were positively associated with children's classroom observed individual positive teacher-child engagement. Additionally, *Child Positive Interactions with Teacher* during free-play and clean-up was positively associated with the observed quality of classroom-level teacher-child interactions (CLASS Emotional Support, Classroom Organization, and Instructional Support) and teachers' perceptions of relationship closeness, while negatively associated with teachers' perceptions of relationship conflict.

Divergent validity. ***Teacher interactive behavior composites.*** For both free-play and clean-up, *Positive Teacher Interactions* and *Negative Teacher Interactions* were more strongly and positively associated with observed teacher-child interactions at the classroom level (CLASS) compared to their associations with children's observed individual engagement in the classroom (inCLASS). In addition, *Teacher Positive Interactions* for both free-play and clean-up correlated most strongly with the quality of teachers' Emotional Support, as compared to Classroom Organization and Instructional Support. *Teacher Negative Interactions* during clean-up was also negatively associated with observed classroom-level Emotional Support.

Child interactive behavior composites. *Child Active Engagement* during free-play and clean-up was not related to the quality of observed, classroom-level, teacher-child interactions. *Child Active Engagement* during free-play and clean-up was positively associated with children's observed individual positive task engagement in the classroom and negatively associated with children's observed individual negative classroom engagement. *Child Positive Interactions with Teacher* during free-play and clean-up were more positively associated with children's observed individual positive engagement with their teachers (inCLASS Positive Teacher Engagement) in the classroom as compared to observed teacher-child interactions at the classroom level (CLASS domains).

Discussion

Teachers' interactions and relationships with children in early childhood are critically important to their later development (Roorda, Koomen, Split, & Oort, 2011). Although measures exist that assess the global quality of classroom interactions (e.g., Pianta et al., 2008) and individual teacher-child interactions (e.g., Downer et al., 2010) within the classroom context, we know of no standardized measure of the quality of teacher-child interactions that assesses teacher and child interactive behaviors, while keeping contextual factors constant. The purpose of this study was to develop a standardized task and associated coding schemes to measure the quality of teachers' and children's interactive behaviors. Our aim was to borrow from laboratory-based, mother-child interaction research to develop a standardized task that measures the quality of teacher-child interactions and was also feasible to administer in an early childhood setting. Naturalistic observations of early childhood classrooms are useful to

understanding teachers and children's interactions (see Zaslow, Martinez-Beck, Tout, & Halle, 2011), because they occur within the context that teachers and children actually spend their time. However, we hoped to provide researchers with a complementary assessment procedure where the quality of teachers and children's interactive behaviors could be assessed while holding the environment more constant—in effect to be able to control for some of the variation, or "noise", that is present when examining individual differences using naturalistic observations (Booren et al., 2012; Vitiello et al., 2012), that do not typically control for the activities that are occurring.

To achieve this goal, we borrowed from a widely-used play task in the mother-child attachment-based literature and then applied and adapted codes previously used with mothers and children (*Teaching Task Rating Scale*; Pianta & Egeland, 1990). The resulting *Teacher Child-Structured Play Task* (TC-SPT) and coding system assessed the quality of both teachers' and children's interactive behaviors during a free-play and clean-up task. The results of this study provide evidence for the utility of the TC-SPT in early childhood educational research.

First, we found that it was feasible to take a structured, laboratory-based task and adapt it to be reliably implemented in a wide variety of preschool settings. We trained data collectors to administer the TC-SPT across three sites (two of which were remote). In almost all cases (96%), data collectors were able to find adequate, quiet space within the preschool to conduct and video record the play task, as evidenced by coders indicating that videos were able to be coded. In addition, coders indicated that data collectors were true to the procedures in terms of timing and use of the script. This means that data collectors can be trained to reliably administer this task, and that it is

feasible for teachers to spend at least 10 minutes in a quiet area with an individual child within the context of the preschool day.

Second, we found that the codes resulting from the TC-SPT were reliable. The composite scores (*Positive Teacher Interactive Behaviors, Negative Teacher Interactive Behaviors, Child Active Engagement, Child Positive Interactions with Teacher*) showed good scale reliability and coders showed good inter-rater reliability when the tasks were one hundred percent double-coded. In terms of future use, when using the composite scores, single coding the tasks appears to be acceptable (with composite single-coded ICC composites ranging from .64 to .82). However, reliability was increased substantially through 100% double coding. In addition, the reliability of at the individual dimension levels was only sufficient when tasks were double coded.

Third, we found that the teacher interaction and child interaction composite scores (*Positive Teacher Interactive Behaviors, Negative Teacher Interactive Behaviors, Child Active Engagement, Child Positive Interactions with Teacher*) evidenced both convergent and divergent concurrent validity. Looking at the within composite associations across free-play and clean-up (e.g., Positive Teacher Interactions during free-play with Positive Teacher Interactions during clean-up), we found that the teacher and child interaction composites were positively associated with one another with the strength of these associations ranging from modest (Negative Teacher Interactions) to strong (Child Positive Engagement with Teacher). The fact that both teachers' and children's behavior varied across tasks provides further evidence that features of the task affect the quality of teacher and child behavior (Cabell et al., 2013; Downer et al., 2010; Vitiello et al., 2012).

Teachers' positive interactive behaviors with individual children during free-play and clean-up were moderately and positively related to the quality of teachers' classroom-level interactions with children within the classroom and, to a lesser extent, with children's observed individual engagement with teachers in the classroom, indicating convergent validity. Divergent validity was demonstrated in that teachers' interactive behaviors had little to no associations with children's observed individual positive task engagement and observed individual negative engagement. Thus, the teacher interactive codes seem to measuring teacher behaviors that are distinct from children behaviors, within the context of dyadic interactions.

With regard to child interactive behaviors, we found that children's active engagement in free-play and clean-up was associated positively with their classroom observed individual positive task engagement and negatively with their observed individual negative classroom engagement. No other associations were significant. Thus, these codes appear to be assessing aspects of the child's approach to interacting with tasks rather than his or her approach to interacting with the teacher. In contrast, children's positive interactions with their teachers during free-play and clean-up were most highly correlated with children's observed individual positive engagement with teachers in the classroom, which demonstrates convergent validity. To a lesser extent, children's positive interactions during free-play and clean-up were associated with the quality of teachers' classroom-level interactions observed in the classroom.

Interestingly, both teachers' and children's interactive behaviors were associated with teachers' perceptions of the teacher-child relationship. Teachers' and children's positive interactive behaviors were positively associated with teachers' perceptions of

relationship closeness. The strength of these associations was modest but similar in terms of strength for both the teacher and the child interactive behaviors. This may suggest that teachers attend to both what they do with children but also how children respond back to them. This is consistent with Pianta's (1999) theory that teacher-child relationships are formed over time through interpreting how each person responds to moment-to-moment interactions. There were two other interesting findings related to associations with teachers' relationship perceptions. The first was that children's positive interactive behaviors with teachers (in free-play and clean-up) - but not teachers' negative interactive behaviors - were associated with teachers' perceptions of their relationship conflict. Thus, teachers tended to report more conflict with children when children interacted less positively with teachers during free-play and clean-up, but there was no link between what teachers did during these tasks and their perceptions of teacher-child conflict. This suggests that teachers may be attending more to child behavior than their own behavior when conceptualizing conflict. The second interesting finding was that teachers who were more directive during free-play tended to report greater feelings of closeness with children. Perhaps teachers who are more directive are receiving more positive feedback from children (children are complying with teacher's requests, answering questions, working with the teacher).

The associations supporting convergent validity between teachers' and children's interactive behaviors as observed during free-play and clean-up and teachers' and children's observed classroom interactions were modest to moderate in strength. This indicates that a modest portion of variance across assessments is shared but that the behaviors assessed within the TC-SPT demonstrated unique variance that is distinct from

what can be assessed through observing teachers' and children's interactions within the classroom. This provides further support that the TC-SPT may be a useful compliment to field-based, early childhood educational and developmental research.

Limitations

There are several limitations that deserve attention. First, although different teams assessed teachers' and children's interactions during the structured play task as compared to the classroom observations, the same observer assessed the quality of interactions at both the classroom and child level in the field. This may have overestimated the association between the quality of teachers' interactions with children and children's individual engagement, which may have reduced our finding for divergent validity. Second, in this study we only examined concurrent validity. Future work will need to examine the predictive utility of this measure and whether it is sensitive to changes due to prevention and early intervention efforts (although see Williford et al., 2015, which demonstrates changes in teacher interactive behavior across intervention conditions). Third, our intra-class correlations for teacher interactive behavior during clean-up were less reliable compared to teacher interactive behavior during free-play and child interactive behaviors during free-play and clean-up. As noted earlier, we recommend the use of double coding of all tasks for future research. Finally, we examined the initial utility of this task and related coding scheme within a sample of diverse preschool programs. However, the children in this study were selected to obtain a sample of children who displayed high disruptive behaviors. Due to the sampling procedure of selecting the two to three highest rated children within each classroom, there was wide variability in children's behavior (e.g., the teacher may have rated only one

child as being disruptive but three children were still selected). Still, the sample contained many children who were reported by their teachers as displaying higher than typical disruptive behaviors. Although this limits the generalizability of our findings, this is an important sample to study as these children are at risk for experiencing negative school outcomes (Conyers, Reynolds, & Ou, 2003) and poor teacher-child relationships (Howes, 2000). However, this task and associated coding schemes need to be examined using other samples of children in order to determine more wide-spread utility.

Conclusions

In conclusion, the TC-SPT was adapted from the laboratory, mother-child literature in order to provide researchers with a way to assess the quality of teachers' and children's interactive behaviors in a standardized setting—holding the task and context consistent across dyads. The TC-SPT is a way to examine the quality of teacher-child interactions in an environment that reduces variations or "noise" due to the wide variety of activities and environments, which vary non-systematically from classroom to classroom. This coding scheme also ensured that teachers and children had the opportunity to interact uninterrupted for a specific amount of time. Thus, the use of a standardized task between an individual child and his/her teacher may allow for the assessment of teacher-child interaction quality where we can more confidently attribute differences between teacher-child dyads to behaviors of the individuals as opposed to the context.

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Table 1

Descriptions of the TC-SPT Codes

Teacher Interactive Behaviors	
Sensitive and responsive presence	Degree to which the teacher is sensitive and responsive to the child's feelings and needs
Positive affect	Degree to which the teacher shows positive regard to the child
Teacher confidence	Degree to which the teacher seems to believe she can work successfully with the child in the situation and that the child will behave appropriately
Teacher encourages stimulating environment	Degree to which the teacher fosters the child's interest and engagement in the activity or takes advantage of the activity to stimulate the child's learning or understanding during the activity
Teacher directiveness	Degree to which the teacher uses directive, strict, or punitive methods to control the child's play or behavior
Teacher support for child autonomy	Degree to which the teacher respects and recognizes the child as an individual
Teacher negativity	Degree to which the teacher displays expressions of anger or rejects/discounts the child
Affective mutuality/felt security	Degree of availability and mutuality of emotion between the teacher and the child, and the degree to which the child feels secure with the teacher
Child Interactive Behaviors	
Child enthusiasm	Degree to which the child acts with vigor, confidence, and eagerness to do the tasks.
Child's experience of the session	Degree to which the child's experience of the play resulted in feelings of success and competence, including the degree to which the teacher supports a child's feelings of success and confidence
Child affection toward teacher	Degree to which there was a substantial period of positive regard and positive affect from the child toward the teacher
Child reliance on teacher for help	Extent to which the child displays personal initiative in the situation or conversely expects the teacher to provide direction or help
Child persistence	Degree to which child is actively engaged in the session and attempts to solve problems
Compliance	Degree to which the child shows willingness to listen to teacher's suggestions and to comply with her requests in a reasonable manner
Child negativity towards teacher	Degree to which child shows anger, dislike, or hostility towards the teacher
Avoidance of the teacher	Degree to which child avoids interacting with teacher
Child's negative emotions	Degree to which the child displays negative emotions and an ability to manage negative emotions (stress, frustration, sadness, anger) during the session
Child's behavior control	Degree to which the child regulates his or her movement, physical activity and awareness, and verbalizations so that they match the expectations of the activity
Affective mutuality/felt security	Degree of availability and mutuality of emotion between teacher and child, and degree to which the child feels secure with the teacher

Note. TC-SPT = Teacher Child-Structured Play Task.

Table 2

Descriptive Statistics, including Mean, Standard Deviation, and Range

	Free-play		Clean-up		
	Mean (SD)	Range	Mean (SD)	Range	*t*-test
Teacher Interactive Behaviors-Dimensions					
Sensitive and responsive presence	4.01 (0.65)	1.0-5.0	3.58 (0.80)	1.0-5.0	6.604***
Positive affect	3.82 (0.61)	1.0-5.0	3.42 (0.81)	1.0-5.0	6.522***
Teacher confidence	4.01 (0.59)	1.0-5.0	3.88 (0.68)	1.0-5.0	1.5
Teacher encourages stimulating environment	3.88 (0.69)	1.0-5.0	3.24 (0.89)	1.0-5.0	10.088***
Teacher directiveness	2.87 (0.70)	1.0-5.0	2.81 (0.68)	1.0-5.0	0.787
Teacher support for child autonomy	3.86 (0.50)	2.0-5.0	3.37 (0.90)	1.0-5.0	8.608***
Teacher negativity	1.04 (0.17)	1.0-3.0	1.33 (0.64)	1.0-4.0	--
Affective mutuality/felt security	3.93 (0.63)	1.0-5.0	3.18 (0.71)	1.0-5.0	13.594***
Teacher Interactive Behaviors-Composites					
Positive Teacher Interactions	3.92 (0.61)	1.0-5.0	3.44 (0.79)	1.0-5.0	11.589***
Negative Teacher Interactions	2.88 (0.84)	1.0-5.0	2.07 (0.79)	1.0-5.0	-2.782**
Child Interactive Behaviors-Dimensions					
Child enthusiasm	3.42 (0.79)	1.0-5.0	3.28 (1.05)	1.0-5.0	2.448*
Child's experience of the session	3.47 (0.56)	2.0-5.0	3.54 (0.81)	1.0-5.0	-1.776
Child affection toward teacher	2.89 (0.76)	1.0-5.0	2.92 (1.10)	1.0-5.0	-0.442
Child reliance on teacher for help	2.32 (0.92)	1.0-5.0	2.07 (1.13)	1.0-5.0	4.112***
Child persistence	3.44 (0.89)	1.0-5.0	3.79 (1.12)	1.0-5.0	-5.258***
Compliance	4.71 (0.50)	2.0-5.0	4.29 (0.90)	1.0-5.0	8.851***
Child negativity towards teacher	1.13 (0.37)	1.0-4.0	1.27 (0.50)	1.0-5.0	-5.299***
Avoidance of the teacher	1.42 (0.61)	1.0-4.0	1.49 (0.74)	1.0-5.0	-1.975*
Child's negative emotions	1.08 (0.27)	1.0-4.0	1.20 (0.48)	1.0-5.0	-4.756***
Child's behavior control	4.08 (0.77)	1.0-5.0	4.27 (0.81)	1.0-5.0	-5.336***
Affective mutuality/felt security	3.03 (0.80)	1.0-5.0	3.04 (1.03)	1.0-5.0	-0.563
Child Interactive Behaviors-Composites					
Child Active Engagement	4.03 (0.47)	2.0-5.0	4.06 (0.75)	1.0-5.0	0.667
Child Positive Interactions with Teacher	3.77 (0.51)	1.0-5.0	3.75 (0.70)	1.0-5.0	-0.707

*Note. *p<0.05. **p<0.01. ***p<0.001.*

Table 3

Inter-rater Reliability for Individual Codes and Composites

	Free-play		Clean-up[1]	
	Single	Average	Single	Average
Teacher Interactive Behaviors-Dimensions				
Sensitive and responsive presence	0.609	0.757	0.664	--
Positive affect	0.638	0.779	0.709	--
Teacher confidence	0.556	0.714	0.479	--
Teacher encourages stimulating environment	0.699	0.823	0.643	--
Teacher directiveness	0.696	0.821	0.501	--
Teacher support for child autonomy	0.483	0.651	0.575	--
Teacher negativity	0.266	0.420	0.573	--
Affective mutuality/felt security	0.627	0.771	0.720	--
Teacher Interactive Behaviors-Composites				
Positive Teacher Interactions	0.742	0.852	0.799	--
Negative Teacher Interactions	0.664	0.821	0.631	--
Child Interactive Behaviors-Dimensions				
Child enthusiasm	0.596	0.747	0.657	0.793
Child's experience of the session	0.473	0.642	0.593	0.745
Child affection toward teacher	0.447	0.618	0.622	0.767
Child reliance on teacher for help	0.494	0.662	0.709	0.830
Child persistence	0.590	0.742	0.752	0.858
Compliance	0.440	0.611	0.672	0.804
Child negativity towards teacher	0.346	0.514	0.442	0.613
Avoidance of the teacher	0.589	0.741	0.512	0.677
Child's negative emotions	0.512	0.677	0.554	0.713
Child's behavior control	0.545	0.705	0.677	0.807
Affective mutuality/felt security	0.568	0.724	0.653	0.790
Child Interactive Behaviors-Composites				
Child Active Engagement	0.644	0.784	0.820	0.901
Child Positive Interactions with Teacher	0.635	0.777	0.741	0.851

Note. [1] For Teacher Interactive Behaviors – clean-up, 20% of videos are double-coded, thus the single measure ICC only is reported.

Table 4

Bivariate, Pearson Correlations of TC-SPT Composites

SPT Composite	Task	1	2	3	4	5	6	7	8
1. Pos Teacher Interactions	Free-play	1							
2. Pos Teacher Interactions	Clean-up	.425**	1						
3. Neg Teacher Interactions	Free-play[1]	.003	.018	1					
4. Neg Teacher Interactions	Clean-up	-.112*	-.365**	.317**	1				
5. Child Active Engagement	Free-play	.200**	.026	-.283**	-.114*	1			
6. Child Active Engagement	Clean-up	.082	.308**	-.097	-.358**	.368**	1		
7. Child Pos w/Teacher- free-play	Free-play	.529**	.322**	.031	-.021	.277**	.118*	1	
8. Child Pos w/Teacher- clean-up	Clean-up	.442**	.549**	.049	-.124*	.152**	.389**	.610**	1

Notes. Pos = Positive; Neg = Negative.

[1]Negative Teacher Interactions during free-play consists of one dimension, *teacher directiveness.*

*$p<0.05$. **$p<0.01$.

Table 5

Bivariate, Pearson correlations with theoretically-aligned measures

SPT Composite Measure	Task	CLASS ES	CLASS CO	CLASS IS	STRS Closeness	STRS Conflict	inCLASS Positive Teacher	inCLASS Positive Task	inCLASS Negative Interactions
Pos Teacher Interactions	Free-play	0.482**	0.393**	0.418**	0.186*	-0.137	0.374**	0.011	-0.120
Pos Teacher Interactions	Clean-up	0.414**	0.381**	0.287**	0.277**	-0.076	0.288**	0.085	-0.112
Neg Teacher Interactions	Free-play[2]	0.023	-0.052	-0.020	0.197*	-0.148	0.089	-0.186*	-0.012
Neg Teacher Interactions	Clean-up	-0.189*	-0.178*	-0.148	-0.056	0.069	-0.056	-0.035	0.034
Child Active Engagement	Free-play	-0.050	-0.031	0.009	0.057	-0.083	0.003	0.191**	-0.147**
Child Active Engagement	Clean-up	-0.043	-0.023	-0.008	0.052	-0.108	-0.026	0.206**	-0.262**
Child Pos w/Teacher	Free-play	0.186**	0.164**	0.123*	0.297**	-0.110*	0.307**	0.153**	-0.096
Child Pos w/Teacher	Clean-up	0.244**	0.222**	0.187**	0.176**	-0.129*	0.305**	0.159**	-0.108*

Notes. Pos = Positive; Neg = Negative; CLASS = Classroom Assessment Scoring System; ES = Emotional Support; CO Classroom Organization; IS = Instructional Support; STRS =Student Teacher Rating Scale; inCLASS = Individualized Classroom Assessment Scoring System.

[2]Negative Teacher Interactions during Free-play consists of one dimension, *teacher directiveness*

**p<0.05. **p<0.01.*

Teacher Beliefs: Developing a Deeper Understanding of the Links between Teacher Beliefs and the Quality of Teacher-Child Interactions

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Abstract

This study explored a teacher's beliefs about children and their behavior and if they were associated with the quality of teacher-child interactions at the classroom and individual child level. The sample of the study consists of 183 teachers and 470 preschool children (approximately three children per teacher) that are at risk for a disruptive behavior disorder. Results demonstrated that a teacher's authoritarian beliefs and causal attributions were associated with the quality of teacher-child interactions at the classroom level at the beginning of the year. Authoritarian beliefs were also associated with the quality of interactions between a teacher and child with disruptive behavior in a structured play task and within the classroom context. The level of a child's disruptive behavior moderated the relation between attributions and teacher-child interactions in different ways for causal and responsibility attributions. Results of the study suggest that interventions with the aim of improving teacher-child interactions at the classroom and/or child level may want to address teacher beliefs in conjunction with or prior to intervention implementation.

Keywords: teacher beliefs, authoritarian beliefs, causal attributions, responsibility attributions, child disruptive behavior, teacher-child interactions

Teacher Beliefs: Developing a Deeper Understanding of the Links between Teacher Beliefs and the Quality of Teacher-Child Interactions

Warm, sensitive, and supportive teacher-child interactions foster children's academic, behavioral, and social-emotional skills (e.g., Mashburn et al., 2008; Pianta, 1999), especially for children who are most at risk for negative outcomes due to disruptive behavior (e.g., Pianta, Stuhlman, & Hamre, 2002; Hamre & Pianta, 2001). Teacher-child interactions can be studied at both the classroom level and at the individual, teacher-child level. Both approaches provide important and unique information. For example, an understanding of how a teacher interacts with children at the classroom level may help to identify specific areas for a consultant to help this teacher, whereas information about how a teacher interacts with an individual child, particularly one with disruptive behavior, may help a consultant work with the teacher regarding the relationship with this child. Teachers' interactions with children are influenced by many factors both proximal (e.g., characteristics, beliefs, and predispositions of teachers and children) and distal (e.g., family, sociocultural context) (Downer, Sabol, & Hamre, 2010). Some of these factors may make it more challenging for teachers to provide responsive and sensitive interactions. One factor that may be important in understanding how a teacher approaches and engages in interactions at both the classroom and individual child level is a teacher's beliefs about children and their behavior. Beliefs, such as whether a teacher endorses a child-centered, compared to an adult-centered (authoritarian) belief, or what is believed to be the cause of disruptive

behavior, may make a critical difference in the way the teacher responds to all children at the classroom level, as well as to an individual child with disruptive behavior. In the current study, we examined how teachers' beliefs were connected to the quality of teachers' interactions with children at both the classroom and the child level.

Teachers' Interactions at the Classroom and Individual Child Level

Teacher-child interactions can be studied at two different levels: the classroom level, as with classroom-wide observational tools (e.g., *Classroom Assessment Scoring System (CLASS),* Pianta, LaParo, & Hamre, 2008; *Early Childhood Environment Rating Scale-Revised (ECERS-R),* Harms, Clifford, & Cryer, 1998), and at the individual teacher-child dyad level, with dyadic observational systems (e.g., *Individualized Classroom Assessment Scoring System (inCLASS),* Downer, Booren, Hamre, Pianta, & Williford, 2011; *Dyadic Teacher-Child Interaction Coding System (DTICS)*, McIntosh, Rizza, & Bliss, 2000). Educational research and subsequent policy have paid more attention to understanding variables that likely impact teacher-child interactions at the classroom level (e.g., Early et al., 2007; Friedman-Krauss, Raver, Morris, & Jones, 2014; Mashburn et al., 2008; Phillips, Fox, & Gunnar, 2011). Although important to understand teacher quality at this level, these interactions are, in part, an aggregate of the quality of individual teacher-child interactions that occur across an observed time period. Less attention has been paid to studying the quality of a teacher's interactions with an individual child. Studies that examine the quality of individual teacher-child interactions demonstrate the importance of assessing interactions at this level (e.g., Driscoll & Pianta, 2010; Williford, Maier, Downer, Pianta, & Howes, 2013). For example, Driscoll and Pianta (2010) found that teachers' interactions with a specific child in a play task varied

depending on a teacher's beliefs and intervention condition. Additionally, evaluating interactions at the dyadic level provides researchers with the opportunity to see if a teacher within the intervention condition is using specific aspects of the intervention, such as following a child's lead.

Research supports the utility of designing studies that include both classroom and child-level interactions (Curby, Downer, & Booren, 2014; Williford et al., 2013). Using cross-lagged, autoregressive models, Curby and colleagues (2014) provided evidence for bidirectional associations between a teacher's emotional and organizational support (measured at the classroom level) and a child's engagement (measured at the individual child level). Furthermore, interactions at the classroom and child level have been shown to jointly predict a child's school readiness skills; in a classroom with high-quality teacher-child interactions, children developed more equitable school readiness skills, specifically expressive vocabulary, regardless of a child's individual engagement (Williford et al., 2013). Studies that incorporate both the classroom and individual child level may provide a fuller picture of the quality of a teacher's interactions because they demonstrate how a teacher's interactions at the classroom and child-level interactions may differ, depending on the child.

An exploration of how a teacher's beliefs are associated with the quality of teachers' interactions at both levels will provide information about how sensitivity and responsiveness is distributed across children in a classroom. At the classroom level, high-quality teacher-child interactions are characterized by having a high level of teacher responsivity, specifically an active engagement in interactions, timely recognition of cues, and an appropriate response to these cues in a contingent manner that fosters

development and growth (Hamre et al., 2014). However, a study that examines teacher responsivity at only the classroom level may miss differential patterns of interactions between teachers and specific children. This is especially relevant for children who display disruptive behavior as these children are more likely to engage in conflictual, negative interactions with teachers (e.g., Doumen et al., 2008; Spilt & Koomen, 2009). Negative interactional cycles are problematic for teachers, as they may lead to burn-out and stress (Alvarez, 2007; Gilliam, 2005), and children, as they place a child at a higher risk for multiple, maladaptive outcomes (e.g., Rimm-Kaufman, Pianta, & Cox, 2000; Ladd & Burgess, 2001). A teacher's beliefs about children and their behavior may be an important contributor to the level of responsivity a teacher provides – at both the classroom level and to individual children.

Teacher Beliefs and the Quality of Teacher-Child Interactions

A teacher's belief system includes beliefs, opinions, and predispositions about multiple areas, including children, behavior, curriculum, and what constitutes 'good teaching.' Based on Bandura's Social Cognitive Theory, an individual's personal factors, including their cognitions, affects, and beliefs, are linked with his/her behavior in a bidirectional manner (Bandura, 1986). Although Bandura presents beliefs as malleable, an adult's beliefs about children are viewed as relatively stable over time (Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997). The current study explores two elements of a teacher's belief system in more depth: a teacher's beliefs about how much agency a child should have in the classroom (authoritarian versus progressive beliefs) and a teacher's beliefs about disruptive behavior (behavior attributions). Previous studies from the education and parenting literature lay the groundwork in establishing the importance

of these two elements of an adult's belief system in the quality of interactions at the classroom-level (Pianta et al., 2005) and with an individual child (e.g., Driscoll & Pianta, 2010; Coplan, Hastings, Lagace-Seguin, & Moulton, 2002).

Teacher beliefs: authoritarian versus progressive. One aspect of a teacher's beliefs about children that has been shown to affect the quality of teacher-child interactions is how much agency a teacher believes a child should have with regard to his or her behavior within the classroom. This belief falls within a continuum that spans from authoritarian (adult-centered) to progressive (child-centered) (Schaeffer & Edgerton, 1985). Within the context of the classroom, teachers with authoritarian beliefs are more likely to endorse statements, such as "a teacher should be obeyed," that "a teacher should be in control of the classroom," and that "children should be treated the same." At the other end of the continuum, teachers with progressive beliefs are more likely to endorse statements, such as "children should have a right to hold and express their own point of view" or that "children learn best by being an active participant."

Teachers with more authoritarian beliefs are less likely to engage in high-quality teacher-child interactions as measured at the classroom-level. In particular, they demonstrated lower levels of emotional support (warmth, sensitivity, and respect for student choice) and provided fewer opportunities for children to engage in child-directed learning centers (Pianta et al., 2005). Additionally, a teacher's authoritarian beliefs have been shown to be a stronger predictor of classroom quality than level of education or years of experience (LaParo et al., 2009). Authoritarian beliefs frequently appear as covariates, or a variable to control for, in studies aimed at improving classroom quality (e.g., Driscoll, Wang, Mashburn, & Pianta, 2011; Hamre et al., 2012).

Research also supports that a teacher with more authoritarian beliefs is less likely to interact with an individual child in a supportive manner (e.g., Driscoll & Pianta, 2010; Hur, Buettner, & Jeon, 2014). In a study conducted with Head Start teachers and children, teachers with authoritarian beliefs were less likely to follow a child's lead (Driscoll & Pianta, 2010). Additionally, Hur and colleagues demonstrated that teachers' authoritarian beliefs had an indirect effect on children's academic skills; teachers with authoritarian beliefs provided lower level of supports for children's behavioral self-regulation, which led to lower literacy and mathematic skills (Hur et al., 2014). It is important to note that authoritarian beliefs are not always associated with negative outcomes. Williford and colleagues (2015) demonstrated that teachers expressing more authoritarian beliefs tended to spend more time engaged in an intervention designed to improve the relationship between a teacher and child with disruptive behavior.

Although these studies provide some support for the link between authoritarian beliefs and a teacher's interactions with children at the classroom and child level, additional research needs to be conducted that further explores the association between authoritarian beliefs and teacher-child interactions. Previous studies at the classroom-level have incorporated authoritarian beliefs as one element of a much larger study that examined multiple predictors, including child-teacher ratio, teacher demographics, etc., in predicting interaction quality with several observational measures, including an older version of the Classroom Assessment Scoring System (Pianta, LaParo, & Hamre, 2005). A study that is focused on the link between authoritarian beliefs and classroom interaction quality (with updated measures) may yield more precise results, because it is focuses on the hypothesized relation with more specificity. At the individual child level,

studies have been conducted with randomly selected children from a teacher's classroom, instead of with children with specific needs. Although random selection helps increase generalizability, it does not provide information regarding how teacher-child interactions may differ by children, particularly for children that tend to have more negative interactions with a teacher. Furthermore, current studies do not include both analyses at the classroom and child-level, which would help parse out how a teacher's authoritarian beliefs are associated with interactions at the classroom level and with individual children that display varying levels of disruptive behavior.

Teacher beliefs: behavior attributions. Theory suggests that a teacher's beliefs about child behavior, specifically disruptive behavior, impacts how she interacts with children. According to Weiner's interpersonal attributions theory, the way that an individual understands the source and rationale for the behavior of others or their behavior attributions, impacts how that individual responds to the behavior (Weiner, 1985). Research in the parenting and education literature provides support for two types of behavior attributions: causal, which refers to whether the behavior is caused by internal or external factors to the child and the degree of stability of the behavior, and responsibility, which refers to whether the child has control over their behavior and deserves blame and discipline for it (Carter, Williford, & LoCasale-Crouch 2014; Williford, Graves, Shelton, & Woods, 2009; Wilson, Gardner, Burton, & Leung, 2006). Parents with more negative attributions, particularly responsibility attributions, were more likely to use harsh and punitive disciplinary practices (Bugental & Johnston, 2000; Laskey & Cartwright-Hatton, 2009) and were more likely to have a lower quality of parent-child relationship (e.g., Black, Heyman, & Slep, 2001).

Despite the prevalence of behavior attribution studies in the parenting literature, few studies have examined teacher behavior attributions. The research that has been conducted within this topic has been primarily completed internationally and with elementary school teachers. At the classroom level, a link was found between causal behavior attributions and a teacher's reported use of behavior management practices, suggesting that the way in which the teacher understands the cause of the behavior predicts how she *reports* her behavior management strategies (Andreou & Rapti, 2010; Bibou-Nakou, Kiosseoglou, & Stogiannidou, 2000). However, there was not further analysis examining observed teacher behavior management practices. A study conducted by Carter and colleagues provided support for how attributions differentially relate to levels of classroom quality (Carter et al., 2014). Bivariate correlations demonstrated that causal attributions were significantly related to a teacher's report of inappropriate behavior management practices, lower levels of emotional support, and lower levels of teacher-child relationship quality (aggregated to the teacher level). Responsibility attributions also correlated with a teacher's report of inappropriate teaching strategies, as well as authoritarian beliefs (Carter et al., 2014).

At the individual child level, there have been few studies that examine how teachers' behavior attributions are associated with how they interact with individual children. One exception is a study conducted by Thijs and Koomen (2009), in which they demonstrated that a teacher's responsibility (or control) attributions strengthened the negative relation between a teacher's behavior appraisals, or the extent to which a teacher beliefs the child's behavior to be problematic, and the closeness in the teacher-child relationship. In other words, a teacher that believed that a child is able to control their

disruptive behavior reported less closeness with a child that she perceived to have more problematic behavior.

Although previous studies conducted with teacher behavior attributions and interaction quality provide preliminary support for this association, further studies need to be conducted that incorporate observational measures and include both classroom and individual child interactions. Previous studies rely on teacher report of inappropriate behavior management strategies (Andreou & Rapti, 2010; Bibou-Nakou et al., 2000) and relationship quality (Thijs & Koomen, 2009). Incorporating observational measures at both the classroom and child-levels, specifically with a child with disruptive behavior, will provide a better understanding of how a teacher's attributions about disruptive behavior are associated with the responsiveness provided at the classroom-level, as well as with a child with disruptive behavior.

Current Study

The present study sought to understand how teacher beliefs were associated with the quality of a teacher's interactions at the classroom-level and at the individual child level, specifically for a child who displays disruptive behavior. Specifically, we asked how teachers' beliefs (authoritarian beliefs, causal attributions, responsibility attributions), assessed at the beginning of the year, were associated with the quality of interactions, at both the classroom-level and with an individual child with disruptive behavior. We also investigated how beliefs were associated with classroom-level and individual child interactions over the course of a single school year. At the individual child level, we explored if the relation between teacher beliefs and the quality of

interactions was moderated by the level of disruptive behavior of the child, as rated by the teacher at the beginning of the year.

We hypothesized that a teacher's beliefs about children would predict teacher's interactions with children at the classroom-level and individual child level in the following ways. First, based on previous studies (Pianta et al., 2005), we expected that a teacher's authoritarian beliefs would be associated with a lower quality of teacher-child interactions at the classroom-level. Due to correlational findings from a previous study (Carter et al., 2014), we hypothesized that causal, but not responsibility attributions would be associated with a lower quality of classroom-level interactions. Following the assumption that a teacher's beliefs are stable, we did not expect that teacher beliefs would predict end of year teacher-child interactions when controlling for beginning of the year scores, as we did not hypothesize that beliefs were associated with change in interaction quality.

At the individual child level, we expected that authoritarian beliefs would be associated with lower quality interactions in a similar way to previous studies (Driscoll & Pianta, 2010), specifically less positive teacher interactive behaviors, more negative/controlling teacher interactive behaviors, and less positive teacher-child interactions between a teacher and individual child in the classroom context. We expected to have differential findings for causal and responsibility attributions at this level: we hypothesized that we would have less positive teacher interactive behaviors when a teacher holds more negative causal attributions and more negative/controlling behaviors when a teacher holds more negative responsibility attributions. We expected that both causal and responsibility attributions would be linked with an individual child's

interactions with the teacher in the classroom context, both at the beginning of the year and over time. We hypothesized that beliefs about child disruptive behavior would be linked with lower end of year quality, controlling for beginning of the year quality, because we expected that a teacher's beliefs about disruptive behavior would become more influential in her interactions with a child with disruptive behavior as she became more familiar with this child.

We hypothesized that the relation between teacher behavior attributions and teacher-child interactions would be moderated by a child's level of disruptive behavior, specifically that children with higher levels of disruptive behavior would engage in more positive teacher-child interactions when with a teacher with less negative causal and responsibility attributions. We did not expect that the relation between authoritarian beliefs and teacher-child interactions would be moderated by child disruptive behavior, as authoritarian beliefs are not beliefs specifically about disruptive behavior.

Method

Participants

Data for the present study were collected within a larger intervention study. The sample for the current study included 183 early childhood teachers and 470 children, with approximately 3 children nested within each teacher's classroom (see Table 1 for classroom, teacher, and child demographics). Teachers worked within a variety of early childhood classrooms, including State-funded (26%), Head Start (19%), and Private (55%). Teachers were mostly female (96.1%), on average 43 years old (range 22-69), and represented a range of ethnicities (53% Caucasian, 41% African American, 1.2% Latino/Hispanic, 4.8% other). The sample included teachers with a range of experience,

from novice teachers to experienced teachers with up to 38 years in early childhood (*M*=9.2 years).

Children were mostly boys (65.4%) and on average 4 years old (*M*=4.1 years). Children were primarily African American or Caucasian (41.9% African American, 37.6% Caucasian, 7.8% Hispanic/Latino, 12.7% Other). Although they came from a range of socio-economic backgrounds, children were mostly from low-income families with a mean family income-to-needs ration of 1.90.

Procedures

Preschool centers were recruited from three urban and semi-urban geographical sites in the southeast. Permission and consent were obtained from the director, lead teachers, and parents of children participating in the study at the beginning of the school year (76% of parents consented). Three weeks after the start of the school year, teachers rated all children in their classroom on two disruptive behavior-rating scales (*ADHD Rating Scale-IV*, DuPaul, Power, Anastopoulos, & Reid, 1998; *ODD Rating Scale,* Hommersen, Murray, Ohan, & Johnston, 2006). Two boys and one girl were selected from each classroom based on having the highest teacher ratings of disruptive behavior and parental consent. Teachers were randomized into one of three intervention conditions: intervention, time control, business as usual. Children were randomized into one of three intervention windows throughout the year. The intervention was not of interest to this study but it was included as a control in the analyses. At the beginning of the school year, teachers completed surveys and measures that assessed basic demographics, beliefs about children, and beliefs about children's behavior. Classroom-level observations were conducted at multiple time points throughout the school year.

Individual child-level, structured play task observations were conducted at the end of each assessment window, and individual child-level observations in the classroom setting were conducted at multiple time points throughout the year.

For classroom-level observations, a diverse group of raters completed the standardized, CLASS-training process and demonstrated reliability above 80% within and across dimensions prior to rating classrooms in the field. Additionally, raters attended weekly calibration meetings and proved continued reliability at 80% as measured by weekly calibration tests.

For individual child-level, structured play task observations, four teams of undergraduate-level coders were trained on the *Teacher Child-Structured Play Task* (TC-SPT) and demonstrated reliability by coding the same as the master code 80% or more of the time. Master codes were derived from independent coding and a follow-up discussion of at least two of the following individuals: the project coordinator, principal investigator of the PREP study, a co-investigator of the PREP study, and/or the team leader (doctoral-level graduate student). During the time they were actively coding videos, coders attended an hour-long calibration meeting each week held by the team leader in order to maintain reliability. At this meeting all coders and a master coder rated the same video and met to discuss the master codes. All structured play tasks were video-recorded according to a scripted procedure at the end of the selected child's assessment window. Video tapes were coded after intervention completion.

For individual child-level observations that were conducted within the classroom, a diverse group of raters were trained using the standardized, inCLASS training and demonstrated reliability above 80% within and across dimensions. Additionally, raters

attended weekly calibration meetings to maintain reliability and proved continued reliability through achieving 80% within and across dimensions on weekly tests.

Measures

Teacher beliefs about children.

Authoritarian beliefs. Modernity Scale* (Schaefer & Edgerton, 1985*).

Authoritarian beliefs were measured at the beginning of the school year. The Modernity Scale is a 16-item, Likert-scale questionnaire that yields information regarding a teacher's beliefs about children, or the extent to which a teacher endorses an authoritarian (or adult-centered) perspective compared to a progressive (or child-centered) perspective. The scale has good internal reliability ($\alpha = 0.79$) in the current study and has demonstrated construct validity (significant correlations to a teacher's emotional support and classroom practices) in prior studies (Pianta et al., 2005; Driscoll & Pianta, 2010). A total score was created for each teacher. Higher scores suggest stronger, more adult-centered, authoritarian beliefs. Individuals with higher scores endorse items such as "Children should always obey the teacher," whereas those with lower scores agree with items like "Children have a right to their own point of view and should be allowed to express it."

Teacher beliefs about children's behavior.

Behavior attributions. The Preschool Teaching Attributions Measure. Behavior attributions were assessed at the beginning of the school year. The PTA was adapted from the *Attributional Style Measure for Parents* (ASMP; O'Brien & Peyton, 2002). This vignette-style measure has been used in several research studies to assess the quality of parental attributions about child disruptive behavior (e.g., Tsethlikai, Peyton, &

O'Brien, 2007; Williford et al., 2009). The measure asked the teacher to think about a recent time that a child in her classroom misbehaved in each of the following five ways: noncompliance to teacher requests, aggression towards peers, aggression or disrespect towards the teacher, interruption, and noncompliance with the routine. As the intent was to assess a teacher's general, behavior attributions, the teacher could choose the same or a different child for each scenario. The teacher then used a 6-point scale (ranging from 1: *strongly disagree* to 6: *strongly agree*) to rate statements for each behavior scenario across eight dimensions: *internal-external locus* (6=something about the child), *controllability* (6=completely within the child's control), *stability* (6=not likely to change), *globality* (6=happens often in my classroom), *purposefulness* (6=definitely intentional, on purpose), *motivation* (6=selfish concerns), *blame* (6=deserves to be disciplined), and *negative intent* (6=did to annoy me). As used in previous studies, scores were aggregated across the five scenarios to create one score for each attributional dimension, then two composites were created from the dimensions (causal: *internal-external locus, stability, globality*, and responsibility: *purposefulness, motivation, blame, negative intent)* (Carter et al., 2014). Higher causal scores suggested a teacher believes that a child will display disruptive behavior across contexts, that the behavior is stable, and that it is caused by internal factors. Higher responsibility scores suggested that a teacher believes that a child's behavior is purposeful, that a child is motivated by selfish reasons, that the child deserves to be disciplined, and that the child engages in disruptive behavior in order to negatively affect (i.e., annoy) the adult. Both scales demonstrated good internal consistency in the current study with Cronbach's alpha coefficients (causal = 0.77, responsibility = 0.85).

Child disruptive behavior.

***Teacher-rated. Sutter-Eyberg Student Behavior Inventory-Revised* (SESBI-R; Eyberg & Pincus, 1999).** Teachers completed the SESBI-R for each of the selected children at the beginning of the year (six weeks into the school year). Using a 38-item questionnaire, teachers rated the frequency and intensity of a child's disruptive behavior on a 7-point intensity scale. A total score for child disruptive behavior was calculated, including individual scores for aggression, defiance, impulsivity, and hyperactivity. Higher scores represent greater frequency and intensity of disruptive behavior. The SESBI-R had excellent reliability in the current sample with a Cronbach's alpha coefficient of 0.97. Evidence of convergent and discriminate validity of this measure has been demonstrated (Rayfield, Eyberg, & Foote, 1998). Even though children were selected due to displaying disruptive behavior, the range (38-256) and standard deviation (42.26) suggest that there was a significant level of variability within the current sample.

Observed teacher-child interaction quality.

***Classroom-level teacher-child interactions. Classroom Assessment Scoring System* (CLASS; Pianta, LaParo, & Hamre, 2008).** Observations of classroom-level teacher-child interaction quality were conducted at the beginning and end of the school year. The *CLASS* is an observational instrument that measures classroom quality across ten dimensions using a 7-point scale: *positive climate, negative climate, teacher sensitivity, regard for student perspectives, behavior management, productivity, instructional learning formats, concept development, quality of feedback,* and *language modeling*. The intra-class correlations (ICCs) across the ten dimensions ranged from fair (0.63 for *concept development)* to good (0.78 for *teacher sensitivity)*. Percent agreement

within 1 (measure developer's standard of reliability) ranged from 85% (*instructional learning formats)* to 97% (*negative climate)*. Multiple studies have demonstrated the validity of the CLASS (e.g., Hamre, 2014; Mashburn et al., 2008).

Although previous research demonstrated that data support three domains of classroom quality – emotional support, classroom organization, and instructional support (Hamre, Pianta, Mashburn, & Downer, 2007), a more recent study supports the use of a bi-factor model (Hamre et al., 2014). With this approach, there is a general teaching factor – responsive teaching (all dimensions), and two domain-specific factors – management & routines (*behavior management, productivity, instructional learning formats*) and cognitive facilitation (*concept development, quality of feedback, and language modeling*). Using this approach helps to shield against collinearity, because the correlation among the three factors is zero. Therefore, the three factors represent three distinct aspects of teacher-child interaction quality. In the current study, the fit statistics for the bi-factor model were good to excellent (CFI = 0.973; TLI = 0.951; RMSEA = 0.089; SRMR = 0.032).

Individualized teacher-child interactions. Teacher Child-Structured Play Task (TC-SPT). Observations of individualized teacher-child interactions with the TC-SPT were conducted at the end of each assessment window. The *TC-SPT* is an observational instrument that measures the quality of teacher-child interactions across eight dimensions using a 5-point scale: *sensitive and responsive presence, positive affect, teacher confidence, teacher encourages stimulating environment, teacher directiveness, teacher support for child autonomy, teacher negativity,* and *affective mutuality/felt security*. This measure was developed based on commonly used structured play tasks in the mother-

child literature and an attachment based coding system frequently used to assess the quality of mother-child interaction quality developed by Egeland and Hiester (1993). We adapted the task for preschool teachers and children so that we could examine the quality of interactions across teacher-child dyads in a standardized setting - a structured play task. The play task consisted of two parts: free play (using specific toys) and clean up. The codes for clean up were used in the current study, as these were designed to elicit stress on the child. Dimension codes were compiled into two composites: positive teacher interactive behaviors (*sensitive and responsive presence, positive affect, teacher confidence, teacher encourages stimulating environment, teacher support for autonomy, affective mutuality*) and negative teacher interactive behaviors (*teacher directiveness, teacher negativity*). Each composite demonstrated good to fair internal consistency (positive teacher interactive behaviors: $\alpha = 0.80$; negative teacher interactive behaviors: $\alpha = 0.63$). Twenty percent of clean-up videos were double-coded. Intra-class correlations indicated good reliability (*M*: ICC = 0.76). The TC-SPT has demonstrated validity with significant correlations to classroom emotional support and teacher-child closeness (Williford, Carter, Whittaker, Vitiello, & Hatfield, *manuscript submitted for review*).

***Individualized teacher-child interaction quality. Individualized Classroom Assessment Scoring System (inCLASS;* Downer et al., 2011).** Observations of individualized teacher-child interactions in the classroom context with the inCLASS were conducted at the beginning and end of the school year. The inCLASS is an observational instrument that measures young children's competence during daily interactions with teachers, peers, and tasks in the preschool environment. For each observation, ten dimension scores were obtained on a 7-point scale: *positive engagement with the teacher,*

teacher conflict, teacher communication, peer sociability, peer conflict, peer assertiveness, peer communication, engagement within tasks, self-reliance, and *behavior control*. Coders were guided in their ratings by detailed descriptors of behaviors that demonstrate low, medium, and high quality. Higher ratings suggested more positive behaviors or interactions.

In an initial validation study, exploratory factor analysis of these dimensions (Downer et al., 2010) identified four domains of child interactions: positive engagement with teachers (*positive engagement, communication with teachers*), positive engagement with peers (*sociability, assertiveness, communication with peers),* positive engagement with tasks (*engagement, self-reliance with tasks*), and negative classroom engagement (*conflict with teachers and peers*). A more recent study of the inCLASS' construct validity found that an additional dimension, *behavior control*, should be reverse scored and included in the model as part of the negative classroom engagement domain (Bohlmann et al., 2012). Bohlmann and colleagues (2012) confirmed this four-factor model across multiple, diverse samples and across demographic subgroups (gender, poverty status, and ethnicity), which demonstrated the inCLASS' applicability across a wide range of children and classrooms. An initial validation study provided support for the inCLASS' construct criterion-related validity (Downer et al., 2010). Additionally, recent studies with the inCLASS have demonstrated good predictive validity, with children's observed engagement predicting school readiness outcomes in language and literacy skills and self-regulation (Bohlmann & Downer, 2012; Maier, Downer, Vitiello, & Booren, 2012; Williford et al., 2013; Vitiello, Downer, & Williford, 2012).

Children's scores for beginning and end of the year were aggregated across cycles and up to the dimension and domain levels. Inter-rater agreement (ICCs) during live observations for the inCLASS domains scores (0.71 to .84) and internal consistencies (0.74 to .83) were good. The domain of positive engagement with teachers was used to assess the quality of teacher-child interactions as displayed in the classroom at the child level.

Data Analytic Plan

Predictor variables included authoritarian beliefs and teacher beliefs about child behavior: causal attributions and responsibility attributions. The level of teacher-reported disruptive behavior for each child served as a moderator variable for analyses at the individual child level. Outcome variables were classroom-level teacher-child interaction quality measured using the CLASS (responsive teaching, management & routines, and cognitive facilitation), as well as individual teacher-child interaction quality using the TC-SPT (positive teacher interactive behaviors and negative teacher interactive behaviors), and inCLASS (positive engagement with teacher). Control variables for the teacher included ethnicity, early childhood major, years of experience, program type, and intervention condition. Control variables for the child included gender, age, child race, income level, standardized PPVT score, and selected intervention window.

Descriptive and psychometric information were calculated on all predictor, moderator, and outcome variables using SPSS Statistics Software, Version 22.

Primary analyses were conducted using M*plus,* version 7 (Muthen & Muthen, 2012), in order to account for nesting of children within teacher. To account for missing data, full information maximum likelihood estimation with robust standard errors was

used to estimate parameters under the assumption that data were missing at random (e.g., McArdle et al., 2004). This type of estimation uses all available data for each case when estimating parameters and, therefore, increases the statistical power of estimated parameters (Enders & Bandalos, 2001). Regression models were used to examine the associations between teacher beliefs and the quality of teacher-child interactions at the classroom level (models included teacher control variables described above). For classroom-level quality models, responsive teaching, management and routines, and cognitive facilitation were regressed on the teacher beliefs measures. Two separate models were run: one at beginning of the year and one at end of year, controlling for beginning of the year scores.

Multi-level regression models (type = two level) were used to examine the associations between teacher beliefs and the quality of teacher-child interactions at the child level (models included teacher and child control variables described above). Similar to the classroom-level models, all three teacher belief variables were included as predictors in the same model. Separate models were run for the different measures included as outcome variables (one model for TC-SPT outcome variables and one model for inCLASS outcome variable). Since TC-SPT was only collected at one time point (end of intervention window), we did not examine change in interaction quality using these outcome variables. The model with inCLASS as the outcome variable was run at baseline, and at end of year, controlling for baseline.

In the child level analyses, we also examined if the level of child disruptive behavior (as reported by the teacher) moderated the association between teacher beliefs and quality of teacher-child interactions. This was accomplished using multi-level

moderation (a 2-1-1) model (see figure 1). Between-level (or teacher level) variables included all three predictor variables, as well as teacher covariates. Within-level (or child level) variables included all outcome variables, moderator variable, and child covariates. In order to test if moderation occurred, we first tested the significance of the random slope of the moderator regressed on the outcome (both within-level variables). We then tested if the slope changed based on level of teacher beliefs (between-level variable). Graphical representations of the moderation were created by calculating predicted values for the outcome variable at plus and minus 1 standard deviation from the mean. Within-level variables were group-mean centered and between-level variables were grand-mean centered to ensure accuracy of graphing and interpretation.

Results

Descriptive Statistics

The descriptive statistics (mean, standard deviation, maximum, and minimum) for predictor, moderator, and outcome variables are reported in Table 2. All variables demonstrated adequate psychometric properties.

Beliefs and Teacher-Child Interactions at the Classroom Level

The regression coefficients and standard errors for classroom-level analyses are presented in Table 3. At the beginning of the year, authoritarian beliefs were negatively associated with teachers' responsive teaching interaction. Similarly, negative causal attributions were negatively associated with responsive teaching. Teacher beliefs were not significantly associated with either of the two domain-specific factors: management and routines or cognitive facilitation. None of the three teacher beliefs significantly

predicted change in the quality of teachers' classroom level interactions from the beginning to the end of the year.

Beliefs and Teacher-Child Interactions at the Individual Child Level

We tested whether teacher beliefs were associated with teachers' interactions at the child level observed during the clean up portion of a dyadic, structured play task. Standardized regression coefficients and standard errors for this analysis are reported in Table 4. Authoritarian beliefs were negatively linked with teachers' positive interactive behaviors. Causal and responsibility attributions were not associated with a teacher's positive interactive behaviors. At the trend level, responsibility attributions were negatively associated with teacher's negative/controlling interactive behaviors (p = .07).

We also tested whether teacher beliefs predicted individual teacher-child interactions in the classroom setting. Regression coefficients and standard errors are reported in Table 5. Teachers' authoritarian beliefs were negatively associated with children's positive engagement with teachers in the classroom.

Moderation Results

A moderated effect of a child's disruptive behavior was found in the association between causal attributions and teacher-child interactions in the classroom and in the association between responsibility attributions and individual teacher-child interactions in the classroom. Child-level disruptive behavior moderated the effect of causal attributions on teacher-child interactions such that as a child's level of disruptive behavior decreased the relation between causal attributions and teacher-child interactions became more negative (β = 0.005, $SE\{\beta\}$ = .002, p=.02) (see figure 2). In other words, children with lower levels of disruptive behavior interacted more positively in a classroom in which the

teacher had lower causal attributions. In contrast, child-level disruptive behavior moderated the effect of responsibility attributions on teacher-child interactions such that as a child's level of disruptive behavior increased the relation between responsibility attributions and teacher-child interactions became more negative (β = -0.005, $SE\{\beta\}$ = .001, p =.001) (see figure 3). In other words, a child with a higher level of disruptive behavior interacted more positively with a teacher with lower levels of responsibility attributions. Moderation effects were not found for authoritarian beliefs.

Post-hoc Analysis

Due to the potential of intervention effects, we tested if intervention condition served as a moderator in the relation between teacher beliefs and classroom-level interactions, as well as between teacher beliefs and individual-level interactions. Models were run for both baseline and end of year interaction quality (controlling for baseline quality). All models demonstrated no significant moderation for intervention condition.

Discussion

We examined whether teachers' authoritarian and negative behavior attributions were associated with the quality of teacher-child interactions at the classroom and child levels. Results demonstrated teachers' authoritarian beliefs and stronger causal attributions were associated with the quality of teachers' interactions with children at the beginning of the year, but beliefs assessed at the beginning of the year did not predict changes in teacher-child interactions from the beginning to the end of the school year. Additionally, results supported that authoritarian beliefs, causal attributions, and responsibility attributions were associated with interaction quality in unique ways, indicating that teachers' beliefs about children and their behavior are differentially linked

with aspects of teacher's interactions with children. In the below sections, results and their implications are further described.

Authoritarian Beliefs at the Classroom and Individual Child Level

Results from the current study provide further support that teachers who hold authoritarian beliefs (teachers who believe that children should be treated the same regardless of differences, that children should obey the teacher, etc.) were more likely to be engaged in lower quality interactions with children at the classroom and individual child level (Driscoll & Pianta, 2010, LaParo et al., 2009; Pianta et al., 2005,). Specifically, at the classroom level, teachers' endorsing authoritarian beliefs tended to be less aware of and responsive to children's emotional, behavioral, and cognitive cues. This may be because teachers with these beliefs tend to believe that all children should receive similar treatment, and thus may be less likely to provide differentiated support for children. They also may be less aware of a child needing additional support, and consequently less likely to provide the scaffolding needed for the child to engage fully within the classroom.

Similar to the classroom level, teachers' with stronger authoritarian beliefs tended to provide individual children with lower levels of sensitivity, responsiveness, and support for a child's autonomy. This finding confirmed previous work that teachers with authoritarian beliefs were less likely to follow the child's lead and provide support (Driscoll & Pianta, 2010) and extended the finding to children who display disruptive behavior. It is possible that a teacher who believes that she must treat all children alike may provide the same level of support to all children, even if a child requires more support due to his/her behavior. Furthermore, teachers indicating that they held more

authoritarian beliefs were less likely to be engaged positively with an individual child in the classroom. Specifically, children demonstrated less positive engagement with their teacher and conversed less with teachers who hold adult centered beliefs. This may be due to a teacher's limited provision of emotional support or differentiated sensitivity. It also could be that the child may no longer expect differentiated support from the teacher, and consequently does not approach her with concerns or questions.

Negative Behavior Attributions at the Classroom Level

We found that teachers' causal attributions were negatively associated with the quality of their teacher-child interactions at the classroom level. That is, when teachers endorsed believing that children's disruptive behavior was stable within the child, occurred across contexts, and was due to something internal within the child they tended to be less responsive, aware, and sensitive to children's needs within the classroom. This provides new evidence that a teacher's causal behavior attributions relate to the ways in which a teacher interacts with children. The lack of awareness to behavioral cues may keep a teacher from intervening at an appropriate time in order to de-escalate behavior, and consequently, cause them to rely on more reactive behavior management practices. This extends the finding that a teacher's causal attributions relate to the teacher's report of inappropriate behavior management practices by providing evidence that a teacher's causal attributions related to more than just a teacher's *report,* but also to observed teacher practices (e.g., Andreou & Rapti, 2010; Bibou-Nakou et al., 2000). It is possible that teachers who believe that child disruptive behavior is not likely to change may feel less need or motivation to provide individualized behavioral or emotional support to children. Additionally, if a teacher believes that a child's misbehavior occurs across

contexts, she may not recognize a need to change management practices within her own classroom.

As expected based on a previous study (Carter et al., 2014), teachers' responsibility attributions did not predict the quality of interactions at the classroom level. A teacher that holds high responsibility attributions believes that child disruptive behavior is purposeful and deserves blame and discipline. It is possible that a teacher with these attributions interacts with individual children within her classroom in different ways (e.g., providing less support for a child with disruptive behavior), but that when aggregated to the classroom-level these interactions are not significantly lower.

Negative Behavior Attributions at the Individual Child Level

Although we expected to find that child disruptive behavior moderated the relation between attributions and teacher-child interaction quality, we did not expect to have differential findings for causal and responsibility attributions. We found that teachers' attributions regarding child disruptive behavior were differentially associated with the quality of teacher-child interactions at the individual child level depending upon the severity of a child's display of disruptive behavior.

With regard to causal attributions, we found that as a child's disruptive behavior decreased, teachers' attributions became more strongly associated with positive interactions with that child. In other words, when a child displayed low levels of disruptive behavior, a teacher's causal attributions were more linked with positive interactions between the teacher and child in the classroom. Given that causal attributions were linked to lower levels of teacher responsivity at the classroom level and previous evidence from the literature of a significant positive correlation between causal

attributions and authoritarian beliefs (Carter et al., 2014), it is possible that teachers with higher causal attributions provide children with low to moderate levels of disrupted behavior a similar level of support as the rest of the children in the classroom (i.e., less differentiated emotional and behavioral support). Perhaps, when a child displays more severe disruptive behaviors this requires a teacher to address the behavior and differentiate her level of support (e.g., physical aggression) in order to maintain adaptive classroom functioning. And, this practice is not dependent upon whether a teacher believes the behavior is due to something internal or external within the child. Consequently, children with severe levels of disruptive behavior may interact with a teacher in a similar way regardless of the teacher's level of causal attributions, whereas the relation between causal attributions and dyadic teacher-child interactions is more similar to the classroom-level interactions for children with lower levels of disruptive behavior. Additionally, since teachers with causal attributions believe that child disruptive behavior is something about the child (internal), they may feel sympathy for a child with severe disruptive behavior, which may encourage them to engage in more interactions or make more accommodations for this child.

With regard to responsibility attributions, we found that as a child's disruptive behavior increased, a teacher's attributions became more strongly and negatively associated with the quality of interactions between her and the child in the classroom, as expected. As figure 1 illustrates, this meant that for children with more disruptive behavior, they engaged more positively with teachers who held low responsibility attributions. Teachers with lower responsibility attributions believe that child misbehavior doesn't deserve blame, it wasn't done purposefully, and it doesn't deserve to

be disciplined. These teachers may be more open to interacting with and providing scaffolding to children with severe disruptive behavior. Additionally, it is likely that children with more severe disruptive behavior need this scaffolding more regularly than a child with less severe disruptive behavior; consequently, the teacher may interact with a child with more severe disruptive behavior more often.

Beliefs over the School Year

As hypothesized, teachers' beliefs about children did not predict change in the quality of teachers' interactions with children at the classroom or individual child level from the beginning to the end of the preschool year. We would expect that change in classroom quality might be due to many factors (e.g., increased familiarity and comfort with the children, professional development, etc.). Contrary to hypothesis, teachers' negative behavior attributions also did not predict change in quality of teachers' interactions at the classroom or individual child level. One reason that we may not have found a link between teacher beliefs as measured at the beginning of the year and change in interaction quality is that beliefs also change over the course of the year. Consequently, in future studies, it seems important to assess beliefs over time to determine how stable they are.

Limitations

There were several limitations to the current study that must be acknowledged. The current study measured teacher beliefs at only one time point – the beginning of the year. This is based on previous studies that have made the assumption that teacher beliefs are stable (Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997). It is possible that beliefs change over the course of the school year. This may even depend upon

different factors, such as the level of experience of the teacher or as a result of professional development. Additional studies need to be conducted to investigate the stability (or lack thereof) of teacher beliefs. Additionally, since this was an observational study, we were unable to make causal claims. Another limitation to the current study is that it was conducted within the context of a larger, intervention trial. The aim of the intervention was to improve the teacher-child relationship between a teacher and child with disruptive behavior. We addressed this by controlling for intervention condition. However, it is possible that the intervention changed a teacher's beliefs or that the intervention had effects that could not be controlled for statistically. Additionally, the generalizability of the findings is limited to preschool teachers and children with disruptive behavior. However, this is an important population to study because interactions between a teacher and young child with disruptive behavior are often negative and lead to short-term and long-term maladaptive outcomes (e.g., Doumen et al., 2008; Ladd & Burgess, 2001).

Future Directions

The results of the current study suggest that teacher beliefs are an important factor in understanding the quality of a teacher's interactions at the classroom and individual child level. Additional studies should examine the stability of authoritarian beliefs and behavior attributions across the course of the year. Based on the finding that a child's disruptive behavior changes the relation between a teacher's attributions and quality of interactions with that child, future research should continue to explore how a teacher's attributions may interact with a child's behavior in order to predict the quality of interactions and subsequently, the relationship, between the teacher and the child.

Additionally, results suggest that the three types of teacher beliefs were linked with quality of interactions in different ways. Future work should continue to examine a range of teacher beliefs and how they are distinct and similar with regard to how they may contribute to teachers' practices at both the classroom and individual child levels.

The current study fills an important gap in the literature by contributing to our knowledge regarding teacher beliefs about children and their behavior. The study provides preliminary support for the idea that interventions that aim to improve teacher-child interactions at the classroom level may want to address authoritarian beliefs and causal attributions before or as a component of intervention implementation. Interventions that aim to improve interactions at the dyadic level may want to address authoritarian beliefs, causal attributions, and responsibility attributions in conjunction with intervention implementation. Further research regarding the stability and malleability of authoritarian beliefs and behavior attributions would provide additional information about how to design professional development to address these teacher beliefs.

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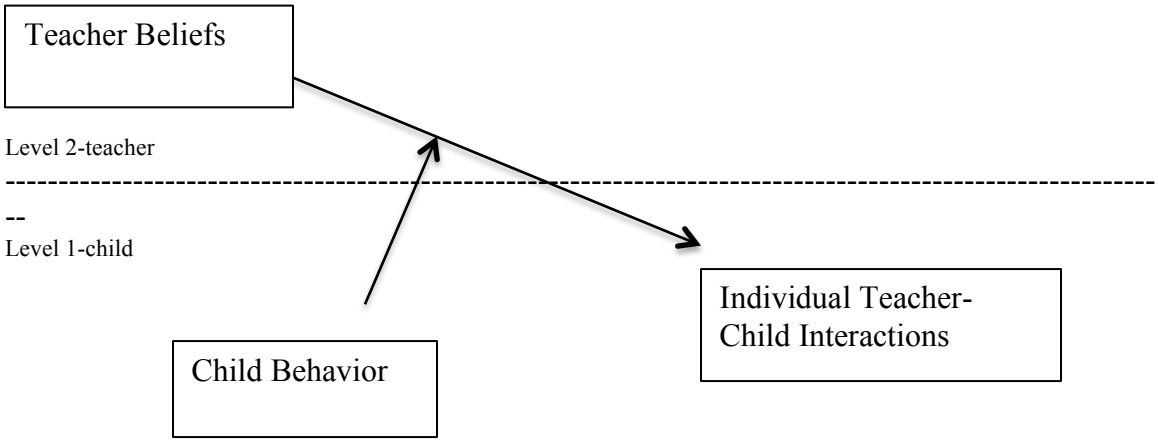
Table 1

Descriptive Statistics of the Sample

Classroom Demographics				
Type				
% State-funded	26			
% Head Start	19			
% Private	55			
Teacher Demographics	**Mean**	**Std Dev**	**Minimum**	**Maximum**
Age (in years)	42.763	11.731	22	69
Years pre-K experience	9.217	7.679	0	38
Gender				
% Female	96.1%			
Ethnicity				
% Caucasian	53%			
% African-American	41%			
% Latino/Hispanic	1.2%			
% Other	4.8%			
Education				
% HS diploma	0.6%			
% Some college, no degree	12.4%			
% HS diploma + training	3.5%			
% 2-year degree	13.5%			
% Bachelor's degree	47.6%			
% Master's degree	12.4%			
Child Demographics				
Age (in years)	4.1			
Income-to-Needs Ratio	1.898	1.534	.20	6.15
Gender				
% male	65.4%			
Ethnicity				
% Caucasian	37.6%			
% African-American	41.9%			
% Latino/Hispanic	7.8%			
% Other	12.7%			



Teacher Covariates: T ethnicity, years of experience, early childhood major, program type, condition
Child Covariates: Child age, gender, ethnicity, PPVT, family income level, selected intervention window

Figure 1. Multi-level (2-1-1) moderation model.

Table 2

Descriptive statistics for predictor, moderator, and outcome variables

Predictor Variables	Mean	Std Dev	Min	Max
Authoritarian Beliefs	2.37	0.59	1.19	3.88
Causal Attributions	3.79	0.74	2.0	5.44
Resp Attributions	2.98	0.77	1.13	4.69
Moderator Variable				
Child Disruptive Behavior	143.64	42.26	38	256
Outcome Variables				
Classroom Interactions: Responsive Teaching (Baseline)	-.0001	0.70	-1.88	1.70
Classroom Interactions: Management & Routines (Baseline)	0.00	0.18	-0.52	0.45
Classroom Interactions: Cognitive Facilitation (Baseline)	0.00	0.37	-0.95	1.36
Classroom Interactions: Responsive Teaching (End of Year)	.0001	0.70	-2.09	1.83
Classroom Interactions: Management & Routines (End of Year)	.0001	0.14	-0.36	0.38
Classroom Interactions: Cognitive Facilitation (End of Year)	.000	0.38	-0.90	1.51
Individual Interactions: Positive Teacher Behaviors	3.45	0.79	1.42	5.0
Individual Interactions: Negative Teacher Behaviors	2.06	0.70	1.0	4.5
Individual Interactions in Classroom: Teacher Interactions (Baseline)	2.41	0.68	1.06	5.02
Individual Interactions in Classroom: Teacher Interactions (End of Year)	2.39	0.72	1.06	4.91

Table 3.

Regression results for beliefs predicting classroom-level interactions

	Baseline			End of Year		
	RT	MR	CF	RT	MR	CF
	β (SE)	*β (SE)*	*β (SE)*	*β (SE)*	*β (SE)*	*β (SE)*
Covariates						
Baseline Scores	--	--	--	0.431 (.17)*	0.430 (.28)	0.493 (.19)**
Banking time	-0.210 (.16)	0.011 (.07)	0.047 (.10)	0.121 (.17)	-0.028 (.13)	-0.163 (.14)
Child time	0.013 (.14)	0.002 (.09)	0.001 (.13)	0.156 (.20)	-0.079 (.14)	-0.064 (.15)
Head Start	0.057 (.19)	0.030 (.10)	-0.047 (.15)	0.134 (.22)	0.002 (.14)	0.157 (.17)
Private	0.123 (.15)	0.027 (.08)	0.031 (.14)	-0.019 (.19)	-0.072 (.13)	0.006 (.15)
EC major	-0.007 (.14)	-0.011 (.08)	-0.053 (.10)	0.131 (.16)	0.012 (10)	-0.134 (.12)
Years of exp	0.001 (0.01)	0.000 (.00)	-0.004 (.01)	0.001 (.01)	-0.003 (.01)	0.001 (.01)
Ethnicity	-0.320 (0.13)*	0.005 (.08)	-0.070 (.12)	-0.282 (.17)	0.034 (.11)	-0.073 (.11)
Main effects						
Auth beliefs	-0.539 (0.13)***	0.017 (.09)	0.039 (.11)	-0.185 (.17)	-0.018 (.13)	0.031 (.10)
Causal attributions	-0.267 (0.10)**	0.008 (.06)	0.018 (.09)	0.041 (.12)	-0.075 (.09)	-0.051 (.09)
Resp attributions	0.172 (0.11)	-0.006 (.06)	-0.042 (.08)	0.007 (.12)	-0.018 (.08)	-0.010 (.09)

***$p \leq 0.001$. **$p \leq 0.01$. *$p \leq 0.05$. $^{t}p \leq 0.10$.

Table 4.

Regression analyses for beliefs predicting teacher behaviors in an individual teacher-child dyad

	Teacher Interactive Behaviors	
	Positive	Negative
	β (SE)	*β (SE)*
Child-level covariates		
Selected window	-0.066 (.06)	0.039 (.06)
Gender	-0.085 (.06)	0.025 (.06)
Age	-0.001 (.09)	-0.162 (.07)*
Ethnicity	0.028 (.09)	-0.042 (.07)
Family income level	-0.048 (.09)	-0.002 (.09)
Language skills	0.008 (.08)	-0.083 (.07)
Teacher-level covariates		
Banking time	-0.251 (.13)*	-0.668 (.24)**
Child time	0.017 (.11)	-0.082 (.23)
Head Start	-0.136 (.14)	-0.068 (.24)
Private	0.189 (.14)	-0.255 (.33)
EC major	0.261 (.12)*	-0.389 (.24)
Yrs of experience	0.041 (.10)	-0.247 (.21)^{t}
Ethnicity	-0.020 (.11)	0.143 (.22)
Main effects		
Auth beliefs	-0.263 (.11)**	0.227 (.20)
Causal attributions	-0.107 (.13)	0.127 (.25)
Resp attributions	0.075 (.15)	-0.560 (.31)^{t}

***$p \leq 0.001$. **$p \leq 0.01$. *$p \leq 0.05$. $^{t}p \leq 0.10$.

Note: Moderation analyses not significant for positive or negative teacher behaviors

Table 5.

Regression and moderator analyses predicting teacher-child interactions at the individual teacher child level in the classroom context

	Baseline Pos Int w/T	End of Year Pos Int w/T
	β (SE)	*β (SE)*
Child-level covariates		
Baseline scores	--	0.423 (.07)***
Selected window	0.026 (.04)	-0.037 (.04)
Gender	-0.124 (.07)	0.030 (.06)
Age	0.020 (.01)^{t}	-0.008 (.01)
Ethnicity	0.006 (.08)	-0.164 (.09)
Family income level	0.017 (.04)	0.034 (.03)
Language skills	0.001 (.00)	-0.004 (.00)
Teacher-level covariates		
Banking time	-0.113 (.11)	-0.007(.10)
Child time	0.163 (.12)	0.116 (.15)
Head Start	-0.220 (.15)	-0.011 (.12)
Private	0.002 (.13)	0.130 (.13)
EC major	0.200 (.10)*	0.038 (.09)
Yrs of experience	0.000 (.01)	0.008 (.01)
Ethnicity	-0.273 (.11)**	-0.184 (.09)
Main effects		
Auth beliefs	-0.172 (.08)*	0.100 (.19)
Causal attributions	-0.150 (.07)*	0.040 (.15)
Resp attributions	0.106 (.07)	-0.116 (.23)
Ch Dis Behavior	0.000 (.001)	--
Moderation		
Auth beliefs*child dis behavior	0.000 (.002)	-0.001 (.001)
Caus attr*child dis behavior	0.005 (.002)**	0.000 (.001)
Resp attr*child dis behavior	-0.005 (.001)***	0.000 (.002)

***$p \leq 0.001$. **$p \leq 0.01$. *$p \leq 0.05$. $^{t}p \leq 0.10$.

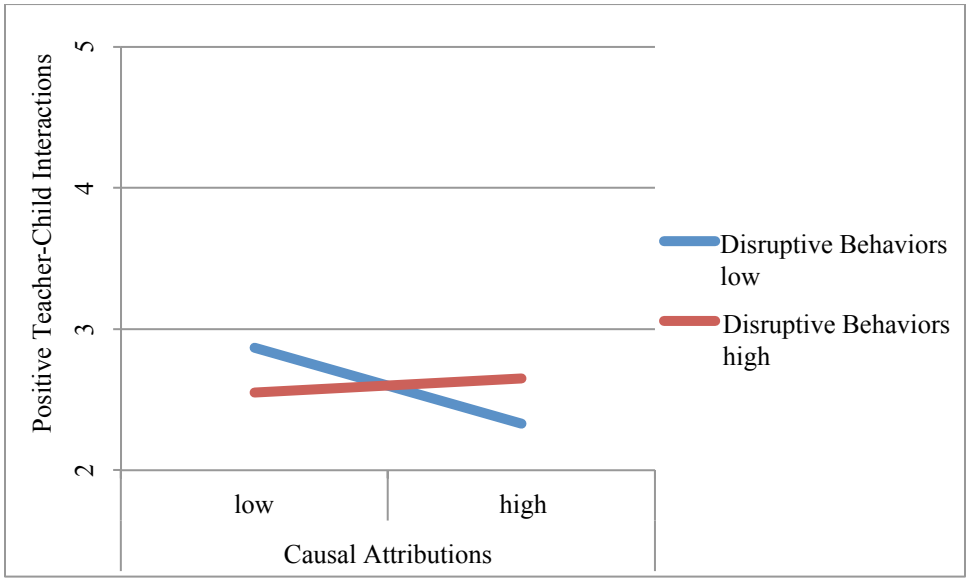


Figure 2. Moderation effect of child disruptive behavior on the association of a teacher's causal attributions and the interaction quality between a teacher and child in the classroom.

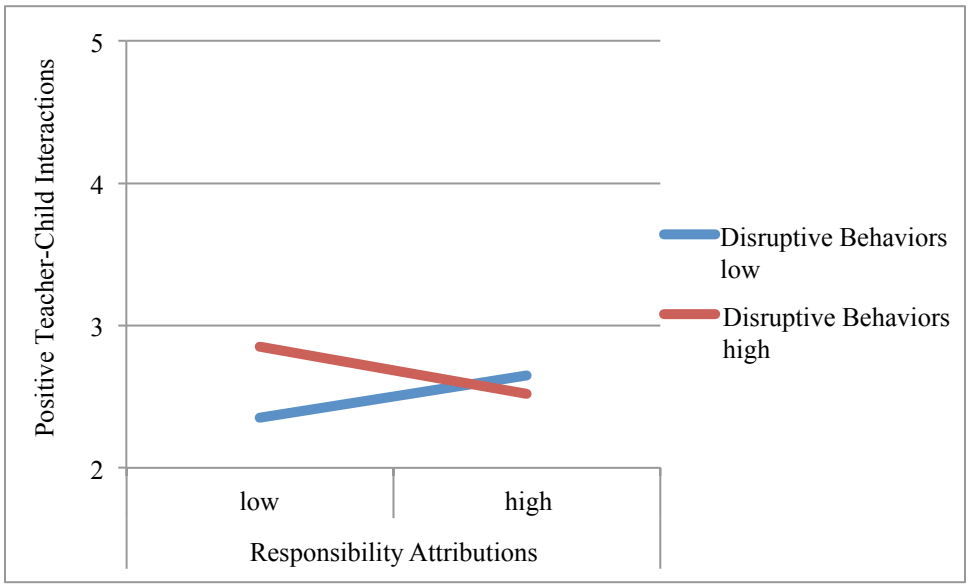


Figure 3. Moderation effect of child disruptive behavior on the association of a teacher's responsibility attributions and the interaction quality between a teacher and child in the classroom.