SUPPORTIVE TEACHER-CHILD INTERACTIONS FOR PRESCHOOL CHILDREN WHO DISPLAY DISRUPTIVE BEHAVIORS

A Dissertation

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APPROVAL OF THE DISSERTATION

This dissertation, ("Supportive Teacher-Child Interactions For Preschool Children Who Display Disruptive Behaviors"), has been approved by the Graduate Faculty of the Curry School of Education and Human Development in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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DEDICATION

I dedicate this work to my father Alberto, whose long fight through Alzheimer has inspired me. I have thought about you each and every single day during these four years. And I will always do.

This work is also dedicated to my mother, Pilar. You took tireless care of my father during these four years, making my studies possible. Between these lines is hidden your encouragement, support, and sacrifice. Thank you.

Both of you instilled in me the value of nurturing relationships and the importance of education.

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Individual children have different experiences interacting with the same teacher (e.g., Cadima, Verschueren, Leal, & Guedes, 2016; Graves & Howes, 2011; Jeon et al., 2010; Lippard, La Paro, Rouse, & Crosby, 2018; Sabol, Bohlmann, & Downer, 2018; Williford, Maier, Downer, Pianta, & Howes, 2013). Children who display externalizing behaviors are at risk for experiencing negativity in their interactions with teachers (e.g., Nelson & Roberts, 2000; Stuhlman & Pianta, 2001; Van Acker, Grant, & Henry, 1996), and teachers have been observed to interact with them in less sensitive and more controlling ways (e.g., Dobbs & Arnold, 2009; Rimm-Kaufman et al., 2002; Spilt, Koomen, Thijs, & van der Leij, 2012). Prior research has focused on classroom-level teacher-child interactions, indicating that their quality predicts children's academic and socioemotional outcomes both concurrently and longitudinally (e.g., Brock & Curby, 2014; Broekhuizen, Slot, van Aken, Dubas, & Leseman, 2017; Hamre, Hatfield, Pianta, & Jamil, 2014; Leyva et al., 2015; Mashburn et al., 2008). However, studying the classroom-level quality of teacher-child interactions is limited in that it may not represent the experience of children whose teachers perceive them as displaying elevated externalizing behaviors. Thus, investigating the quality of teacher-child dyadic interactions is critical to better understand the classroom experiences of this specific group of children.

Prior work on dyadic teacher-child relational processes has often relied on teacher reports of relationship quality, especially in the relational closeness and conflict that teachers perceive with a particular child (see Sabol & Pianta, 2012 for a review). In addition to investigating the links between a teachers' perception of the relationship and

that child's social and behavioral outcomes, it may be equally important to examine whether observed teacher-child dyadic interactions support children's school adjustment. Observed interactions are of interest given that teacher-child relationships are formed over time through repeated interactions (Pianta, 1999). Focusing on real-time observations of interactions, the studies in this dissertation provide insight into specific teacher-child processes —particularly affective qualities of teacher-child interactions— that support classroom adaptation of preschoolers at risk for exhibiting elevated externalizing behaviors.

Preschoolers whose teachers perceive them as displaying externalizing behaviors (i.e., hyperactivity, inattention and/or oppositionality) are at risk for later school difficulties including, but not limited to, academic underachievement, peer rejection, suspension and expulsion, and school dropout (Conroy & Brown, 2004). However, when these children are paired with teachers who connect emotionally with them and meet their regulatory needs in the classroom, they are more likely to show better academic, social, and behavioral outcomes (e.g., Baker, 2006; Baker, Grant, & Morlock, 2008; Roorda, Verschueren, Vancraeyveldt, Van Craeyevelt, & Colpin, 2014; Silver, Measelle, Essex, & Armstrong, 2005). These findings underscore that warm and close teacher-child interactions and relationships are particularly beneficial for the development of preschoolers who exhibit early disruptive behaviors, and therefore are the focus of this dissertation.

This dissertation is comprised of three independent studies, each of which examined observed teacher-child dyadic interactions in preschoolers rated by their teachers as displaying elevated externalizing behaviors. Paper 1 applied an

implementation science framework to identify patterns of teachers' practices—in the context of a teacher-child relationship intervention—that were associated with improvements in the quality of teacher–child interactions. Paper 2 examined the extent to which teachers' dyadic interactive behaviors enhanced preschoolers' positive engagement with tasks in the classroom, beyond the quality of classroom-level teacher-child interactions. Finally, Paper 3 investigated teachers' emotion talk and its intersection with dyadic teacher-child affective qualities in promoting children's positive engagement with the teacher in the classroom. Together, these studies contribute to our knowledge on how and why dyadic teacher-child interactions support positive classroom adaptation for preschoolers whose teachers perceive them as displaying elevated externalizing behaviors.

Theoretical Perspective

Teacher-child interactions. This dissertation is grounded in developmental-contextual theories emphasizing that children develop through dynamic, reciprocal, and progressively more complex interactions with their contexts (Bronfenbrenner & Morris, 2006; Sameroff, 2010; Vygotsky, 1978; Witherington, 2015). All these theories share the notion that social interactions are the most proximal process through which children's development is enhanced within a specific context. Thus, they serve as guiding frameworks for examining teacher-child interactions as the most critical process that guides or constrains children's learning and development in the early childhood classroom.

Interactions with teachers are meaningful in that teachers bring to them resources that children use to grow and learn in the classroom setting (Hamre, 2014). Compared to

interactions with peers, exchanges with teachers are especially powerful to regulate children's behavior given their asymmetrical nature; the adult is more mature, and there is a power differential between teachers and children (Davis, 2003; Pianta, 1999). For instance, teachers model and instruct children in how to express their emotions (Denham, Bassett, & Zinsser, 2012), and they also play a role in shaping the classroom peer ecology (Bierman, 2011). Interactions with teachers are particularly salient for children who display externalizing behaviors; these children are more likely to need external resources provided by teachers to regulate their emotions and behaviors to positively adapt to the classroom (Bierman, Mathis, & Domitrovich, 2018; O'Connor, Collins, & Supplee, 2012). Consequently, teachers in the preschool classroom are relational resources for all children, and especially for those at risk for exhibiting early challenging behaviors.

Quality of teacher-child interactions. This dissertation stems from attachment theory to define high quality teacher-child interactions (Bergin & Bergin, 2009; Howes & Spieker, 2016; Verschueren & Koomen, 2012). This viewpoint stresses the importance of affective qualities of interactions and relationships, which often include high levels of warmth, closeness, and emotional connection, along with low levels of conflict, negativity, and dependency (Howes, 2000; Schuengel, 2012; Williford, Carter, & Pianta, 2016). Teacher-child relationships are established and maintained through daily reciprocal interactions that provide information to both the teacher and the child. Among these daily exchanges, *how* the teacher and child interact with each other is viewed as the main source of information to build their relationship (Pianta, 1999; Thompson, 2010). For instance, a teachers' sensitivity and responsiveness to the child's needs, the consistency in their availability for the child, and the level of acceptance and emotional

warmth conveyed are all qualities of how a teacher interacts with a particular child that provide information to that child. Pianta (1999) argues that these qualities determine the affordance value of the context for a child; children who experience sensitive and responsive interactions with their teachers are more likely to use them as a secure base to engage with peers and learning tasks, problem solve, and navigate the classroom demands. Children perceived by their teachers to display elevated disruptive behaviors are more likely to enter into and experience interactions with their teachers characterized by conflict, negativity, and high levels of control (Dobbs & Arnold, 2009; Nelson & Roberts, 2000; Stuhlman & Pianta, 2001; Van Acker et al., 1996). As a result, these children may be provided with fewer resources that enhance or support their positive adaptation to the preschool classroom.

Preschool years. Early teacher-child interactions set the stage for children's school success and academic and behavioral competence (Rimm-Kaufman & Pianta, 2000). This is not surprising when considering that neuroscience views early childhood as a period of rapid brain plasticity (Couperus & Nelson, 2008), implying that high-quality preschool teacher-child interactions can serve to build children's brain architecture, thereby building a strong foundation for future learning (Thompson, 2014). Similarly, developmental cascade models posit that children's early competencies and adaptive behaviors cascade over time and across domains (Masten et al., 2005; Masten & Cicchetti, 2010). Thus, teacher-child interactions that support preschoolers' early competencies and adaptive behaviors increase the likelihood of academic and behavioral competence in later years. Likewise, prevention science stresses the importance of high-quality early teacher-child interactions in buffering children from a host of negative

outcomes associated with early risk, such as externalizing behaviors (Domitrovich et al., 2010). Collectively, these perspectives explain why preschool teacher-child interactions can be powerful in shaping children's school success, and thus inform the relevance of examining teacher-child dyadic exchanges in this specific period.

The Importance of Teacher-Child Interactions For Young Children Perceived to Display Elevated Externalizing Behaviors

Emotionally supportive teacher-child interactions are critical for all preschool children (Hamre, 2014). When teachers are attuned to children's emotional needs and respond contingently to them, children show better socio-emotional outcomes such as greater social integration during peer play (Broekhuizen et al., 2017), more positive social self-concept (Leflot, Onghena, & Colpin, 2010), and higher levels of task engagement (e.g., Rimm-Kaufman et al., 2002; Thijs & Koomen, 2008). Sensitive and responsive teacher-child interactions also predict children's gains in emotion identification and recognition (Torres, Domitrovich, & Bierman, 2015), self-regulation (Williford, Vick Whittaker, Vitiello, & Downer, 2013), and prosocial skills (Johnson, Seidenfeld, Izard, & Kobak, 2013).

The quality of teacher-child interactions can be especially powerful to buffer risk and support social and behavioral adjustment for children exhibiting externalizing behaviors (e.g., Baker et al., 2008; Ladd & Burgess, 2001; Silver et al., 2005). This echoes our knowledge that sensitive, responsive, and consistent parent-child interactions are linked to reductions in externalizing behavior (e.g., Dishion et al., 2008; Eisenberg et al., 2005; Webster-Stratton, 1998). Indeed, recently evaluated interventions to improve classroom-level teacher-child interactions demonstrated the largest impact on

socioemotional outcomes for children who started the academic year at highest risk of challenging behaviors (Morris, Millenky, Raver, & Jones, 2013; Raver et al., 2009). This has led to the emergence and evaluation of interventions that include an emphasis on improving exchanges between teachers and children (Lyon et al., 2009; Sutherland et al., 2018; Vancraeyveldt, et al., 2015), or that directly target teacher-child interactions for children display externalizing behaviors (Spilt et al., 2012; Virmani, Masyn, Thompson, Conners-Burrow, Mansell, 2012; Williford et al., 2017). Although this work has provided strong evidence that high-quality teacher-child interactions lead to improvements in children's outcomes, there remain key questions about the mechanisms through which teacher-child interactions serve to support children's positive classroom adaptation. Further, children perceived by their teachers as displaying elevated externalizing behaviors are still at risk for experiencing one-on-one teacher-child interactions characterized by negativity (Nelson & Roberts, 2000; Stuhlman & Pianta, 2001; Van Acker et al., 1996), which in turn leads to increase externalizing behaviors and can create an escalating cycle of conflict (Doumen et al., 2008). For these reasons, it is warranted to examine how and why teacher-child dyadic interactions play out in relation to positive classroom adaptation for this specific group of children. This is the question that the three papers in this dissertation sought to start addressing.

Overview of The Sample

The data used across all three studies come from the Preschool Relationships Enhancement Project (PREP). As part of this project, testing the impact of *Banking Time* on children and teachers, 183 preschool teachers in Head Start (N = 19%), state-funded public (26%) and private (55%) programs rated all children in their classroom on two

externalizing behavior-rating scales (see the Measures section in Paper 2 or Paper 3 for more details). Items from both measures were combined to create a total disruptive behavior score. The two boys and one girl (for adequate gender distribution) with the highest ratings of externalizing behavior in each classroom who had caregiver consent participated. Eighty-eight percent of the children in the study were those identified based on the criteria above. For the 12% of children rated by their teachers as being one of the highest but whose parents did not provide consent, the child with the next highest rating and with parental consent was selected for participation. Selected children's total disruptive score (M = 28.42, SD = 16.18, range 0-78) was significantly higher compared to non-selected children [M = 10.82, SD = 12.43, range 0-78; t(-25.75, $p < 0.001$)] and corresponded to the 81st to 84th percentile on ADHD behaviors. However, the third selected child's teacher-rated externalizing behavior score (M = 19.62, SD = 0.84, range) was significantly lower compared to the first and second selected children [M = 36.65, SD = 0.95; t(13.37, $p < 0.001$)], indicating that there was variability in teachers' perceived externalizing behaviors among selected children.

Overview of The Three Papers

Paper 1 (Understanding *Banking Time* Implementation in a Sample of Preschool Children Who Display Early Disruptive Behaviors). This study took an in-depth look at the implementation of a teacher-child relationship intervention (*Banking Time*; Pianta & Hamre, 2001), in a sample of preschool children rated by their teachers as displaying externalizing behaviors. Children in classrooms where teachers implemented *Banking Time* improved their behavior over the preschool year (Williford et al., 2017) and showed more adaptive stress responses as measured by cortisol (Hatfield &

Williford, 2017). We applied an implementation science framework to identify patterns of teachers' practices in the context of *Banking Time* implementation that were associated with gains in the quality of teacher–child interactions, thus contributing to our knowledge on how to improve interactions between preschool teachers and children perceived by them as displaying externalizing behaviors.

Paper 2 (Exploring Dyadic Teacher-Child Interactions, Emotional Security, and Task Engagement in Preschool Children Displaying Externalizing Behaviors). In this study, we examined one specific mechanism by which dyadic exchanges with teachers might serve to regulate children's behavior. Grounded in an attachment framework, we explored the extent to which teachers' dyadic interactive behaviors enhance preschoolers' engagement with tasks in the classroom through providing children with emotional security. We accounted for the classroom-level emotional climate to isolate the unique contribution of dyadic teacher-child interactions on children's task engagement. Findings from this study expanded our understanding on how dyadic teacher-child interactions support positive task engagement for preschoolers perceived by their teachers as displaying elevated externalizing behaviors.

Paper 3 (Teacher-Child Emotion Talk in Preschool Children Displaying Elevated Externalizing Behaviors). We examined teacher-child emotion talk and its link with gains in children's positive engagement with the teacher in the classroom. To isolate the unique contribution of emotion talk, we accounted for the affective quality of teacher-child interactions and relationships. We also explored whether the link between emotion talk and children's engagement with the teacher depended on teacher-child affective qualities. Findings from this study underscored that early childhood teachers can

play a role in supporting positive engagement with teachers for preschoolers perceived by them as displaying elevated externalizing behaviors.

Significance

Most of our current knowledge on teacher-child dyadic relational processes is based on teacher-reported measures (e.g., Baker et al., 2008; Birch & Ladd, 1998; Henricsson & Rydell, 2004). Although informative, teacher-reports are retrospective and they lack the sensitivity and specificity that characterize observational information (Yoder & Symons, 2010). Thus, observations of teacher-child interactions may contribute to provide a more comprehensive understanding of teacher-child relational processes. Addressing this gap in the literature, the three studies in this dissertation relied on observational data to investigate teacher-child interactions.

The majority of classroom-based research in this sample aims to describe, prevent, or reduce the risk associated with early disruptive behaviors (e.g., Brock & Beaman-Diglia, 2018; DuPaul, McGoey, Eckert, & vanBrakle, 2001; Kupersmidt, Bryant, & Willoughby, 2000; Major, Seabra-Santos, & Gaspar, 2018; Wood, Cowan, & Baker, 2000). The focus on the risk accompanying externalizing behaviors offers an informative but narrow perspective on the behaviors and experiences of these children in the early childhood classroom. Observation-based evidence indicates that behaviors such as physical aggression, active non-compliance, or tantrums occur at relatively low rates in the classroom environment (McEvoy, Stray, Rodriguez, & Olson, 2003; Walter & LaFreniere, 2000; Zaghlawan & Ostrosky, 2011). Therefore, moving beyond externalizing behaviors and their associated risk is critical to more comprehensively characterize children's preschool experiences. Further, it may be especially important to

investigate these children's capacity to actively and positively participate in the classroom to better understand how to support their school success. Responding to this need, all three papers in this dissertation intentionally studied children's positive engagement in the classroom —with teachers in Papers 1 and 3, with tasks in Paper 2—as one key aspect of children's positive classroom adaptation (Ladd, Kochenderfer-Ladd & Rydell, 2017).

Finally, this work contributes to emphasize the role that the classroom context—particularly teacher-child dyadic relational processes—plays in the social and behavioral adjustment of children perceived by their teachers as displaying elevated externalizing behaviors. For instance, Paper 2 showed that the quality of teacher-child dyadic interactions matters for children's engagement with tasks above and beyond the classroom-level quality of teacher-child interactions. Likewise, Papers 1 and 3 point to specific teaching practices (i.e., observing and narrating the child's actions or talking with them about emotions) that support children's positive engagement with teachers in the classroom. Ultimately, the studies in this dissertation demonstrate that the patterns in which young children engage in the classroom are inherently relational. Thus, they suggest that a relational perspective is needed to support these children in making the most out of the social and learning opportunities offered by the early childhood classroom.

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Understanding *Banking Time* implementation in a sample of preschool children who display early disruptive behaviors

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Abstract

The development of a warm and supportive relationship with their teacher is protective for preschool children, and particularly beneficial for children who display early disruptive behaviors. *Banking Time* is a dyadic, short-term intervention to improve the quality of teacher-child interactions between a teacher and a specific child, building a more positive teacher-child relationship. During *Banking Time* sessions, both teacher and child interact towards an activity chosen by the child. This study used variable- and person-centered approaches to examine *Banking Time* implementation in a sample of diverse preschool teachers (*N*=120) and children (*N*=319) randomly selected to participate in the intervention. Results indicated that the majority of teachers implemented expected practices (i.e., observe and narrate the child's actions, allow the child to lead) as intended. However, although teachers were instructed to limit teacher-directed practices (i.e., ask questions, give praise, and use commands), teachers' use of these practices was not as limited as ideally expected. Three different implementation patterns were evident: (i) High Fidelity, in which the teachers engaged in the child's activity while ensuring that the child led the session; (ii) Low Engaged, in which the child led the session but the teacher was not engaged in the child's activity; and (iii) Teacher-Led, in which the teacher was engaged in the child's activity but also directing the session instead of ensuring the child's lead. These implementation patterns were linked to changes in the quality of teacher-child interactions. Implementation findings from this study can inform interventions to improve the quality of teacher-child interactions.

Keywords: Implementation Science, Teacher-child Interactions, Teacher-child Relationships, Disruptive behaviors, Preschool, Early Intervention.

Introduction

Children who display early disruptive behaviors are at risk for having interactions with teachers that are more often characterized by negative affect and conflict (Sabol & Pianta, 2012). These negative teacher-child interactions are linked to long-term negative outcomes including academic under-achievement and grade retention (Bierman et al., 2013). Various targeted interventions have focused on improving teacher-child interactions as a way to improve behavioral and academic outcomes for children who display early disruptive behaviors (e.g., Webster-Stratton, Reid & Hammond, 2001). Among them, *Banking Time* (Pianta & Hamre, 2001) is an attachment-based, dyadic intervention to improve the relationship between a teacher and a specific child by changing the nature and quality of teacher-child interactions (Pianta, 1999). *Banking Time* comprises a set of practices designed for teachers to intentionally interact closely and positively with a specific child to develop a strong and supportive relationship with them. Teachers apply these practices on a regular basis during *Banking Time* sessions, which are short (10-15 min), one-on-one sessions where both the teacher and child engage in an activity chosen by the child. *Banking Time* practices involve teachers' active involvement in the child's activity (i.e., teachers carefully observe the child's actions; narrate what the child is doing; label the child's emotions) while ensuring that the child leads the session (i.e., teachers limit teacher-directed practices such as choosing the activities, asking questions, giving praise and using commands).

Children in classrooms where teachers implemented *Banking Time* improved their behavior over the preschool year (Williford et al., 2017) and showed more adaptive stress responses as measured by cortisol (Hatfield & Williford, 2017). Based on these

promising results, the current study expanded upon *Banking Time* intent-to-treat results by being the first one to take an in-depth look at implementation fidelity within the intervention condition. We applied implementation science to gain a better understanding of the variability in teachers' *Banking Time* fidelity. A deep understanding of *Banking Time* implementation is critical to guide replication and scale-up efforts (McCall, 2003), as well as the development and use of similar interventions to improve the quality of teacher-child interactions and relationships.

Teacher-Child Relationships Are Critical For Children Who Display Early Disruptive Behaviors

The teacher-child relationship is a critical proximal process through which children's academic and socioemotional development are enhanced within the preschool classroom (Birch & Ladd, 1997; Hamre & Pianta, 2001). When children have a close relationship with their teachers—in which they show warmth and respect to each other, share positive affect, and the child is comfortable approaching the teacher—children tend to be more accepted by their peers and show higher levels of academic achievement (e.g., Berry & O'Connor, 2010). In contrast, when high levels of conflict characterize their relationship with teachers, children show lower levels of behavioral adjustment and academic achievement ratings (e.g., Pianta & Stuhlman, 2004). Teacher-child relationships are formed over time through repeated interactions (Pianta, 1999), and children who display early disruptive behaviors are at risk for developing maladaptive cycles of interactions with their teachers (Spilt, Koomen, Thijs, & van der Leij, 2012). The associations between teacher-child interactions and children's developmental outcomes are bidirectional; teachers influence children as well as the reverse. Teachers

report more conflict when interacting with children who display early disruptive behaviors (Doumen et al., 2008), and children who show more conflict with teachers experience more negativity from them (Stulhman & Pianta, 2001), which may exacerbate children's externalizing behavior. As a result, these children likely have fewer opportunities for engaging in learning and being accepted by peers, and may also have fewer incentives to behave in adaptive ways. Therefore, close teacher-child relationships are a key feature of children's high quality school experience and are the target of *Banking Time.*

Banking Time **Intervention Effects**

Preliminary evidence of *Banking Time* effectiveness in reducing children's disruptive behavior (Driscoll, Wang, Mashburn, & Pianta, 2011; Driscoll & Pianta, 2010) led to a large-scale randomized control trial (RCT) that tested its impact in a sample of 470 preschoolers displaying elevated externalizing behavior (Williford et al., 2017). Classrooms were randomized into one of three conditions: *Banking Time*, Child Time (a time-controlled condition where teachers spent the same amount of individual time with children but had no constraints about how they interacted with children), or Business-as-Usual (BAU). Compared to children in BAU, children in *Banking Time* were reported by their teachers to show declines in disruptive behaviors from baseline to the end of the year. A similar, but not statistically significant pattern, was seen for teachers who participated in Child Time. Compared to BAU teachers, only teachers assigned to implement *Banking Time* displayed lower negativity in their interactions with children during a structured task post-intervention. In addition, Hatfield and Williford (2017) embedded a quasi-experimental design within the larger RCT to examine cortisol patterns

of a sub-sample of children across the three conditions. Children in the *Banking Time* condition showed a significant decline in cortisol when compared to BAU children. These unique positive findings provide evidence to support the use of *Banking Time*, suggesting something protective in the intervention that goes beyond spending time with the child. Based on these results, the logical next step is to examine *Banking Time* implementation to advance our understanding of how and why the intervention worked (Berkel, Mauricio, Schoenfelder, & Sandler, 2011; McCall, 2003).

Applying Implementation Science To Better Understand How *Banking Time* Works

Implementation science studies how evidence-based interventions are translated into naturalistic settings (e.g., schools), and stresses that the adoption of evidence-based interventions will be effective only if they are implemented as intended (Durlak, 2015). Descriptive data from *Banking Time* implementation indicated that *Banking Time* teachers were more likely to report activities consistent with a *Banking Time* session (e.g., play with a clay, blocks, or art materials), and less likely to report unintended activities (i.e., academics tasks such as teaching letters, or practicing counting), when compared to Child Time teachers (Williford et al., 2017). Previous work examining *Banking Time* implementation found adequate levels of dosage and consultant-reported quality (i.e., teachers' overall delivery of the intervention as prescribed) across the intervention trial (Williford, Wolcott, Vick Whittaker, & LoCasale-Crouch, 2015). Regarding quality, consultants rated that *Banking Time* teachers were engaged with the intervention and that their general use of *Banking Time* practices was good (i.e., a global rating of the extent to which teachers used expected practices effectively, maintained child-led sessions, and limited teacher-directed practices). In related work, LoCasale-

Crouch and colleagues (2017) observed and coded for the presence of *Banking Time* practices during a structured play-task for all teacher-child dyads that participated in the efficacy trial, regardless of their treatment condition (i.e., *Banking Time*, Child Time, or BAU). The authors used a composite that grouped *Banking Time* practices together into expected (i.e., observation, narration, labeling, and child-led) and restricted (i.e., questions, commands, and praise), and found that variability in the use of both expected and restricted practices accounted for changes in the quality of teacher-child interactions. In the present study, we extend the understanding of *Banking Time* implementation in two ways. First, it is the first study to examine teachers' fidelity to *Banking Time* practices within the intervention sessions, which were video-recorded and coded by independent research assistants. Second, we investigated the extent to which fidelity to individual *Banking Time* practices was associated with changes in the quality of teacher-child interactions. To successfully bring *Banking Time* to scale, this specificity is crucial to prioritize those intervention components that are essential to improve teacher-child interactions, and thus replicate the positive outcomes that were found in the intervention trial (McCall, 2003).

Regarding the study of fidelity, implementation science research indicates two key issues. First, there is a need to empirically test whether intervention components (i.e., *Banking Time* practices) are associated with changes in intended outcomes (Durlak, 2015; Humphrey, 2013). Further complicating this need, studying single components of an intervention does not account for the dynamism of implementation that actually occurs, where all components are enacted in tandem. Thus, describing patterns or combinations of intervention components, and exploring their relation to desired outcomes, may be a

better way to understand how the intervention works in naturalistic settings (Century, Rudnick & Freeman, 2010). Second, most fidelity of implementation studies have relied on a single informant report by the intervention implementer (Domitrovich & Greenberg, 2000). Thus, there is a need for observational measures of implementation fidelity as a way to provide a less biased perspective of participants' enactment of core components. Following these two indications, the current study utilized observational data from *Banking Time* sessions to explore patterns of the multiple components or practices that make up *Banking Time,* and their association with changes in the quality of teacher-child interactions.

The Present Study

This study examined variability in *Banking Time* fidelity of implementation in a sample of diverse preschool teachers randomly selected to participate in the intervention. Relying on videotapes from the actual intervention sessions ($N = 458$), data collectors observed and coded for teachers' fidelity to individual *Banking Time* practices (see Table 1). We integrated both variable- and person-centered approaches to obtain complementary information on teachers' fidelity to *Banking Time* practices. Additionally, we empirically tested whether patterns of fidelity to these practices were associated with changes in the quality of teacher-child interactions.

Using a variable-centered approach, we first characterized teachers' implementation of each *Banking Time* practice during the intervention sessions. Furthermore, we compared teachers' use of each *Banking Time* practice during the intervention sessions with BAU teachers' use of the same practices during a structured-play session. We did this to explore the extent to which *Banking Time* changed teachers'

interactions with children in ways that looked different from how teachers would interact with a child in a similar play situation.

Because teachers implemented multiple *Banking Time* practices concurrently during the intervention sessions, we then used a person-centered approach to examine patterns of *Banking Time* practices. These analyses were exploratory, and thus we did not have prior research evidence to guide predictions about implementation patterns. However, we anticipated that some sessions would be characterized by teachers enacting practices indicative of high fidelity to *Banking Time*, as well as sessions that would show teachers engaging in practices that indicate variability in implementation. Finally, we explored the extent to which patterns of implementation predicted changes in the quality of teacher-child interactions. Based on the *Banking Time* theory of change, we expected that teachers who conducted *Banking Time* with high fidelity, and the children with whom they engaged in *Banking Time*, would demonstrate greater gains in the quality of teacher-child interactions when compared to teachers and children from dyads in which teachers conducted *Banking Time* with lower fidelity. Results from this study may inform refinements to the intervention to make it simpler, incorporate practitioners' adaptations, or incorporate future implementation supports, all of which will ultimately contribute to improved efficiency in future *Banking Time* applications without compromising its effects.

Method

Participants

Preschool teachers (N =173) who participated in the *Banking Time* efficacy trial were randomly assigned into one of three conditions: *Banking Time*, Child Time, or BAU (see Williford et al., 2017). The present study included only those teachers and children in the

Banking Time (*N* = 59 teachers; 168 children) and BAU (*N* = 61 teachers; 151 children) conditions. There were no significant differences in the demographic characteristics of teachers and children across conditions. The subsample of teachers in the present study was age 41 years on average (*SD* = 11.90), nearly all teachers were female (95%), and their ethnic composition was diverse (51% White, 40% Black/African American, 9% Other race/ethnicity). On average, teachers had 9 years of experience teaching Pre-K (*SD* = 7.58) and most of them had a bachelor's degree (49%). Children were an average age of 49 months (*SD* = 6.48), 66% were male, and their ethnic composition was diverse (36% White, 44% Black/African American, 20% Other race/ethnicity). On average, children's mothers had 14 years of education (*SD* = 2.29), and their income to needs ratio was 1.82 (*SD* = 1.51) indicating that children were part of families with low incomes. For a table with more details, see Williford et al. (2017).

Procedures

Preschool programs (Head Start, state-funded public, and private) were recruited in two Mid-Atlantic states in the United States (for more details see Williford et al., 2017). Teachers rated all children in their classroom on two externalizing 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 (for adequate gender distribution) with the highest ratings of externalizing behavior per each classroom who had caregiver consent participated in the study. Within teachers, each of the three participating children was randomly assigned to one of three seven-week windows across the school year. During the child's window, the teacher either engaged

with the child in *Banking Time* (described below), Child Time (a time-control condition), or BAU (where teachers were not instructed to change their practice in any way).

Intervention condition. *Banking Time* (Pianta & Hamre, 2001) sessions are a set of time-limited (10–15 min) meetings during which a teacher and a specific child spend one-on-one time together, two-to-three times per week, within the school setting. As part of the *Banking Time* efficacy trial, teachers implemented *Banking Time* sessions with one child at a time for seven consecutive weeks during that child's randomly determined window. During each session, teachers were instructed to implement expected practices (i.e., observe the child's actions; narrate what the child is doing; label the child's emotions; allow the child to lead the activity) and refrain from restricted practices (i.e., ask questions; give praise; use commands).

A standardized manual and ongoing consultation were used to promote teachers' uptake of *Banking Time*. The manual explains *Banking Time* and its rationale, describes the teacher role, and provides examples and considerations for implementation. Consultants described the intervention and gave the manual to teachers in their first in-person meeting. Following this introduction, teachers began implementing *Banking Time* (one child for a seven-week intervention window, then moving to the second child and finally the third child). As part of the intervention trial, teachers were expected to videotape a *Banking Time* session once a week and send this footage to their consultant. Thus, we expected teachers to submit seven videos per child (one per week, during a seven-week window). On average, teachers submitted 5.02 (SD = 2.20) videos per child. Teachers and consultants met in person once every two weeks, during which time they reviewed short clips of the teachers' own *Banking Time* practice with a child in order to

improve implementation. On the alternate weeks, consultants and teachers met briefly over the phone to make sure teachers were on track with implementation and to problem-solve teachers' questions/concerns.

All consultants ($N = 4$) had early childhood experience and a master's degree in education or psychology. Before starting their work with teachers, consultants received intensive training that consisted of one week of onsite training and additional offsite training. Consultants also participated in weekly group and individual supervision throughout the year to ensure that they were providing accurate information in their support of teachers. A professional with extensive early childhood experience and prior training in *Banking Time* led these supervisions.

Data collection. The majority of data were collected at four time points during the year: baseline (at the beginning of the study before treatment was introduced), and following each of the three, seven-week intervention windows (see Williford et al., 2017). End-of-year (EOY) data collection occurred immediately following the third intervention window. At baseline, child and teacher characteristics were collected via family and teacher survey, respectively. Teacher and child outcome data were collected at the four time points via teacher report, parent report, and observation. In addition, a videotaped Teacher–Child Structured Play Task (TC-SPT) was conducted post the seven-week intervention window for each teacher-child dyad. In this task, both the teacher and child engage in a play session that includes free play and clean-up tasks (Whittaker, Williford, Carter, Vitiello & Hatfield, 2018). As noted above, observations of *Banking Time* fidelity (i.e., teachers videotaping a *Banking Time* session) were collected weekly during each child's intervention window.

Data collectors attended a two-day training for the observation measures. To be reliable and be able to conduct observations, they were required to code five reliability clips independently, and score within one point of a master-code on 80% of the dimensions (see below for details on each measure). Observations of teachers occurred at baseline and EOY (i.e., before and after the three, seven-week intervention windows), and observations of children occurred before and after the seven-week intervention window they participated in. Each observation day lasted three–four hours and about three days per time point. Teachers were observed for approximately five 20-minute cycles ($M = 4.88$, $SD = 1.78$) and children for approximately eight 15-minute cycles ($M = 8.40$, $SD = 1.54$). Data collectors were also trained to administer and videotape the TC-SPT during the post-window of the selected child.

Two separate teams of undergraduate research assistants served as coders in this study: one team for the TC-SPT and the other for *Banking Time* fidelity. No coders were involved with any field data collection or had any other interaction with teachers or children in the study. Coders were randomly assigned video sessions, and two coders applied the coding scheme independently for tapes that were double-coded. Coders were trained to reliability and maintained reliability via regular calibration meetings.

Measures

Teacher and child characteristics. Teachers and parents or guardians completed a demographic survey in the fall for teacher and child characteristics, respectively.

Fidelity of implementation. Coders evaluated teachers' enactment of *Banking Time* practices (see Table 1). The overall use of *Banking Time* expected practices was coded considering frequency and quality, using a five-point Likert scale, were 1=very poor and

5=very good. The presence of *Banking Time* restricted practices was coded considering only frequency: praise was assessed using a 5-point scale, where 1=none/never and 5=frequently/often, and simple counts were used to record questions and commands. Trained coders rated the presence of these practices by applying this coding scheme to videotapes of both *Banking Time* sessions and the TC-SPT.

For *Banking Time* sessions, up to four videos per child were randomly selected (from the ideal total of seven videos per child) and double-coded independently by two different coders. The ICC across scores was .84, which indicated good reliability (Koo & Li, 2016), and scores across coders were averaged for further analysis and used as continuous variables for the latent profile analysis. If a child had four or fewer videos (N = 49), all videos were coded. On average, 3.75 videos per child were coded (SD = 0.64).

For the TC-SPT, the free play portion of the task was selected due in part to the opportunity for BAU teachers to engage in play with children in the most typical way they could (see Whittaker et al., 2018). Thirty-five percent of tapes were double coded by coders different from the ones who coded *Banking Time* sessions and blind to treatment condition. The ICC across scores was .73, which indicated moderate and acceptable reliability (Koo & Li, 2016).

Quality of teacher-child interactions at the child level. The Individualized Classroom Assessment Scoring System (inCLASS; Downer, Booren, Hamre, Pianta & Williford, 2011) is an observational assessment of children's classroom engagement in interactions with teachers, peers, and tasks. The inCLASS measures 10 dimensions on a 7-point scale: (1) positive engagement with teacher, (2) communication with teachers, (3) conflict with teacher, (4) sociability with peers, (5) conflict with peers, (6) assertiveness

with peers, (7) communication with peers, (8) engagement with tasks, (9) reliance with tasks, and (10) behavior control. In this study, we used the domain score of Positive Engagement with Teacher, which includes the dimensions of positive engagement (i.e., attunement to the teacher, proximity seeking, and shared positive affect) and communication with teachers (i.e., initiates communication with the teacher, sustains conversations, and uses speech for varied purposes). We also used the dimension score of conflict with teacher (i.e., aggression, noncompliance, negative affect, and attention-seeking directed toward the teacher, for varied purposes).

Inter-rater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same child. ICCs, and agreement within one point (the measure developers' benchmark for reliability) were as follows: Positive Engagement with Teacher = .74, 86% and Conflict with Teacher = .63, 98%, suggesting moderate and acceptable reliability. Internal consistency was calculated across observation periods and showed acceptable levels: Positive Engagement with Teacher was $\alpha = 0.69$ and Conflict with Teacher was $\alpha = 0.73$. The inCLASS has shown construct and criterion validity (Downer, Booren, Lima, Luckner, & Pianta, 2010), in addition to predicting growth in children's readiness skills (e.g., Williford, Whittaker, Vitiello, & Downer, 2013).

Quality of teacher-child interactions at the classroom level. The Classroom Assessment Scoring System (CLASS; Pianta, LaParo, & Hamre, 2008) is an observational measure of classroom quality across 10 dimensions using a seven-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. For this study, we used the domain of Emotional Support (i.e., positive and negative climate, teacher sensitivity, and regard for student perspectives), as it was the most proximal to our questions.

Inter-rater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same classroom. The ICC for Emotional Support was .67, which indicated moderate reliability (Koo & Li, 2016), and agreement within 1 point was 95% (the measure developers' benchmark for reliability). Internal consistency was calculated across observation periods and was good: Emotional Support was $\alpha = 0.82$. Multiple studies have demonstrated reliability and validity of the CLASS (e.g., Mashburn et al., 2008).

Analytic Plan

Individual *Banking Time* Practices: Descriptive Statistics And Comparison Models

We computed descriptive statistics to examine teachers' implementation of individual *Banking Time* practices (see Table 1) during the intervention sessions. In addition, we compared the implementation of individual *Banking Time* practices during the intervention sessions with BAU teachers during a free-play task. We began by randomly selecting one intervention session per child, resulting in a sample of 130 intervention sessions. To explore whether teachers engaged in *Banking Time* interacted with children in ways that were different from teachers in a similar situation (a free-play session), we examined a set of multilevel models (i.e., children nested in teachers). Models had each *Banking Time* practice as the outcome predicted by a dummy code representing the type of session, with free play as the reference group. Session length and window were entered as covariates at level one to control for the variability in the

sessions. Models were estimated using full information maximum likelihood estimation (FIML) in MPlus version 7 (Muthen & Muthen, 1998-2015). This type of estimation accounts for missing data by using all available data for each case when estimating parameters to adjust for potential bias in the estimates resulting from missing data.

Patterns Of Implementation: Latent Profile Analysis

We used latent profile analysis to investigate *Banking Time* patterns of implementation at the session level ($N = 458$). This analytic approach allowed us to use continuous observed variables (i.e., *Banking Time* practices) to derive categorical latent variables, which represent profiles of sessions with shared similar implementation patterns. Three *Banking Time* expected practices (i.e., Observation, Narration, and Child-Led) and three restricted practices (i.e., Questions, Commands, and Praise) were included in the models. Labeling was not included because of insufficient observed variability (see Table 2). All variables were standardized to be on the same scale to facilitate interpretation.

Models with profiles added iteratively were estimated at the session level in MPlus version 7, using FIML (Muthen & Muthen, 1998-2015). We addressed the multilevel nature of the data by using a sandwich estimator (the COMPLEX command). Models with two, three, and four profiles were compared to determine the number of implementation patterns that best fit the data. To do so, we considered multiple indices of overall and comparative model fit; classification certainty or entropy; and parsimony and interpretability (Collins & Lanza, 2010). In particular, we reviewed the Akaike Information Criterion [AIC], and the Sample-size Adjusted BIC [ABIC]. Lower values in these indices indicate better fit. We next examined the Vuong-Lo-Mendell-Rubin

likelihood ratio test and the Adjusted Lo-Mendell-Rubin likelihood ratio test (Adjusted LRT). These statistical tests compare the current model to a model with one fewer profile, and a significant *p*-value suggests retaining the current model. Then, we considered the entropy value for which higher values (>.80) signify a more accurate solution. Lastly, we examined the proportion of sessions classified into each profile to describe the distribution of sessions across profiles.

After determining the number of profiles that best fit the data (see results below), we interpreted and labeled the profiles by examining the means and standard deviations of *Banking Time* practices for each profile. Once this process was complete, we saved the probability of profile membership for each session.

Changes In The Quality Of Teacher-Child Interactions: Prediction Models

First, we tested whether profile membership predicted changes in the quality of teacher-child interactions at the child-level. Because profiles were estimated at the session level ($N = 458$), we averaged each child's probability of profile membership across sessions (i.e., aggregated at the child level; $N = 130$). Per child, this produced a single probability of being classified in each profile, which we used as an estimate of children's average *Banking Time* experience. We then used multilevel models to explore whether children's average experience predicted post-intervention scores in teacher-child interaction quality (i.e., outcome). Pre-intervention scores were included as covariates to predict changes in the outcomes. At the child level, models controlled for baseline externalizing behavior, race/ethnicity, age, parent years of education, family income-to-needs ratio, window, and site. At the teacher level, models controlled for age, ethnicity, years of experience, and education. The multilevel models were required to account for

the nesting of students within teachers. To compare all three profiles, we ran two sets of models: one excluding the probability of being classified in profile two (i.e., Low Engaged) and one excluding profile three probability (i.e., Teacher-Led).

Second, we tested whether profile membership predicted changes in the quality of teacher-child interactions at the teacher level. Because profiles were estimated at the session level ($N = 458$), we averaged each teacher's probability of profile membership across sessions (i.e., aggregated at the teacher level; $N = 55$). Per teacher, this produced a single probability of being classified in each profile, which we used as an estimate of the teacher's average *Banking Time* implementation. We then used linear regression models to explore whether teachers' average implementation predicted EOY scores in teacher-child interactions quality (i.e., outcome). Baseline score (i.e., beginning of the year) was included as a covariate to predict changes in the outcome. Models controlled for teachers' age, ethnicity, years of experience, and education. To compare all three profiles, we ran two sets of models: one excluding the probability of being classified in profile two (i.e., Low Engaged) and one excluding profile three probability (i.e., Teacher-Led).

Results

Individual *Banking Time* Practices: Implementation And Free-Play Comparison

Results indicated variability in the implementation of expected practices and in the refrainment from restricted practices (see Table 2). On average, sessions showed good implementation of Observation and Child Led, fair implementation of Narration, and poor implementation of Labeling. However, restricted practices were present often during the sessions as well, with an average of some instances of Praise, 11 commands, and 25 questions. Thus, an average session could be described as having multiple instances of

the teacher being engaged in the child's play by carefully watching it and describing out loud what the child was doing (e.g., "you chose the yellow ones for your necklace"). Additionally, an average session could be described as one in which the teacher provided instances for the child to choose what and how to play, but also directed their play or conversations by asking questions (e.g., "Do you want me to tie your necklace?"), giving instructions (e.g., "You should not be scared, you just need to take a deep breath"*),* and praising the child's behavior (e.g., "Good job. Your learned the trick!").

Compared to BAU teachers during free-play (see Table 2 for descriptives), teachers during *Banking Time* sessions exhibited significantly more of all expected practices and less of all restricted practices (see Table 3). Thus, during the intervention sessions, *Banking Time* teachers were likely to interact with children in a way that is different from what BAU teachers normally do when playing with a child (i.e., free-play).

Patterns of *Banking Time* Implementation

Two-, three-, and four-profile solutions were examined. Both the three-profile (AIC = 7105.37; ABIC = 7130.15; VLMR = -3627.90, $p < 0.05$; Adj. LRT = 197.82, $p < 0.05$; entropy = .78) and four-profile (AIC = 7030.18; ABIC = 7061.64; VLMR = -3256.69, $p = 0.22$; Adj. LRT = 87.16, $p = 0.22$; entropy = .81) solutions showed patterns of *Banking Time* implementation that were easily interpretable and thus both were considered. A four-profile solution demonstrated a slightly better model fit based on reductions of AIC and ABIC, as well as an increase in the entropy value. However, according to both likelihood ratio tests (i.e., VLMR and Adj. LRT), a four-profile solution did not fit the data significantly better than a three-profile one. Also, in the four-profile solution one of the profiles had a small percentage of sessions (9%; $N = 42$) and the pattern was very

similar to one of the other profiles. After examining both options, the three-profile solution was selected as the most parsimonious solution.

Descriptive statistics and a graphical representation of the three profiles are presented in Table 4 and Figure 1, respectively. Fifty-three percent of *Banking Time* sessions ($N = 244$) were classified into the *High-Fidelity* profile, which described sessions that were led by the child (i.e., relatively high child-led and low levels of restricted practices) and in which the teacher was actively engaged in observing and narrating the child's play. A second profile, comprising 28% of the sessions ($N = 129$), was labeled *Low Engaged*. Similar to the High-Fidelity profile, the Low Engaged profile also described sessions that were led by the child. In contrast, teachers in these sessions were not actively engaged in observing and narrating the child's play. *Teacher-led* was the third profile and represented sessions (19%; $N = 85$) with the lowest levels of child-led and the highest levels of restricted practices, particularly questions and commands.

Banking Time Patterns of Implementation And Changes In The Quality Of Teacher-Child Interactions

At the child level, we predicted changes in positive engagement with the teacher and conflict with the teacher with the child's average probability of membership in each profile. We first used Low Engaged and then Teacher-Led as the reference category to compare all profiles. Table 5 presents unstandardized regression coefficients (β), standard errors, and *p* values for these analyses. Results indicate that an average High Fidelity *Banking Time* experience, in comparison to a Low Engaged one, was associated with significant gains in children's positive engagement with the teacher. An average High Fidelity intervention experience, in comparison to a Teacher-Led one, was not associated

with gains in positive engagement with the teacher. Similarly, having a Teacher-Led *Banking Time* experience, when compared to a Low Engaged one, was not associated with changes in positive engagement with the teacher. In addition, none of the comparisons between profiles was associated with changes in children's conflict with their teacher.

At the teacher level, we predicted changes in emotional support with the teacher's average probability of membership in each profile. We first used Low Engaged and then Teacher-Led as the reference category to compare all profiles. Results, which are presented in Table 5, indicate average High Fidelity implementation, in comparison to Low Engaged, was associated with significant gains in classroom emotional support. An average Teacher-Led implementation, when compared to a Low Engaged one, was also significantly associated with gains in classroom emotional support. When compared to a Teacher-Led average implementation, High Fidelity was not associated with changes in classroom emotional support.

Discussion

This study examined implementation fidelity of *Banking Time,* an evidence-based, dyadic, short-term intervention to improve the quality of teacher-child interactions between a teacher and a specific child. In addition to conducting randomized trials that test the impact of interventions under rigorous conditions, the field has called for a better understanding of how variation in implementation fidelity affects targeted outcomes (Durlak, 2015). Accordingly, this study investigated teachers' fidelity to *Banking Time* practices during the intervention sessions. Using observational data from *Banking Time* sessions, we descriptively examined teachers' fidelity to the intervention components in a

sample of teachers and preschool children who displayed elevated disruptive behaviors. Results indicated that systematic variation in teachers' use of certain practices during *Banking Time* sessions was associated with changes in the quality of teacher-child interactions. This suggested potential core components of *Banking Time* that helped improve the quality of teacher-child interactions. Findings from the present study have implications for informing future school communities' adoption of *Banking Time*, as well as to guide teachers' practices in the context of dyadic interactions. These implications will be discussed in more details below.

Teachers Interacted Differently With Children During *Banking Time* Sessions

One descriptive finding was that teachers' use of *Banking Time* practices was indeed different during the intervention sessions when compared to how teachers typically engage with children during one-on-one play. BAU teachers directed play during free play sessions by embedding teaching moments (e.g., "Let's count how many animals do you have here!"), and asking children to play with the toys in a certain way (e.g., "Where does this piece go?"). In comparison, play during *Banking Time* sessions was much more child-led. This suggests that the intervention had the intended effect of shifting teacher-child interactions to ways different from how teachers usually interact with children—more child-led and less teacher-directed. When compared to other children in the classroom, teachers tend to use more teacher-directed practices when interacting with children who display early disruptive behaviors (Spilt et al., 2012; Stulhman & Pianta, 2001). Such teacher-directed interactions emphasize the power differential between children and teachers, and thus have a negative impact on teacher-child relationships (Davis, 2003). Our finding stresses that it is feasible to shift this

pattern by supporting teachers to intentionally interact with children who display early disruptive behaviors in ways that are more child-led and less teacher-directed. It is probably the case that the training and support associated with *Banking Time* aid these differences in the quality of teacher-child interactions. Allowing the child to take the lead is intrinsically related to teachers' sensitivity to the child's interests and needs, and as such, to the development of a close and positive teacher-child relationship (Ryan, Deci, &, Grolnick, 1995).

Teachers' Attunement Matters For Children's Positive Engagement With The Teacher

Teachers' attunement with the child emerged as a potential core component of the intervention. When a child experienced an average High Fidelity *Banking Time* session, as compared to Low Engaged, this was associated with greater gains in their positive engagement with the teacher in the classroom. During both High Fidelity and Low Engaged intervention sessions, the teacher allowed the child to lead the interactions. However, only during High Fidelity sessions, and not during Low Engaged sessions, the teacher was attuned with the activity – observing and narrating the child's actions. This finding underscores that teachers' attunement with the child during *Banking Time* matters for children's positive engagement with their teachers in the classroom (i.e., seeking interactions with and proximity to the teacher, sharing their affect, and being connected to the teacher). A teacher's attunement in the child's play likely conveys interest in the child during the sessions, providing a platform for the child to positively engage with the teacher in the classroom. Positive engagement with the teacher is important as children rely on teachers to provide them with the support needed to get the most out of the

classroom environment (Hamre, 2014). In fact, for children who display early disruptive behavior, relying on their teachers may be especially important for them to meet the behavioral and regulatory expectations of the classroom (Sabol & Pianta, 2012).

Teachers' Involvement With The Child Matters For Teachers' Improved Emotional Support

Teachers' involvement with the child emerged as another potential core component of the intervention. Teachers' average High Fidelity or Teacher-Led implementation of *Banking Time* was associated with gains in emotional support in the classroom, when compared to Low Engaged. Emotional support refers to the degree to which the teacher builds a positive climate in the classroom, shows sensitivity to students' academic and social needs, and considers children's perspectives (Pianta, LaParo, & Hamre, 2008). One explanation may be that teachers in both High Fidelity and Teacher-Led patterns showed significantly higher levels of Observation and Narration, in comparison to teachers with an average Low Engaged implementation. Observing the child's behavior during the sessions possibly led teachers to be more aware of and sensitive to the child's emotions and needs. Similarly, narrating the child's activities during the sessions possibly encouraged responsiveness to children's perspectives. Both sensitivity and responsiveness are the essence of emotional support (Hamre, 2014), which represents a teacher's efforts to support students' social and emotional functioning in the classroom. Another explanation may be that teachers in both High Fidelity and Teacher-Led patterns showed significantly higher levels of Commands and Praise, in comparison to teachers with an average Low Engaged implementation. Using commands to tell the child what behavior to perform and giving praise to express appreciation for the child's

specific behavior possibly led teachers to be more engaged with the children during *Banking Time* sessions. It is likely that such engagement provided a platform for teachers to be more emotionally supportive in the classroom; high levels of engagement with children are needed to be aware of and responsive to children's academic and emotional needs and cues. This second explanation is contrary to what teachers are instructed to do in *Banking Time* and requires further exploration, which highlights the need for research on whether features of teacher-child dyadic interactions result in improved teacher practices at the classroom level (Hughes, 2012).

Limitations And Future Directions

In sum, findings from the present study pointed to teachers' attunement and involvement with the child as two core components through which the intervention may improve the quality of teacher-child interactions. To successfully bring *Banking Time* to scale, this specificity is crucial to prioritize these two components among others. More broadly, these findings provide insight into two specific ways —demonstrating attunement with the child, and showing involvement with the child's activity—through which teachers could improve the quality of their interactions with children who display early disruptive behaviors.

Several limitations of this study should be considered. First, this study is correlational in nature and so we cannot make causal claims. Second, descriptive statistics indicated insufficient variability for labeling of emotions. Thus, we were not able to include labeling in the implementation patterns. Similarly, as in previous studies (Downer, Booren, Lima, Luckner & Pianta, 2010), insufficient variability was observed for conflict with teacher (i.e., inCLASS dimension). As noted earlier, we did not find any

significant association between patterns of implementation and negative conflict with teachers. Still, it is possible that the lack of variability in teacher conflict may be hiding an association, if there is one. In addition, our decision to aggregate implementation patterns at the child and teacher levels allowed us to get a more precise estimate about children's and teachers' overall *Banking Time* experience, and examine whether these experiences were associated with changes in the quality of teacher-child interactions. However, this decision masks the fact that implementation varies across sessions. As such, future studies should model how fidelity to *Banking Time* practices varies across sessions, to gain a better understanding of how teachers changed their implementation, if they did. Finally, we opted for a person-centered approach to get a sense of how different *Banking Time* practices were implemented together during the intervention sessions. Although this information was valuable to understanding the intervention, the associations between profiles of implementation and outcomes did not allow for examining individual practices in relation to outcomes. Thus, research looking at specific *Banking Time* practices is needed to further unpack the intervention and improve its effectiveness for teachers and children.

Conclusion

This study took an in-depth look at implementation fidelity in the context of an efficacy trial examining the impact of a school-based intervention in the quality of teacher-child interactions. Efficacy trials test the impact of interventions under ideal or highly controlled implementation conditions. However, these conditions are likely unrealistic due to cost outside the randomized control trial context. The present study exemplifies the need for examining interventions' components to better understand the

mechanisms for change in the intended outcomes. Systematic research in intervention components will help move the field beyond interventions to integrating key specific practices into daily interactions between teachers and students (Jones & Bouffard, 2012).

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Table 1.

Definitions and examples for individual Banking Time practices

Practice	Definition	Example
Expected practices		
Observation	Carefully watching the child's behavior, words, and feelings, as well as her own thoughts and feelings.	Carefully watch the child when he/she is intently playing with materials on his own
Narration	Describing out loud what the child is doing with an interested tone of voice.	I see that you are putting the red block on top of the blue block
Labeling	Communicating out loud the child's emotional state.	You are very proud of your drawing!
Child Led	The session was child-led and NOT teacher-directed	The child chose the materials, activities and guided the play.
Restricted practices		
Questions	Making a verbal inquiry that requires an answer from the child	What are you playing with those animals?
Commands	Giving an instruction or order that indicates to perform a behavior. Or giving an implied action or stating it in the form of a question	Put your hands on the table/Use these blocks to build a tower. Or, don't you want to come sit over here?
Praise	Verbalize a favorable judgment attribute, product or behavior of the child	I like the way you cleaned up!

Table 2.
Means, standard deviations and ranges for individual Banking Time practices during intervention sessions and free-play

	Banking Time sessions (Intervention teachers)			Free play sessions (BAU teachers)		
	M	SD	Range	M	SD	Range
Expected practices						
Observation	4.04	0.72	2-5	2.96	.79	1-5
Labeling	1.63	0.96	1-5	1.02	.14	1-2
Narration	3.33	0.89	1-5	2.51	.79	1-5
Child led	4.26	0.74	1-5	2.79	1.01	1-5
Restricted practices						
Questions	25.12	19.86	0-123	40.74	16.90	5-93
Commands	10.88	9.23	0-79.5	19.48	11.06	0-49
Praise	2.69	0.96	0-5	2.81	.95	1-5

Note: Observation, Labeling, Narration, Child Led and Praise are on a five-point Likert scale, where 1 is very poor and 5 is very good. Questions, Direct Commands and Indirect Commands are frequencies.

Table 3.
Unstandardized Regression Coefficients, p values, and Standard Errors for fitted Multilevel Regression Models comparing Banking Time sessions with a Standard Free Play session

	Observation		Labeling		Narration		Child Led		Questions		Commands		Praise	
	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*	β (SE)	*p*
Banking Time	.86 (.14)	<.01	.48 (.14)	<.01	.53 (.15)	<.01	1.38 (.15)	<.01	-23.46 (2.82)	<.01	-11.87 (1.67)	<.01	-.45 (.18)	0.01
Session length	.02 (.02)	0.08	.01 (.01)	0.71	.05 (.02)	<.01	.02 (.02)	0.25	1.65 (.37)	<.01	0.46 (.19)	0.02	0.04 (.01)	0.02
Cycle	-.08 (0.6)	0.15	.07 (.05)	0.19	.03 (.06)	0.66	.001 (.07)	0.98	-3.28 (1.31)	0.01	-.06 (.75)	0.94	0.02 (.06)	0.77

Note: For Banking Time: 1 = Banking Time session; 0 = free play session

Table 4.
Means, standard deviations and ranges for the three profiles of Banking Time implementation

	High Fidelity (a) (N = 244)			Low Engaged (b) (N = 129)			Teacher-Led (c) (N = 85)		
	M	SD	Range	M	SD	Range	M	SD	Range
Expected practices									
Observation	4.53[bc]	0.41	3.5 - 5	3.34[c]	0.48	2-4	3.56	0.54	2.5-4.5
Labeling	1.85[bc]	1.09	1-5	1.39	0.75	1-5	1.36	0.65	2-5
Narration	3.88[bc]	0.66	2.5-5	2.52[c]	0.6	1-4	2.96	0.72	1-5
Child led	4.51[c]	0.47	2.3-5	4.36[c]	0.67	1.5-5	3.38	0.79	1-4.75
Restricted practices									
Questions	21.29[c]	14.75	0-86.5	17.56[c]	13.96	0-69.5	47.56	24.08	6-123
Commands	8.56[bc]	5.63	0-28	6.43[c]	4.86	0-20.5	24.3	10.37	5.5-79.5
Praise	2.82[bc]	0.94	1-5	2.18[c]	.87	1-5	3.12	.84	1-5

Note: Observation, Labeling, Narration, Child Led and Praise are on a five-point Likert scale, where 1 is very poor and 5 is very good. Questions, Direct Commands and Indirect Commands are frequencies.

Letters [a], [b], and [c] indicate significant differences

Table 5.
Patterns of Banking Time implementation predicting the quality of teacher-child interactions at the child and teacher levels.

	Child engagement with the teacher		Child conflict with teacher		Teacher emotional support	
	β	SE	β	SE	β	SE
High Fidelity vs. Low Engaged	0.37*	0.16	0.03	0.1	1.17**	0.32
Teacher-Led vs. Low Engaged	-0.12	0.30	-0.06	0.1	1.31**	0.43
High Fidelity vs. Teacher-Led	0.27	0.23	0.02	0.07	-0.14	0.34
Outcome at pre-intervention	0.23	0.15	0.43*	0.17	-	-
Outcome at baseline	-	-	-	-	0.13	0.11

Note: Values are unstandardized coefficients.
* $p<.05$; ** $p < .01$

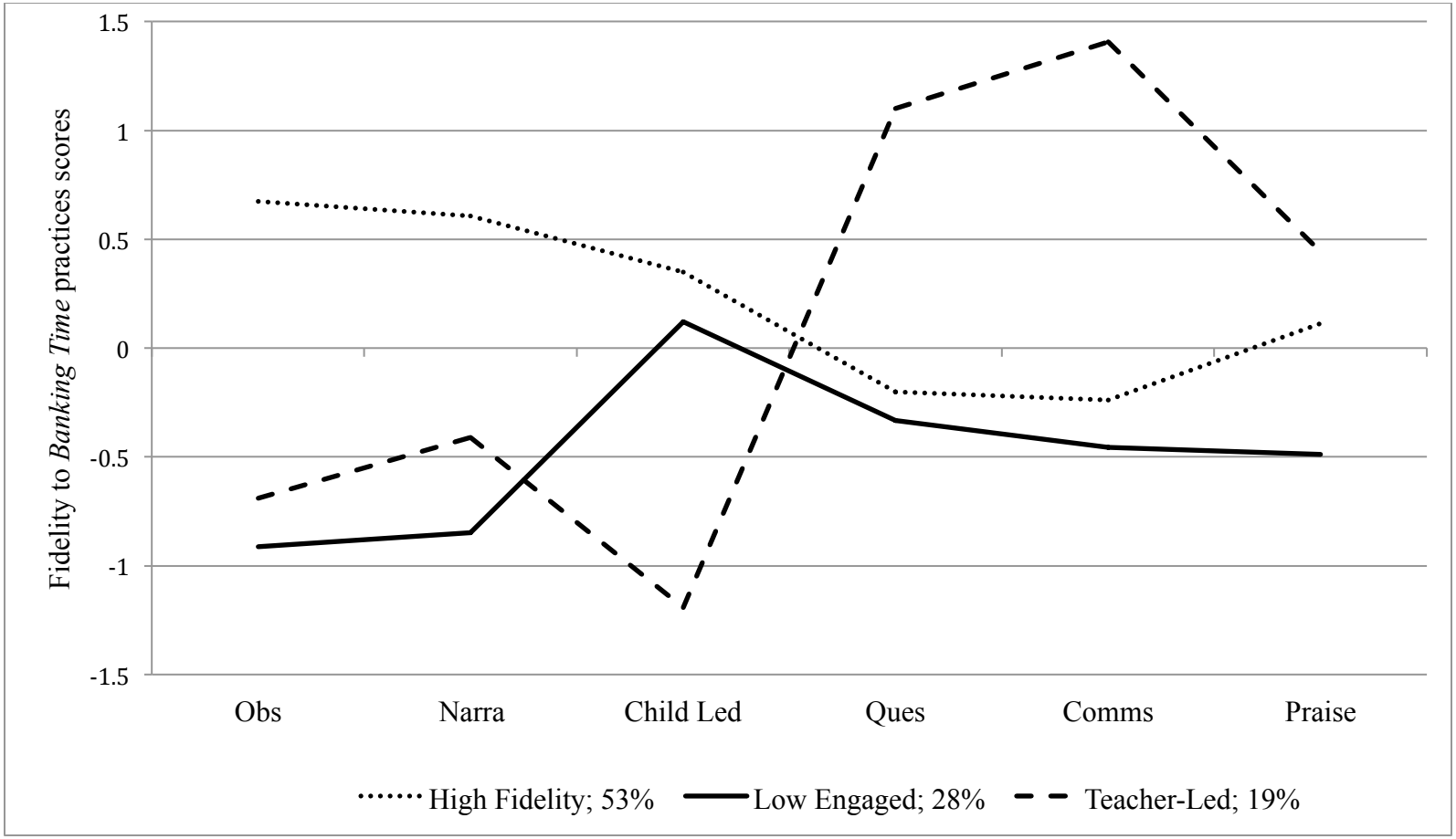

Figure 1. Graphical representation of the final three-profile solution using six *Banking Time* practices that assessed implementation fidelity during the intervention sessions. Obs = Observation; Narra = Narration; Ques = Questions; Comms = Commands. All *Banking Time* practices were z-scored to be on the same scale so that for high fidelity you would expect higher scores on Observation, Narration, and Child Led, and lower scores for Questions, Commands, and Praise.

Exploring Dyadic Teacher-Child Interactions, Emotional Security and Task Engagement in Preschool Children Displaying Externalizing Behaviors

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Abstract

Based on attachment theory, we tested whether the link between dyadic teacher-child interactions and task engagement operates through a child's security toward the teacher. In a sample of preschoolers ($N = 470$) rated by their teachers as exhibiting elevated disruptive behaviors, dyadic teacher-child interactions and children's security were observed using a standardized task. Children's engagement with tasks was both observed in the preschool classroom and rated by the teacher. Results indicated that the quality of teacher-child dyadic interactions was directly associated with teacher-reported task engagement, and indirectly associated, through a child's security, with observed task engagement. We discussed the contribution of these findings to our understanding of how dyadic teacher-child interactions may serve to regulate children's behavior in the classroom, particularly for children whose teachers perceive them as displaying early externalizing behaviors.

Keywords: Teacher-child Interactions, Teacher-child Relationships, Disruptive behaviors, Preschool, Task Engagement.

Introduction

During the preschool years, dyadic interactions with teachers play a key role in facilitating or impeding children's behavioral regulation (Silkenbeumer, Schiller, & Kärtner, 2018). These early teacher-child dyadic interactions also make unique contributions to children's long-term behavioral outcomes (Hamre & Pianta, 2001; O'Connor, Collins, & Supplee, 2012). Sensitive and responsive interactions with teachers may enhance children's behavioral regulation, in part, by providing children with emotional security to explore the classroom environment (Howes, 1997; Verschueren & Koomen, 2012). Supportive one-on-one interactions with teachers offer preschoolers external resources to regulate the stress associated with a classroom demands, thus advancing children's feelings of security (Barnas & Cummings, 1994; Hughes, Zhang, & Hill, 2006). Testing this process is critical because it represents a key mechanism by which dyadic exchanges with teachers serve to regulate children's behavior, allowing them to freely engage and make the most out of the classroom setting. The present study examines the extent to which teachers' dyadic interactive behaviors enhance preschoolers' behavioral regulation in the classroom, specifically task engagement, through providing children with emotional security.

Children perceived by their teachers as displaying externalizing or disruptive behaviors (i.e., characterized by high levels of impulsivity, hyperactivity, aggression, and defiance; Campbell, Shaw & Gilliom, 2000) are at risk for more often having conflictual interactions with their teachers (Doumen et al., 2008; Henricsson & Rydell, 2004; Nelson & Roberts, 2000). These early conflictual teacher–child interactions are linked to long-term negative outcomes including lower academic achievement, grade retention, and

school dropout (Bierman et al., 2013; Bulotsky-Shearer, Bell, & Domínguez, 2012; Jimerson, Egeland, Sroufe & Carlson, 2000). As a result, these children are more likely to experience the classroom setting as stressful and challenging (Hamre & Pianta 2006), which can make achieving and maintaining emotional security difficult for them (Davies & Cummings, 2013). Positive teacher-child interactions are important for all children and may be particularly beneficial for children displaying externalizing behaviors; dyadic interactions with teachers afford important opportunities to advance children's security and support their regulation in the classroom. No studies, however, have investigated links between dyadic teacher-child interactions, emotional security, and classroom behaviors in this specific sample. This lack of knowledge limits our understanding of how these relational processes unfold for preschoolers displaying externalizing behaviors, and therefore our capacity to better meet their regulatory needs in the classroom.

We sought to better understand how teacher-child dyadic interactions might serve to regulate children's classroom behavior in a sample of preschoolers perceived by their teachers as displaying elevated externalizing behaviors. We selected task engagement as the behavioral outcome given its relevance for children's learning, both concurrently and longitudinally (e.g., Dobbs-Oates, Kaderavek, Guo, & Justice, 2011; Ladd & Dinella, 2009). Task engagement refers to children's active and positive participation in classroom activities in ways that are appropriate given the demands of the task (Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009), such as coloring a drawing, paying attention to a storybook, or pretending to be a vet in the dramatic play center. We used a multi-method, multi-informant approach (i.e., teacher reports and external observer ratings) to capture multiple perspectives of the degree to which preschoolers' actively and positively

participate in classroom tasks. Applying an attachment framework, we explored whether the link between dyadic teacher-child interactions and task engagement operates through a child's security toward the teacher. We were particularly interested in investigating dyadic teacher-child interactions above and beyond the classroom emotional climate.

Theoretical Perspective

As posited by Pianta (1999), a child's classroom behaviors are better understood as a dynamic attribute of the teacher-child system, rather than as a characteristic of the child themself. This view highlights the importance of teachers' support and challenge in determining a child's active and positive involvement with classroom tasks (Davis, 2003); a child will likely display greater task engagement competence when their teacher is attuned and responsive to the child's cues and interests and matches the level of scaffolding to the child's needs. Such regulatory influence of teachers' interactive behaviors is especially important during the preschool years, when children are coping with novel situations (e.g., take turns with peers, follow instructions) and their independent regulation skills are still developing (Hughes & Kwok, 2006). Compared to older children, preschoolers are more willing to rely on the external resources provided by teachers to regulate their behaviors in the classroom (Bierman & Motomedi, 2015). Further, as children who display externalizing behaviors are more likely to experience challenges regulating their behavior in the classroom (e.g., be off-task, intrude upon others, and defy rules; Henricsson & Rydell, 2004; Rimm-Kaufman et al., 2002), supportive interactions with teachers are particularly beneficial for them to elicit the guidance and support they need to adequately engage in a classroom tasks and activities (Baker, Grant & Morlock, 2008).

Elucidated in the attachment framework (Bowlby, 1969), teacher-child interactions support children's task engagement, at least in part, indirectly; warm and positive interactions with teachers promote children's feelings of security —a sense of trust, comfort or equilibrium—to explore the classroom environment (Birch & Ladd, 1997; Williford, Carter, & Pianta, 2016). According to the emotional security hypothesis (Davies & Cummings, 1994; Davies & Martin, 2013), in moments of stress (e.g., frustration with a task, difficult interactions with peers) children rely on their teachers for support to preserve and attain security (Little & Kobak, 2003; Thijs & Koomen, 2008). The stability and predictability of sensitive and responsive interactions is theorized to reassure a child that their teacher is available, thus advancing a child's feelings of security. As early childhood classrooms place cognitive and social demands that elicit stress on children (e.g., Watamura, Donzella, Alwin, & Gunna, 2003), preschool teachers are salient resources to support all children's stress regulation (e.g., Badanes, Dmitrieva, & Watamura, 2012; Hatfield, Hestenes, Kintner-Duffy, & O'Brien, 2013) and help them re-engage with classroom tasks. This support system is especially important for children who display disprutive behaviors (Hatfield & Williford, 2017).

Direct Links Between Teacher-Child Dyadic Interactions and Task Engagement

Substantial research now indicates that the quality of dyadic teacher-child interactions plays a key role in facilitating young children's active and positive participation in classroom activities. Generally, children demonstrate higher levels of task engagement when they experience warm and sensitive interactions with their teachers that support their autonomy (e.g., Birch & Ladd, 1997; Hughes & Kwok, 2006). For example, a longitudinal study (Cadima, Doumen, Verschueren, & Buyse, 2015) found

that a close teacher-child relationship predicted teacher-reported task engagement in kindergarten, as well as children's observed task engagement in first grade. Although these patterns are evident for children overall, teachers have been observed to be less sensitive and more controlling during interactions with young children displaying disruptive behaviors (e.g., Rimm-Kaufman et al., 2002). When teachers tend to control the interactions (e.g., try to influence the child's behaviors, do not allow the child to take the lead), children show lower levels of task engagement (Roorda, Spilt, & Koomen, 2017).

In examining the links between teacher-child interactions and relationships, and children's engagement with tasks, most studies have relied on teacher ratings of task engagement (e.g., Birch & Ladd, 1997, Hughes, Luo, Kwok, & Loyd, 2008; Searle, Miller-Lewis, Sawyer, & Baghurst, 2013). Although teacher ratings have the advantage of summarizing children's task-related behaviors over an extended period of time, they are less informative about how task-related behaviors unfold in real-time classroom exchanges (Brownell, Lemerise, Pelphrey & Roisman, 2015). Because task engagement is a complex and dynamic process that involves ongoing interactions between the child and the classroom context (Eccles & Wang, 2012), relying *only* on retrospective teacher-reports may be lacking adequate sensitivity to capture how interactions with teachers serve to regulate a child's behavior in the classroom context.

Indirect Links Between Teacher-Child Dyadic Interactions and Task Engagement Through Security

The few studies investigating emotional security in the classroom have focused on describing its variability over the school year (Koomen & Hoemska, 2003), linking

security to children's stress reactivity (Little & Kobak, 2003), and examining the unique contributions of security to children's learning outcomes (Howes & Smith, 1995). Although these studies document the role that security plays in children's classroom adaptation, how dyadic teacher-child interactions and security operate together to regulate children's classroom behaviors is not well understood. The only study exploring this question (Thijs & Koomen, 2008) provided preliminary evidence for the indirect pathway posited by attachment theory; results indicated that the quality of teacher-child interactions supported task engagement, in part, through providing children with emotional security. However, two limitations should be noted. First, task engagement was measured using a teacher-child dyadic task, which limits the generalization of these findings to the classroom context, where the presence of other children will likely facilitate or impede a child's involvement with tasks and activities. Second, the authors did not account for the fact that dyadic interactions with teachers occur within the classroom context, and thus classroom-level interactions may also contribute to children's feelings of security and task engagement. Further, as the work by Thijs and Koomen (2008) was conducted with kindergarten children rated by their teachers as socially inhibited, the extent to which these processes operate similarly in children who show disruptive behaviors remains unclear.

The Present Study

This study examined how teachers' interactive behaviors serve to regulate children's behaviors in a sample of preschoolers rated by their teachers as displaying disruptive behaviors. To that end, we first aimed to replicate the direct link between dyadic teacher-child interactions and children's task engagement found in prior studies.

We then explored the indirect link between teachers' interactive behaviors and task engagement through children's emotional security. Based on Thijs and Koomen (2008), it was hypothesized that children's emotional security will partially account for the association between teachers' interactive behaviors and children's task engagement.

This study addresses the gaps in the current literature in three ways. First, this is the first study examining these processes in young children whose teachers perceive them as displaying externalizing behaviors –a group of children for whom the regulatory influence of teacher-child interactions may be especially important as they experience difficulties engaging with classroom tasks. Second, as indicated previously, prior work relied primarily on teacher ratings of task engagement that are retrospective in nature, thus limiting our understanding of how interactions with teachers may support children's engagement with tasks in the moment. Addressing this gap, we used a multi-method (i.e., survey and observations), multi-informant (i.e., teachers and observers) approach to assess children's task engagement, both retrospectively and in real time. Third, previous studies examining similar questions have not considered that dyadic teacher-child interactions occur within the classroom setting, despite abundant evidence indicating that classroom-level interactions also influence children's behavioral outcomes (e.g., Merritt, Wanless, Rimm-Kaufman, Cameron, & Peugh, 2012). Therefore, in the present study we accounted for the classroom context to explore how dyadic teacher-child relational processes may serve to regulate children's task engagement beyond the classroom-level emotional climate.

Method

Participants

Our research questions were addressed using data from the *Banking Time* efficacy trial (see Williford et al., 2017). *Banking Time* is a dyadic intervention aimed at improving the relationship between a teacher and a specific child by changing the nature and quality of teacher–child interactions (Pianta, 1999). As part of the efficacy trial, teachers were randomized into one of three conditions: *Banking Time* (i.e., teachers implemented the intervention and received ongoing consultation), *Child Time* (i.e., a time-controlled condition where teachers spent the same amount of individual time with children but had no constraints about how they interacted with children), or Business-as-Usual (BAU). In this study we analyzed data from all three conditions and included intervention condition as a covariate to isolate any potential intervention influence.

Participants included 470 preschool children and 183 teachers in three sites over 3 years (2010– 2013) within two states in the eastern U.S. Teachers' age was 41 years on average (*SD* = 11.82), nearly all teachers were female (96%), and their ethnic composition was 53% White, 41% Black/African American, and 6% Other race/ethnicity. On average, teachers had 9 years of experience teaching Pre-K (*SD* = 7.73) and most of them had a bachelor's degree (52%). Children were an average age of 49 months (*SD* = 6.72), 66% were male, and their ethnic composition was 38% White, 42% Black/African American, and 20% Other race/ethnicity. On average, children's mothers had 14 years of education (*SD* = 2.33), and their income-to-needs ratio was 1.89 (*SD* = 1.53), indicating that children were part of families with low incomes.

Procedures

Child Selection. Preschool programs (Head Start, state-funded public, and private) were recruited in two Mid-Atlantic states. Teachers rated all children in their

classroom on two externalizing behavior-rating scales (see Measures for details). Items from both measures were combined to create a total disruptive behavior score. The two boys and one girl (for adequate gender distribution) with the highest ratings of externalizing behavior in each classroom who had caregiver consent participated in the study. Selected children's total disruptive score (M = 28.42, SD = 16.18) was significantly higher compared to non-selected children [M = 10.82, SD = 12.43; t(-25.75, $p < 0.001$)]. However, the third selected child's teacher-rated externalizing behavior score (M = 19.62, SD = 0.84) was significantly lower compared to the first and second selected children [M = 36.65, SD = 0.95; t(13.37, $p < 0.001$)]. Selected children did not significantly differ from non-selected children in any of the demographic characteristics described above, except for gender; selected children were more likely to be Male (66%) compared to non-selected children [44% t(-6.75, $p < 0.001$)]. Within teachers, each of the three participating children was randomly assigned to one of three seven-week windows across the school year. During the child's window, the teacher either engaged with the child in *Banking Time*, *Child Time*, or BAU.

Data collection. The majority of data were collected at four time points during the year: baseline (at the beginning of the study before treatment was introduced), and following each of the three, seven-week intervention windows (i.e., January for Window 1, March/April for Window 2, and May/June for Window 3). At the beginning of the year, child characteristics were collected via family survey, and teacher and classroom characteristics –including ratings of children's externalizing behavior– were collected via teacher report. Teacher and child outcome data were collected at the four time points via teacher report, parent report, and observation. In addition, a videotaped Teacher–Child

Structured Play Task (TC-SPT) was conducted post the seven-week intervention window for each teacher-child dyad. In this task, both the teacher and child engage in a play session that includes free play and clean-up tasks (Whittaker, Williford, Carter, Vitiello & Hatfield, 2018). This study used data collected at baseline (i.e., teacher and child characteristics, and classroom observations), and post window (i.e., TC-SPT, and child's task engagement).

Data collectors attended a two-day training for the observation measures. To be reliable and able to conduct observations, data collectors were required to code five reliability clips independently and score within one point of a master-code on 80% of the dimensions (see below for details on each measure). Observations of teachers occurred at baseline, and observations of children occurred after their seven-week intervention window. Each observation day lasted three–four hours and about three days per time point. Teachers were observed for approximately five 20-minute cycles (M = 4.88, SD = 1.78) and children for approximately eight 15-minute cycles (M = 8.40, SD = 1.54). Data collectors were also trained to administer and videotape the TC-SPT during the post-window of the selected child.

A separate team of undergraduate research assistants served as coders for the TC-SPT. No coders were involved with any field data collection or had any other interaction with teachers or children in the study. Coders were randomly assigned video sessions, and two coders applied the coding scheme independently for tapes that were double-coded. Coders were trained to reliability and maintained reliability via regular calibration meetings.

Measures

Teacher and child characteristics. Teachers and parents or guardians completed a demographic survey at baseline (i.e., Fall) for teacher and child characteristics, respectively.

Teacher perceptions of children's externalizing behaviors. The ADHD Rating Scale-IV (DuPaul, Power, Anastopoulos, & Reid, 1998) and ODD Rating Scale (Hommersen, Murray, Ohan, & Johnston, 2006) were used to assess teachers' perceptions of children's externalizing behaviors. The ADHD-RS-IV is an 18-item rating scale that measures a child's inattentive and hyperactive/impulsive behaviors on a four-point scale (i.e., 1 = "never or rarely"; 4 = "very often). Sample items include "runs about or climbs excessively in situations in which it is inappropriate" (i.e., hyperactivity) and "does not seem to listen when spoken to directly" (i.e., inattention). The ODD-RS contains 8 items that assess oppositional behavior (e.g., "argues with adults," "is angry and resentful"). In the ODD-RS, the rater uses a similar 4-point scale to judge how well a statement describes a specific child. Items from both measures were combined to create a total disruptive behavior score for each child. Internal consistency for the total disruptive score was excellent $\alpha = .96$. Both measures have demonstrated validity and reliability with preschool samples (e.g., McGoey, DuPaul, Haley, & Shelton, 2007; Purpura, Wilson, & Lonigan, 2010).

Observations of children's task engagement. The Individualized Classroom Assessment Scoring System (inCLASS; Downer, Booren, Hamre, Pianta & Williford, 2011) was used to assess children's observed task engagement in the classroom. The inCLASS is an observational measure that captures 10 dimensions of children's classroom engagement using a 7-point scale: (1) positive engagement with teacher, (2)

communication with teachers, (3) conflict with teacher, (4) sociability with peers, (5) conflict with peers, (6) assertiveness with peers, (7) communication with peers, (8) engagement with tasks, (9) reliance with tasks, and (10) behavior control. In this study, we used the engagement with tasks dimension.

Inter-rater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same child. The ICC and agreement within one point (the measure developers' benchmark for reliability) were .72, and 85% respectively, indicating acceptable reliability. Internal consistency was calculated across observation periods and was acceptable: $\alpha = .69$. The inCLASS has shown construct and criterion validity (Downer et al., 2010), in addition to predicting growth in children's readiness skills (e.g., Williford et al., 2013).

Teacher-reported children's task engagement. The task orientation subscale of the Teacher-Child Rating Scale (TCRS; Hightower et al., 1986) was used to capture teachers' perceptions of children's task engagement. In the TCRS, teachers use a 5-point scale (i.e., 1 = "not at all"; 5 = "very well") to rate how well a statement concurs with their view of a particular child. The task orientation subscale includes five items related to children's positive engagement with classroom tasks: "completes work," "well organized," "functions well even with distractions," "works well without adult support," and "a self starter." The subscale showed good internal consistency ($\alpha = .85$) in the current sample. The TCRS has been widely used to assess behaviors in preschoolers, and is linked to classroom processes (e.g., Brophy-Herb, Lee, Nievar, & Stollak, 2007; Graves & Howes, 2011).

Observed teachers' interactive behaviors. The TC-SPT (Whittaker et al., 2018)

clean up portion of the task was selected to observe teachers' interactive behaviors. The TC-SPT is a videotaped dyadic teacher-child structured task and rating scale that measures the quality of teacher interactive behaviors (see Table 1 for definitions) and child interactive behaviors using a 5-point Likert-type scale. We selected the clean up portion of the task because it allowed us to capture teachers' interactive behaviors in a stressful context, which was relevant to our research questions; adults' interactive behaviors during stressful situations are a strong predictor of a child's security (Leerkes, 2011).

Twenty percent of tapes were double coded. The ICCs for individual teachers' behaviors were as follows: Sensitive and Responsive Presence =. 66; Positive Affect = .71; Teacher Confidence = .48; Teacher Encourages and Stimulating Environment = .64; Teacher Support for Child Autonomy = .58. The five individual behaviors were averaged to create a composite for teachers' interactive behaviors. The internal consistency for the composite was good (α = .88).

Observed child's security toward the teacher. The TC-SPT clean up portion of the task and rating scale was also used to capture a child's emotional security (see Table 1 for definition). Coders different from the ones who rated teachers' interactive behaviors coded children's emotional security using a 5-point Likert-type scale (i.e., 1 = "very low"; 5 = "very high").

Twenty percent of tapes were double coded by coders different from the ones who coded teachers' interactive behaviors. The ICC for child's felt security was .79, indicating good reliability (Koo & Li, 2016).

Observed classroom emotional climate. The Classroom Assessment Scoring

System (CLASS; Pianta, LaParo, & Hamre, 2008) is an observational measure of classroom quality across 10 dimensions using a seven-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. For this study, we used the Emotional Support domain score (i.e., positive and negative climate, teacher sensitivity, and regard for student perspectives), as it was the most proximal to our measure of teachers' dyadic interactive behaviors.

Inter-rater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same classroom. The ICC for Emotional Support was .67, which indicated moderate reliability (Koo & Li, 2016), and agreement within 1 point was 95% (the measure developers' benchmark for reliability). Internal consistency was good across observation periods ($\alpha = 0.82$). Multiple studies have demonstrated reliability and validity of the CLASS (e.g., Mashburn et al., 2008).

Results

Descriptive results

Descriptive statistics of study variables and correlations are presented in Table 2. On average, observers ($M = 4.94$, $SD = .77$) and teachers ($M = 2.81$, $SD = .91$) reported moderate levels of children's positive engagement with tasks. However, the level of agreement between observers and teachers was low, as evidenced by a small correlation between observed and teacher-reported task engagement ($r = .16$, $p < .01$). The quality of observed teacher-child interactions was in the high-range at both the dyadic ($M = 3.50$, $SD = .81$) and classroom ($M = 5.05$, $SD = .77$) levels. Yet, the moderate correlation

between dyadic and classroom teacher-child interactions ($r = .29$, $p < .001$) indicated that they are related but different constructs. The quality of dyadic teacher-child interactions was associated with teacher-reported task engagement, although the magnitude of the correlation was small ($r = .18$, $p < .01$). There was also a small relation among classroom emotional support and children's observed task engagement ($r = .14$, $p < .01$). The strongest correlation was between the quality of teacher-child dyadic interactions and children's emotional security ($r = .58$, $p < .001$). For all study variables, the majority of variance was due to differences from child to child (62-90%). A smaller proportion of the variance was due to differences between teachers: 38% for the quality of dyadic interactions, 31% for child's emotional security, 24% for teacher-reported task engagement, and 10% for observed task engagement. All variance components were significant at the $p < 0.01$ level.

Direct Links between Dyadic Teacher-Child Interactions and Task Engagement

For each outcome – (1) observed task engagement and (2) teacher-reported task engagement – we estimated a model that tested the direct links between dyadic teacher-child interactions on children's task engagement. Models included classroom-level emotional support as a covariate to account for the classroom emotional climate. Both models also controlled for intervention condition, window, and site (all dummy coded) to isolate any potential intervention influence. To improve precision, the following demographic characteristics were included as controls: child's age in months, child's minority ethnicity status (minority = 1, White = 0), and classroom type (dummy coded). Other covariates relevant to our study variables were tested and removed because they showed no associations with task engagement or children's security. Non-significant

covariates were removed to obtain the most parsimonious model (Bentler & Mooijaart, 1989). Covariates tested and subsequently removed included child gender (dummy coded), family income-to-needs ratio, individualized education program (dummy coded), and baseline disruptive behaviors; and teachers' years of education, early childhood major (dummy coded), years of experience, and minority ethnicity status (dummy coded). Data were analyzed using path analyses in Mplus version 7 (Muthen & Muthen, 1998-2015). Given the multilevel structure of the data (i.e., children nested in teachers), multilevel imputation conducted in Blimp v1.1 was used to handle missing data (Enders, Keller, & Levy, 2018). Twenty separate imputed datasets were created for each outcome. Below we present standardized regression coefficients.

Table 3 shows results for the associations between dyadic teacher-child interactions and children's task engagement, above and beyond the classroom emotional support. The quality of dyadic teacher-child interactions was not significantly associated with children's observed task engagement. The quality of dyadic teacher-child interactions was positively related to teacher-reported task engagement ($\beta = .17$, $p < .01$).

Indirect Links Between Dyadic Teacher-Child Interactions and Task Engagement via Security

A mediation model was conducted for each outcome (i.e., observed task engagement and teacher-reported task engagement) to explore indirect links between dyadic teacher-child interactions and children's task engagement via security. Bootstrap confidence intervals with 10,000 samples were estimated to provide a robustness test of the indirect associations. Such intervals are the preferred method to account for the non-normal indirect effect distribution (Muthen, Muthen, & Asparouhov, 2016). However,

given that bootstrap estimates fail to account for the nesting of children within teachers, standardized confidence intervals using type=complex were also explored. Mediation models were also estimated in Mplus version 7 (Muthen & Muthen, 1998-2015), used multilevel imputation conducted in Blimp v1.1 to handle missing data (Enders, Keller, & Levy, 2018), and included the same covariates described earlier.

Unstandardized and standardized coefficients for total, indirect, and direct associations are presented in Table 4. We found an indirect link between dyadic teacher-child interactions and observed classroom task engagement via child security ($\beta = .07$, $p < .05$). Results for the robustness test of indirect association also indicated a non-zero association and were not sensitive to the method used; 95% standardized confidence intervals (CI [.005, .135]) and bootstrap confidence intervals (CI [.015, .141]). The indirect association value is interpreted as follows: dyadic teacher-child interactions are associated with observed task engagement indirectly via child's emotional security by .07 points (see Figure 1). This association lies in the small range (indirect effect sizes can be defined as small, medium, and large as .01, .09, and .25 respectively; Preacher & Kelley, 2011). No indirect link was found for teacher-reported task engagement.

Discussion

This study investigated the role that teacher-child interaction processes play in regulating preschoolers' positive engagement with classroom tasks. We examined this inquiry in a sample of preschool children rated by their teachers as exhibiting disruptive behaviors. Aligned with calls to examine mechanisms by which teacher-child interactions serve to support children's school adjustment (e.g., Hughes, 2012; Schuengel, 2012), and guided by attachment theory (Bowlby, 1969; Verschueren, & Koomen, 2012), we

explored whether dyadic teacher-child interactions support children's task engagement through providing them with emotional security. To explore the unique contribution of dyadic teacher-child interactions on children's task engagement, we accounted for the classroom-level emotional climate. Responding to the need for multi-method and multi-informant approaches to assess children's behaviors in context (Brownell et al., 2015), we used observations and teacher-reported ratings of children's task engagement in the classroom. Results indicated that the quality of teacher-child dyadic interactions was directly associated with teacher-reported task engagement, and indirectly associated, through child's security, with observed task engagement. Although the small associations indicate the need for further research and replication, findings from this study have implications for understanding how dyadic teacher-child interactions may serve to support positive task engagement for preschool children perceived by their teachers as displaying elevated externalizing behaviors. Such implications are discussed in detail in the following sections.

Children's Task Engagement Assessed by Multiple Methods and Multiple Informants

One descriptive finding was that both observers and teachers rated children as moderately engaged with classroom tasks. Prior research examining task engagement for all preschool children in the classroom has reported slightly higher levels of task engagement (e.g., $M = 5.12$ for observed task engagement, Downer et al., 2010; $M = 3.76$ for teacher-reported task orientation, Dobbs-Oates et al., 2011). This suggests that children who show disruptive behaviors demonstrate slightly lower levels of positive task engagement when compared to their peers, as indicated by both observed and teacher-

reported measures. Despite this pattern, it is important to notice that the agreement between informants was low, implying that the two measures are tapping into related but different perspectives of task engagement. Observations provided real-time information about how task-related behaviors were expressed in the classroom and were based on a relatively small sample of behaviors, whereas teacher reports retrospectively summarized a large amount of task-related behaviors (Brownell et al., 2015). Additionally, observers were unfamiliar with the children, whereas teachers shared with them a relational history that likely influences their task engagement ratings (Doumen, Koomen, Buyse, Wouters, & Verschueren, 2012). Therefore, it is likely that the measures captured two different perspectives, which is consistent with prior studies using multiple methods and informants to assess task engagement (e.g., r = .23; Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015). It is also possible that the small agreement is explained by the fact that the two measures were not exactly parallel. In the current study, observers rated task engagement focusing on sustained attention (i.e., focus/distractibility, on-task, and follow directions), and active engagement (i.e., intensity, volunteering, enthusiasm). In contrast, teachers' ratings included those same behaviors, but also autonomy (e.g., "the child works well without adult support"). Hence, compared to observers, teachers may have had greater opportunities to differentiate children based on their task engagement. However, when excluding the autonomy item from the teacher-reported task engagement measure, the alignment between both measures did not improve (r=.15, p<.01), highlighting that both informants are providing related but unique information.

Direct Links Between Teacher-Child Dyadic Interactions and Task Engagement

Our results provided partial support for the direct link between teacher-child dyadic interactions and task engagement. On the one hand, findings indicated that when children who display disruptive behaviors interact with their teachers in sensitive and responsive ways, teachers rate those children as demonstrating higher levels of task engagement. This result is consistent with prior work stressing the role that teacher-child relational processes play in regulating children's behavior in the classroom (e.g., Cadima et al., 2015; Rimm-Kaufman et al., 2002). On the other hand, our results did not confirm a direct association between dyadic teacher-child interactions and observed task engagement. Although this was an unexpected finding, it is important to notice that prior work relying on observations of both dyadic teacher-child interactions and task engagement have yielded mixed findings. For instance, Thijs and Koomen (2008) reported a direct effect of dyadic teacher-child interactions on children's task engagement, whereas Doumen et al. (2012) failed to replicate such an association. One possible explanation is that our study, as well as the one by Doumen and colleagues (2012), observed task engagement in the classroom setting, whereas Thijs and Koomen (2008) assessed task engagement using a dyadic structured task. It is likely that one-on-one interactions with teachers are more salient for children to regulate their behaviors in a dyadic task, whereas in the classroom children may also rely on other relational resources (e.g., classroom-level support or peers) to engage with tasks. This raises questions about whether dyadic interactions with teachers are differentially salient for children depending on the activity setting (e.g., small versus large group) or other classroom factors (e.g., cognitive challenge). For instance, dyadic teacher-child interactions as a regulation source may be more or less important for children depending on the degree to which the

task places demands on children. Dyadic interactions with teachers may be more salient resources for children when working on tasks that are challenging to them and which elicit discomfort (e.g., frustration or insecurity). Another possible explanation for the lack of a direct link between dyadic teacher-child interactions and observed task engagement is that we accounted for the classroom emotional climate, and thus may have set a higher bar for finding significant associations.

Indirect Links Between Teacher-Child Dyadic Interactions and Task Engagement

Findings for the indirect links between teacher-child dyadic interactions and task engagement via security provided mixed evidence. Although no direct association between dyadic teacher-child interactions and observed task engagement was found, an indirect link via child's security towards the teacher was supported by the data, and remained statistically significant after the robustness check. Modern perspectives on mediation analyses argue that there can be a significant indirect effect even in the absence of a direct effect (Preacher & Hayes, 2008). Consistent with attachment theory, our indirect association indicated that when children rated by teachers as displaying disruptive behaviors experience high quality dyadic interactions, they are observed to feel secure, which in turn supports their observed engagement with tasks in the classroom. This suggests that dyadic teacher-child interactions give these children an entry to explore the classroom environment by actively participating in tasks and underscore that high-quality one-on-one interactions with teachers can be beneficial in supporting task engagement for preschoolers perceived to display externalizing behaviors. Yet, it is important to note that the observed indirect association was small, which suggests that

there may be other relationships such as peers that nurture children's security in the classroom context.

Contrary to our expectations, no mediation through children's emotional security was found for teacher-reported task engagement, as there was no support for a direct association between child's security and task engagement. One possible explanation for this finding is that teacher-reported measures tend to be influenced by teacher-level characteristics including their wellbeing and perceptions of children's behaviors (e.g., Brownell et al., 2015; Hamre et al., 2008). Indeed, an examination of the intraclass correlation coefficient for teacher-reported task engagement revealed that 24% of the variance resides between teachers (compared to 10% for observed task engagement), indicating that teachers' ratings of task engagement are less likely to be explained by child-level variables such as security, when compared to observer ratings of task engagement.

Limitations and Future Directions

The present study adds to our emerging understanding of how dyadic teacher-child interactions may serve to regulate children's behavior in the classroom. One key aspect of our findings is that they examined the unique contribution of dyadic teacher-child interactions, above and beyond the classroom emotional climate, to children's task engagement. Yet, several limitations of our study should be noted. First, our examination of direct and indirect associations was correlational and all variables of interest were collected at the same time point. Although there is a strong theoretical argument for the directionality of the relationships tested, future research designs featuring time precedence are needed to make more robust conclusions. Second, data for this study was

collected in the context of a dyadic intervention to improve teacher-child relationships. Though all of our models controlled for intervention condition, window, and site to isolate any potential intervention effects, it is still possible that the intervention could have influenced any of the reported associations. Another limitation is that we decided not to combine the models across outcomes to conduct multilevel imputation to account for missing data, which requires a separate model for each outcome. Because there is some degree of overlap between observed and teacher-reported task engagement, it is possible that some of what we found for observed task engagement was accounted for by what we saw for teacher-reported task engagement. However, as the correlation between both outcomes was small, it was more important to prioritize accounting for the multilevel structure of the data to handle missing data. Finally, our measure of teachers' interactive behaviors and children's security was selected because its standardized nature permitted us to examine how interaction quality differed across dyads under comparable circumstances, when contextual variables remained constant. Though this was beneficial for the internal validity of our study variables, it may challenge the external validity as teacher and children interact with each other within the classroom context. To address this challenge, future research should aim to replicate these findings using more ecologically valid measures that assess dyadic teacher-child interactions.

Conclusion

To date, classroom-based interventions to improve teacher-child interactions have focused more at the classroom level than at the dyadic level (Hughes, 2012). Our findings, however, underscore that dyadic teacher-child interactions are important for the behavioral adaptation of preschoolers who display disruptive behaviors, beyond the

classroom emotional climate. Sensitive and responsive one-on-one interactions with teachers enable children to feel secure to actively participate in classrooms tasks and activities (e.g., spend time, focus, enjoy them, etc.). Therefore, efforts to support the behavioral adjustment of preschoolers at-risk for displaying disruptive behaviors should include an emphasis on the quality of their dyadic interactions with teachers in the classroom.

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Table 1.
Descriptions for teachers' behaviors and child security

Code	Definition
Teachers' 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 that he or 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 support for child autonomy	Degree to which the teacher respects and recognizes the child as an individual
Child emotional security with the teacher	
Felt security	Degree of availability and mutuality of emotion between the teacher and child and degree to which the child feels secure with the teacher

Table 2.
Descriptive statistics and bivariate correlations among predictors, mediator, and outcome variables

	1	2	3	4	5
1. Dyadic teacher-child interactions	1				
2. Classroom emotional support	.29***	1			
3. Child emotional security	.58***	.26***	1		
4. Observed task engagement	.09†	.14**	.19**	1	
5. Teacher-reported task engagement	.18**	0.07	.12*	.16**	1
M	3.5	5.05	3.04	4.94	2.81
SD	0.81	0.77	1.03	0.77	0.91
Standardized mean					
Theoretical range	1-5	1-7	1-5	1-7	1-5
Observed range	1.4-5	2.9-6.5	1-5	2.25-6.5	1-5
ICC	0.38	_	0.31	0.10	0.24

†$p < .10$, * $p < .05$; ** $p < .01$; *** $p < .001$

Note: Dyadic support, security, observed- and teacher-reported task engagement were collected at post-window. Classroom support was collected at baseline.

Table 3.
Observed teacher-child dyadic interactions and classroom emotional support predicting observed and teacher-reported task engagement

	Observed task engagement		Teacher-reported task engagement	
	β	*S.E.*	β	*S.E.*
Unstandardized coefficients (Standardized coefficients)				
Dyadic teacher-child interactions	.05 (.05)	.06 (.06)	.19** (.17**)	.06 (.06)
Classroom emotional support	.11† (.11†)	.03 (.05)	.12 (.10)	.08 (.07)

†$p < .10$, * p .05; ** $p < .01$; *** $p < .001$

Note: Models control for child characteristics (i.e., intervention condition, window; site; age in months; minority ethnicity status) and classroom characteristics (classroom type)

Table 4.
Total, indirect, and direct effects for dyadic teacher-child interactions on observed and teacher-reported task engagement

	Observed task engagement		Teacher-reported task engagement	
	β	*S.E.*	β	*S.E.*
Unstandardized coefficients (Standardized coefficients)				
Total	.07 (.08)	.06 (.06)	.19** (.17)**	.07 (.06)
Total indirect	.07* (.07*)	.03 (.04)	.002 (.002)	.04 (.04)
Specific indirect				
Task Engagement Security Dyadic	.07* (.07*)	.03 (.04)	.002 (.002)	.04 (.04)
Direct				
Task Engagement Dyadic	.004 (.004)	.07 (.07)	.19** (.17*)	.08 (.06)

$^{\dagger}p < .10$, * $p < .05$; ** $p < .01$; *** $p < .001$

Note: Models control for child characteristics (i.e., intervention condition, window; site; age in months; minority ethnicity status) and classroom characteristics (classroom type; baseline emotional support)

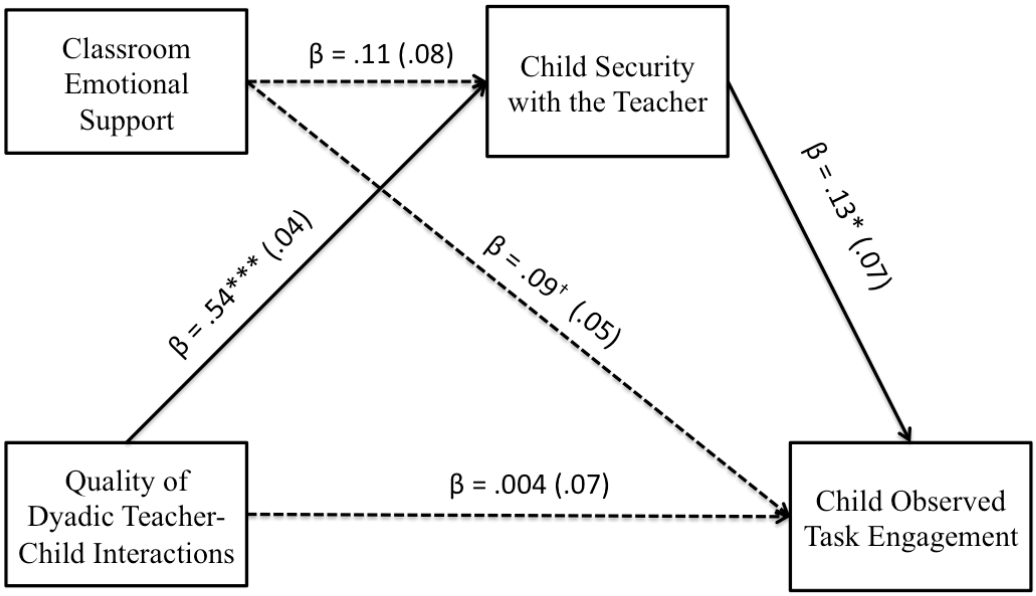

Figure 1. Graphical representation of the indirect association between dyadic teacher-child interactions and observed task engagement via child's security, accounting for classroom emotional support. Solid lines represent associations significant at $p < .05$; dotted lines are non-significant associations. The indirect link was estimated multiplying the direct association between dyadic interactions and security (β = .54), and the direct association between security and task engagement (β = .13). All coefficients are standardized.

$^{\dagger}p < .10$, * $p < .05$; ** $p < .01$; *** $p < .00$

Teacher-Child Emotion Talk in Preschool Children Displaying Elevated Externalizing Behaviors

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(Manuscript in Preparation)

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Abstract

Although emotion talk has been extensively studied as a socialization mechanism in the family context, scant research has examined emotion talk in the early childhood classroom. This study examined teacher-child emotion talk in a sample of preschool children rated by their teachers as displaying elevated externalizing behaviors ($N = 470$). Emotion talk was observed using a teacher-child dyadic storybook reading task. We examined the link between emotion talk and children's gains in their observed positive engagement with teachers across the preschool year. To isolate the unique contribution of emotion talk, we accounted for the affective quality of teacher-child interactions and relationships and children's receptive language skills. We also explored whether the link between emotion talk and children's positive engagement with their teacher was moderated by teacher-child affective qualities. The results provide evidence that if teachers offer frequent opportunities to talk about emotions in the context of warm and sensitive dyadic interactions, children connect and communicate more with their teachers regardless of their initial engagement level. Implications for early childhood teachers practice are discussed.

Keywords: Teacher-child Interactions, Teacher-child Relationships, Externalizing behaviors, Preschool, Emotion Talk.

Introduction

Parental emotion talk has been extensively studied as a socialization mechanism in the family context (e.g., Cervantes & Callanan, 1998; Dunn, Brown, & Beardsall, 1991; Eisenberg, 1999; Garner, Carlson-Jones, Gaddy, & Rennie, 1997; Lagattuta & Wellman, 2002; Martin & Green, 2005; Oppenheim, Koren-Karie, & Sagi-Schwartz, 2007; Perez Rivera & Dunsmore, 2011; van der Pol et al., 2015). As children spend increasing amounts of time in preschool programs (Burchinal, Maguson, Powell, & Hong, 2015), early childhood teachers' emotion talk may also serve to support children's development, particularly in the socioemotional domain (Denham, Basset, & Zinsser, 2012). Because children in the preschool classroom experience a host of emotions (e.g., anxiety when separating from their caregivers, joy when making new friends, or frustration with a task; Raver, 2002; Schutz & DeCuir-Gunby, 2002), this context affords opportunities for teachers to talk about emotions with children. Relying on evidence from the parenting research, two aspects of emotion talk — (1) a teachers' emotion discourse (i.e., *what* they say) and (2) the affective quality of the interactions in which the emotion conversations unfold (i.e., *how* they say it) — are critical because they represent the proximal processes by which emotion talk contributes to children's socioemotional development.

Prior work examining emotion talk in the early childhood classroom (e.g., Ahn, 2005; Farkas, Strasser, Badilla, & Santelices, 2017; Frampton, Perlman & Jenkins, 2012; King & La Paro, 2015; Morris, Denham, Bassett, & Curby, 2013; Yelinek & Grady, 2017) has focused primarily on describing *what* teachers say, including features such as frequency, referent (i.e., whose emotions are being discussed), and function (e.g.,

labeling emotions versus explaining them). But, beyond teachers' emotion discourse, *how* a teacher interacts with children is also important in that reciprocal, sensitive, and coordinated interactions are related both to children's socioemotional development, and greater openness and disclosure to talk about emotions (Harrist & Waugh, 2002; Thompson, 2010). No prior studies, however, have directly examined teacher-child emotion talk considering both teachers' emotion discourse and the affective quality of their interactions and relationships with specific children. This lack of integration limits our understanding of how teachers' emotion talk intersects with the quality of their interactions with children in contributing to optimal classroom experiences that support preschoolers' social and emotional development.

Preschoolers' ability to positively engage with their teacher is related to children's improved literacy (Sabol, Bohlmann, & Downer, 2018) and self-regulation (Williford, Maier, Downer, Pianta, & Howes, 2013) skills, in addition to being considered a key aspect of children's positive adaptation to the early childhood classroom (Ladd, Kochenderfer–Ladd, & Rydell, 2011; Searle, Miller-Lewis, Sawyer, & Baghurst, 2013). Teacher-child emotion talk may support children's engagement with the teacher, in part, through regulating their emotional experiences and offering children a platform to emotionally connect with their teachers (Thompson, 2010). Emotion talk may also help children pair emotions with words that they can later use to express and communicate their needs and emotions to the teacher (Lemerise & Arsenio, 2000; Valloton & Ayoub, 2011). As such, this study described preschool teachers' emotion talk—in the context of a dyadic structured storybook reading task— and examined its links to children's observed positive engagement with the teacher in the classroom. Additionally, we sought to

explore the extent to which emotion talk and the quality of teacher-child interactions and relationships combine to predict preschoolers' observed engagement with the teacher in the classroom. We were particularly interested in examining these questions in children perceived by their teachers as displaying externalizing behaviors because these children are more likely to experience difficulties engaging with their teacher in positive ways (Nelson & Roberts, 2000; Stuhlman & Pianta, 2001; Van Acker, Grant, & Henry, 1996).

The Importance of Emotion Talk for Preschoolers Displaying Externalizing Behaviors

For preschool children, engagement can be observed by focusing on specific behaviors demonstrating participation and involvement in the classroom in a way that is appropriate for their age, abilities, and context (Casey & McWilliam, 2007; Ladd & Dinella, 2009; McWilliam, Scarborough, & Kim, 2003; Sabol et al., 2018; Williford et al., 2013). These behaviors include seeking and enjoying interactions with their teachers, along with using words to communicate to teachers their emotions and needs (Downer, Booren, Lima, Luckner, & Pianta, 2010). Children whose teachers perceive them as displaying elevated externalizing behaviors are more likely to exhibit behaviors that denote negative engagement such as wandering around the classroom, defying the teacher requests, or responding with physical aggression (Casey & McWilliam, 2007). Children's negative classroom engagement has been linked to increased relational conflict as perceived by the teacher (Hartz, Williford, & Koomen, 2017), which further amplifies children's externalizing behavior in the classroom (Doumen et al., 2008). Consequently, these children likely have fewer opportunities to positively engage with their teachers and take advantage of the social and learning opportunities in the classroom (Searle et al.,

2013). Therefore, supporting positive engagement with the teacher in this specific group of children may be particularly beneficial.

When teachers talk about emotions (i.e., use language to label emotions, identify their cause or consequence, provide background or context for an emotion, and/or link emotions to a child's prior experiences), they draw young children's attention to their own and others' emotions, along with helping them to represent, reason, and respond to their emotional experiences from a reflective distance (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013). This lets the child knows that their teacher pays attention to and cares about emotional experiences, which in turn enhances children's use of the teacher as a secure base to explore the classroom environment. Furthermore, children at risk for showing early externalizing behaviors more often experience difficulties reading and expressing emotions appropriately (see Southam-Gerow & Kendall, 2002 for a review). As a result, these children may require additional opportunities to practice labeling emotions, identifying common emotion-eliciting situations, and to discuss emotions' causes and consequences. Therefore, teachers talking about emotions may boost children's ability to use words to make meaning of and express their experiences and needs in the classroom (Cole, Armstrong, & Pemberton, 2010).

Teacher-Child Emotion Talk and Children's Positive Engagement with The Teacher

To date, most research on adult-child emotion talk has focused on mothers, given their presumed role as primary caregivers (for a review, see Denham, Bassett, & Wyatt, 2015). This body of work indicates that when mothers use emotion labels and explanations (e.g., clarify the causes and/or consequences, identify behavioral indicators

of emotions, make connections to the child's experiences), young children are better at labeling emotions (Salmon et al., 2013), interpreting contextual cues of emotions (Garner, Dunsmore, & Southam-Gerrow, 2008), demonstrating affective perspective taking (Dunn et al., 1991), and managing their arousal and attention (Senehi et al, 2018). Such benefits of maternal emotion talk have been found to be stronger for children at greater risk of displaying externalizing behaviors (Brophy & Dunn, 2002; Brophy-Herb et al., 2015). Although the relationship between maternal emotion talk and children's regulation skills is likely bidirectional, experimental work demonstrates that increasing mothers' emotion talk contributes to increases in children's emotion knowledge and behavioral control (Havighurst, Wilson, Harley, Prior, & Kehoe, 2010). Relying on this evidence from mother-child emotion talk, it is possible to infer that caregivers' emotion talk benefits children's emotion knowledge and self-regulation skills that underlie their ability to remain positively engaged with their environment.

Research on social-emotional learning programs for preschool children also provides evidence to infer that teacher-child emotion talk has the potential to support children's positive engagement in the classroom. For instance, a series of experimental studies (Domitrovich, Cortes, & Greenberg, 2007; Domitrovich et al., 2009) tested the impact of the Promoting Alternative Thinking Strategies [PATHS] curriculum —which includes a strong focus on emotion talk and coaching— in Head Start classrooms. Compared to their peers in the business-as-usual condition, PATHS children showed improvements in social-cognitive skills (i.e., emotion identification, emotion recognition, reduction in anger attribution bias), and in observer-rated task orientation (Bierman et al., 2008; Domitrovich et al., 2007). Similarly, a recent experimental trial instructed teachers

to discuss with children about emotions. Compared to teachers who read emotion-based stories (i.e., control group), teachers who read the same stories *and* had discussions about emotions with children (i.e., intervention group) had toddlers who more frequently used words to express their emotions during peer interactions (Ornaghi, Brazzelli, Grazzani, Agliati, & Lucarelli, 2017).

Taken together, these two lines of research provide indirect evidence to argue that when teachers use language to label and explain emotions to children, they support children's development of social-cognitive and regulatory skills needed to effectively participate in social interactions encountered in the classroom. As such, we expect that children will exhibit more positive engagement in the classroom when their teachers frequently talk about emotions. In this study, we examined the direct association between teacher-child emotion talk and one specific domain of children's classroom experiences: their engagement with the teacher.

Teacher-Child Emotion Talk is Embedded within a Relational Context

Attachment theory stresses that adult-child emotion talk occurs within a relational context, highlighting that the affective quality of adult-child interactions and relationships shapes the influence of emotion talk on children's social and emotional outcomes (Thompson, 2015). When adult-child interactions are characterized by attunement and shared affect, emotion talk allows the adult to regulate the child's emotional experiences (e.g., listen to and validate their feelings or help them calm down and problem solve), thus enhancing the adults' role as a secure base from which to explore the environment. As such, preschool teachers who use more frequent emotion talk —in the context of warm and close interactions and relationships —may create an environment especially

supportive of children's positive engagement with them in the classroom (Howes & Spieker, 2016; Pianta, 1999). Indeed, the parenting literature offers evidence that the quality of teacher-child interactions likely intersects with emotion talk to forecast children's positive engagement with the teacher in the classroom. For instance, when mothers explain emotions within the context of a secure mother-child relationship, young children demonstrate higher levels of emotion understanding (Laible & Thompson, 2000; Ontai & Thompson, 2002). Similarly, when mothers use mental-state references (a construct that includes emotion, desires, and cognition terms) within connected mother-child dyadic interactions, preschoolers demonstrate higher levels of social understanding (Ensor & Hughes, 2008). Although none of these studies examine children's positive engagement with their caregiver especifically, they all point to the key role that affective qualities of adult-child interactions and relationship play in understanding how emotion talk contributes to children's outcomes. Therefore, in the present study we explored the extent to which the link between emotion talk and children's positive engagement with the teacher depended on the affective quality of teacher-child dyadic interactions and relationships.

The Present Study

In this study we were explicitly interested in investigating emotion talk in children whose teachers perceived them as displaying externalizing behaviors —a group of children for whom teachers' support to actively and positively engage in the classroom may be especially important. This is one of the first studies (see Morris et al., 2013 for an exception) to empirically examine links between early childhood teachers' emotion talk and children's outcomes. By investigating emotion talk in relation to children's observed

positive engagement with the teacher, this study may elucidate one specific teaching practice to support children's adaptation to the preschool classroom. Prior research on early childhood teachers' emotion socialization has primarily focused on how to best train children in specific skills (i.e., efficacy of an intervention or curriculum, implementation of evidence-based practices). In keeping with the notion that intentionally teaching emotion skills to children is important, we aimed to emphasize that such process is embedded within and dependent on the affective quality of teacher-child interactions and relationships. Investigating how emotion talk and aspects of the affective quality of teacher-child interactions operate together may contribute to a more complex understanding of how to support children's engagement with their teacher.

To first describe the natural variation in teachers' emotion talk in the context of a dyadic standardized storybook task, we adapted a coding scheme from the parenting research literature to be used within the teacher-child context. We assessed interrater reliability to ensure that this adapated coding scheme reliably measured teachers' emotion talk. Based on prior studies using a similar task with mother-child dyads, we anticipated some teachers would talk very little about the emotional content of the story, whereas we expected other teachers to provide children with frequent opportunities to discuss emotions. Second, we examined links between emotion talk and children's positive engagement with the teacher at the end of the year, accounting for their observed engagement level and language skills at the beginning of the year. We hypothesized that children whose teachers talked about emotions more frequently will demonstrate greater gains in positive engagement with the teacher from the beginning to the end of the year. Finally, we explored the extent to which the affective quality of teacher-child dyadic

interactions and relationships moderated the link between emotion talk and children's positive classroom engagement. We expected that children who made the greater gains in positive engagement with the teacher would be those whose teachers use more emotion talk in the context of supportive and sensitive teacher-child interactions and relationships.

Methods

Participants

Participants were drawn from the *Banking Time* efficacy trial (see Williford et al., 2017 for a description of the study design, intervention, and impacts). *Banking Time* is a dyadic intervention to improve the relationship between a teacher and a specific child by changing the nature and quality of teacher–child interactions (Pianta, 1999). As part of the efficacy trial, teachers were randomized into one of three conditions: *Banking Time* (i.e., teachers implemented the intervention and received ongoing consultation), *Child Time* (i.e., a time-controlled condition where teachers spent the same amount of individual time with children but had no constraints about how they interacted with children), or Business-as-Usual (BAU). The impact of the intervention was not of interest in this study but was controlled for in all analyses (see Results).

Participants included 470 preschool children and 183 teachers. Teachers' age was 41 years on average (*SD* = 11.82), nearly all teachers were female (96%), and their ethnic composition was 53% White, 41% Black/African American, 6% Other race/ethnicity. On average, teachers had 9 years of experience teaching Pre-K (*SD* = 7.73) and most of them had a bachelor's degree (52%). Children were an average age of 49 months (*SD* = 6.72), 66% were male, and their ethnic composition was 38% White, 42% Black/African American, 20% Other race/ethnicity. On average, children's mothers had 14 years of

education (*SD* = 2.33), and their income-to-needs ratio was 1.89 (*SD* = 1.53), indicating that most children's families were low-income.

Procedures

Recruitment of Programs and Teachers. Preschool programs (19% Head Start, 26% state-funded public, and 55% private) were recruited in three sites over 3 years (2010– 2013) within two Eastern states in the United States. Following program approval, researchers met with teachers and obtained informed consent. For participating teachers, guardians of all children in their classrooms received a letter explaining the study, a consent form, and a family demographic survey.

Child Selection. Teachers rated all children in their classroom on two externalizing behavior-rating scales (see Measures for details). Items from both measures were combined to create a total disruptive behavior score. The two boys and one girl (for adequate gender distribution) with the highest ratings of externalizing behavior in each classroom who had caregiver consent participated in the study (69% consent rate). Selected children's total disruptive score (M = 28.42, SD = 16.18) was significantly higher compared to non-selected children [M = 10.82, SD = 12.43; t(-25.75, $p < 0.001$)]. Selected children did not significantly differ from non-selected children in any of the demographic characteristics described above, except for gender; selected children were more likely to be Male (66%) compared to non-selected children [44% t(-6.75, $p < 0.001$)]. Within teachers/classrooms, each of the three participating children was randomly assigned to one of three seven-week windows across the school year. During the child's window, the teacher either engaged with the child in *Banking Time*, *Child Time*, or BAU.

Data collection. The majority of data were collected at four time points during the year: baseline (at the beginning of the study before treatment was introduced), and following each of the three, seven-week intervention windows. At the beginning of the year, child characteristics were collected via family survey, and teacher and classroom characteristics –including ratings of children's externalizing behavior– were collected via teacher report. Teacher and child outcome data were collected at the four time points via teacher report, parent report, and observation. In addition, a videotaped Teacher–Child Structured Play Task (TC-SPT; Whittaker, Williford, Carter, Vitiello & Hatfield, 2018) was conducted post the seven-week intervention window for each teacher-child dyad. The TC-SPT was adapted from a widely used mother–child interaction task (Egeland & Hiester, 1993), and included free play, clean up, and storybook reading tasks. This study used data collected at baseline (i.e., teacher and child characteristics; child and classroom observations), post window (i.e., TC-SPT) and end of year (i.e., child observations).

Data collectors attended a two-day training for the observation measures. To be considered reliable and able to conduct observations, data collectors were required to code five reliability clips independently and score within one point of a master-code on 80% of the dimensions (see below for details on each measure). Observations lasted three–four hours per day and about three days per time point. Teachers were observed for approximately five 20-minute cycles ($M = 4.88$, $SD = 1.78$) and children for approximately eight 15-minute cycles ($M = 8.40$, $SD = 1.54$). Data collectors were also trained to administer and videotape the TC-SPT during the post-window of each selected child.

Three separate and independent teams of undergraduate research assistants served as coders for the TC-SPT tasks (i.e., free play, clean up, and storybook reading). No coders were involved with any field data collection or had any other interaction with teachers or children in the study and were blind to study condition. Coders were randomly assigned video sessions, and two coders applied the coding scheme independently for tapes that were double-coded. Coders were trained to reliability and maintained reliability via regular calibration meetings.

Measures

Teacher and child characteristics. Teachers and parents or guardians completed a demographic survey at baseline (i.e., beginning of the year) for teacher and child characteristics, respectively.

Teacher perceptions of children's externalizing behaviors. The ADHD Rating Scale-IV (DuPaul, Power, Anastopoulos, & Reid, 1998) and ODD Rating Scale (Hommersen, Murray, Ohan, & Johnston, 2006) were used to assess teachers' perceptions of children's externalizing behaviors. The ADHD-RS-IV is an 18-item rating scale that measures a child's inattentive and hyperactive/impulsive behaviors on a four-point scale (i.e., 1 = "never or rarely"; 4 = "very often). Sample items include "runs about or climbs excessively in situations in which it is inappropriate" (i.e., hyperactivity) and "does not seem to listen when spoken to directly" (i.e., inattention). The ODD-RS contains 8 items that assess oppositional behavior (e.g., "argues with adults," "is angry and resentful"). In the ODD-RS, the rater uses a similar 4-point scale to judge how well a statement describes a specific child. Items from both measures were combined to create a total disruptive behavior score for each child. Internal consistency for the total disruptive

score was excellent α = .96. Both measures have demonstrated validity and reliability with preschool samples (e.g., McGoey, DuPaul, Haley, & Shelton, 2007; Purpura, Wilson, & Lonigan, 2010).

Observed teacher's emotion talk. The TC-SPT storybook reading portion of the task was used to observe teachers' emotion talk. Teacher-child dyads read the book 'My Friend Bear,' which depicts a story about loneliness and friendship between a bear and a little boy (Alborough, 1998). Standardized instructions to the teachers were intentionally vague (i.e., "I'd like you to read this book to [child's name] and I'll be back when you're finished") to allow maximum flexibility. The coding scheme used to measure teachers' emotion talk was adapted from parenting studies using similar book reading tasks (e.g., Bailey, Denham & Curby, 2013; Brownell et al., 2013). Four categories of emotion talk were coded for frequency: emotion labeling produced by the teacher, emotion labeling elicited from the child, emotion explaining produced by the teacher, and emotion explaining elicited from the child (see Table 1 for definitions and examples). Only teachers' talk *outside* of the book text was coded. Interrater reliability was calculated across all observations with two coders independently observing and counting the instances of teachers' emotion talk. A two-way random model of absolute agreement, ICCs, indicated good to excellent reliability; emotion labeling teacher produced = .88, emotion labeling elicited from the child = .91, emotion explaining teacher produced = 80, and emotion explaining elicited from the child = .75.

Observed children's classroom engagement. The Individualized Classroom Assessment Scoring System (inCLASS; Downer, Booren, Hamre, Pianta & Williford, 2011) was used to assess children's engagement in the classroom. The inCLASS is an

observational measure that captures 10 dimensions of children's classroom engagement using a seven-point scale: positive engagement with teacher, communication with teachers, conflict with teacher, sociability with peers, conflict with peers, assertiveness with peers, communication with peers, engagement with tasks, reliance with tasks, and behavior control. Prior measurement work demonstrated that the data support four domains of children's engagement: positive engagement with teachers, positive engagement with peers, positive engagement with tasks, and negative classroom engagement (Downer et al., 2010). We used the positive engagement with the teacher domain, as it was the most proximal to the process of interest. In the current study, the inCLASS demonstrated good internal consistency, with Cronbach alpha of .82 for positive engagement with teachers. Interrater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same classroom. ICCs was .80 for positive engagement with teacher, indicating good reliability. The inCLASS has shown construct and criterion validity (Downer et al., 2010), in addition to predicting growth in children's readiness skills (e.g., Williford et al., 2013).

Affective Quality of Teacher-Child Interactions and Relationships.

Observed teacher interactions at the teacher-child dyad level. The TC-SPT free play and clean up portions of the task were selected to observe teachers' interactive behaviors. The TC-SPT is a videotaped dyadic teacher-child structured task and rating scale that measures the quality of teacher interactive behaviors and child interactive behaviors. The following teacher interactive behaviors were rated using a 5-point Likert-type 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. In an initial validation study (Whittaker et al., 2018), two composites were identified: positive teacher interactions and negative teacher interactions. We used positive teacher interactions, as it was the most proximal to our construct of interest. The positive teacher interactions composite demonstrated excellent internal consistency, with Cronbach alphas of .91 for free play and .90 for clean up. Interrater reliability was calculated across all and 20% of all observations for free play and clean up, respectively, with two coders independently observing and rating the same teacher behaviors. ICCs were .85 for free play and .80 for clean up, showing good reliability.

Teachers' perceptions of their relationships with children. Teachers' perceptions of relational closeness and conflict with children were measured through their reports on the short form of the Student–Teacher Relationship Scale (STRS; Pianta, 2001). In this measure, teachers apply a 5-point scale (5 = definitely does apply) to rate their perceived closeness (e.g., "I share an affectionate warm relationship with this child") and conflict (e.g., "This child and I always seem to be struggling with each other") with a specific child. In the present study, the Cronbach coefficient for the closeness and conflict subscales was .83 and .87, respectively, indicating good internal consistency. The STRS is a widely used measure of the teacher– child relationship that has demonstrated discriminant and predictive validity (Birch & Ladd, 1998; Hamre & Pianta, 2001).

Observed teacher interactions with children at the classroom level. The Classroom Assessment Scoring System (CLASS; Pianta, LaParo, & Hamre, 2008) was used to collect observations of classroom-level teacher-child interactions at the beginning of the

year. The CLASS measures classroom quality across 10 dimensions using a seven-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, classroom organization, and instructional support (Hamre, Pianta, Mashburn, & Downer, 2007). In the current study, the CLASS demonstrated good internal consistency, with Cronbach's alphas of .89 for emotional support, .84 for classroom organization, and .87 for instructional support. Interrater reliability was calculated across 20% of all observations with two data collectors independently observing and rating the same classroom. ICCs were .82 for emotional support, .76 for classroom organization, and .73 for instructional support. Multiple studies have demonstrated reliability and validity of the CLASS (e.g., Mashburn et al., 2008).

Results

Emotion Talk Coding Results

Table 2 shows descriptive statistics for the individual emotion talk codes. As indicated by the median, 50% of the teachers labeled an emotion or asked the child to label an emotion once or more. The median for both emotion-explaining codes was 0, showing that half of the teachers never explained or asked the child to explain an emotion during the storybook reading task. Indeed, only 10% of teachers prompted children to explain emotions and a quarter of teachers explained emotions themselves. As teachers' use of emotion talk was relatively infrequent, we created a composite score by adding all instances of emotion labeling and explaining within a storybook reading session. The

composite demonstrated acceptable internal consistency, with Cronbach alpha of .73.

The total number of emotion talk instances was positively correlated with the length of the session (r = .53, p< .001), suggesting that teachers who took longer to complete the task also talked about emotions more frequently. Thus, for descriptive purposes and to account for the differences in the length of the session (M = 7.11, SD = 1,88, range = 3.18 – 16.83), we computed rates of emotion talk per minute. To obtain the emotion talk rate for each teacher-child dyad, we divided the total emotion talk instances (i.e., composite score) by the length of their book reading session in minutes. This procedure aligns with prior work that used observational methods to study parents or teachers' talk (e.g., Garner et al., 2008; Garret-Peters et al., 2008; Gest et al., 2006; King & La Paro, 2015).

Descriptive Results

Descriptive statistics and Pearson correlations were computed to describe the natural variation in teachers' emotion talk and its relation to the affective quality of teacher-child interactions and relationships (see Table 3). The mean for teachers' rate of emotion talk was .48. However, the large standard deviation (SD = .52) shows that the data for this variable was positively skewed with more scores falling toward the low end of the distribution. Indeed, the median for teachers' rate of emotion talk was .31, indicating that 50% of the teachers engaged in .3 or less instances of emotion talk per minute. The moderate correlation between teachers' emotion talk and positive teacher interactions during the free play (r = .22, p < .01) and clean up (r = .23, p <.01) tasks indicated that they are related but different constructs. No correlation was observed for emotion talk and teachers' perceptions of relational closeness (r = .02, p = .75) or conflict

(r = -.02, p = .73), suggesting that they are different constructs. Teachers' emotion talk during the storybook reading task was associated with children's observed positive engagement with the teacher in the classroom, although the magnitude of the correlation was small (r = .16, p =.007). The ICC associated with teachers' emotion talk indicated that 45% of the variation in teacher-child emotion talk was due to differences between teacher and 55% of the variation had to do with differences between children. Both variance component were significant at the p<.01 level.

Link Between Emotion Talk and Children's Positive Engagement with the Teacher

To examine the links between emotion talk and children's observed engagement, a regression model was estimated at the child level using the type=complex command in Mplus version 7 (Muthen & Muthen, 1998-2015) to account for the nesting of children within teachers. The model was estimated using full information maximum likelihood to handle missing data and controlled for treatment, intervention window, and site (all dummy coded) to isolate any potential intervention influence. The model also included a set of child- (i.e., age in months, baseline externalizing behavior, family income-to-needs ratio, parents' years of education, and receptive vocabulary) and classroom-level (i.e., classroom mean externalizing behaviors, emotional support, classroom organization, instructional support, and classroom type dummy coded) covariates. Standardized estimates are presented in tables and text. Additionally, Cohen's f^2 was calculated as a measure of effect size for all significant predictors in the model. Cohen's f^2 represents the variance explained by a predictor of interest relative to the variance explained by other predictors in the model (Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012). An f^2 effect size of .02, .15, and .35 is interpreted as small, medium, and large, respectively.

Table 4 presents findings for the model testing whether teachers' emotion talk predicted children's end of year observed positive engagement with the teacher, controlling for their baseline engagement level. To isolate the unique contribution of emotion talk, measures of observed interaction quality (i.e., teacher positive interactions during free play and clean up) and teacher-reported relational quality (i.e., closeness and conflict) were entered as control variables in the model.

Regarding covariates, results indicated that children in classrooms with a higher mean of externalizing behaviors at baseline were observed to be less engaged with their teachers at the end of the year, controlling for their baseline level of engagement with the teacher (β = -.14, *SE* = .06, *p* = .01, f^2 = .03). Findings for affective quality of teacher-child interactions and relationships showed that children whose teachers' reported higher levels of relational closeness were observed to be more positively engaged with their teacher at the end of the year (β = .12, *SE* = .05, *p* = .02, f^2 = .01), controlling for their baseline engagement level.

Teachers' emotion talk did not significantly predict children's engagement with teachers at the $p < .05$ level. Although only trending towards significance, children whose teachers' used more emotion talk were observed to engage more positively with their teachers in the classroom at the end of the year (β = 12, *SE* = .06, *p* = .05, f^2 = .02), controlling for their baseline observed engagement with the teacher.

Link Between Emotion Talk and Children's Positive Engagement with the Teacher Moderated by the Affective Quality of Teacher-Child Interactions and Relationships

In addition to examining the unique contribution of emotion talk to children's engagement with the teacher, we were interested in exploring whether this link depended on the quality of teacher-child interactions and relationships. We investigated this question by including three interaction terms in the regression model described above (i.e., emotion talk x closeness, emotion talk x teacher positive interactions during free play, and emotion talk x teacher positive interactions during clean up). Results are displayed in Table 4.

The association between emotion talk and children's engagement with the teacher was significantly moderated by the quality of dyadic interactions during free play (β = 18, *SE* = .06, *p* = .002, f^2 = .04). To explore this interaction, we used the equations estimated from the final model to predict children's engagement with the teacher for teacher-child dyads with relatively low (i.e., 1 *SD* below the sample mean), average (i.e., sample mean) and relatively high (i.e., 1 *SD* above the sample mean) interaction quality. We graphed these relationships (see Figure 1) and conducted a simple slopes analysis (see Aiken & West, 1991). Results indicated that the rate of teachers' emotion talk was significantly linked to children's gains in positive engagement with their teachers *only* for teacher-child dyads with relatively high quality interactions during free play (β = .27, *SE* = .08, *t* = 3.22, *p* = .001). For children whose teachers interacted with them during free play with average quality (β = .10, *SE* = .07 *t* = 1.42, *p* = .16,) or relatively low quality (β =.07, *SE* = .09, *t* = -.82, *p* = .41), emotion talk was not significantly linked to children's gains in positive engagement with the teacher.

Discussion

This study described the natural variation in preschool teachers' emotion talk in the context of a standardized dyadic storybook reading task. To do so, we adapted a coding scheme from the parenting research literature to be used with teacher-child dyads. Responding to the need for examining the role that early childhood teachers play in supporting children's socioemotional development (Denham et al., 2012), we investigated links between emotion talk and children's positive engagement with the teacher in the classroom. To isolate the unique contribution of emotion talk on children's observed engagement with teachers, we held the affective quality of interactions and relationships and children's language skills constant. Guided by an attachment perspective (Thompson, 2010; 2015), we also explored whether the link between teachers' emotion talk and children's gains in positive engagement with teachers operated differently in dyads with varying levels of teacher-child affective quality. Results indicated that teachers' emotion talk was infrequent and that teachers' emotion talk was associated with children's engagement with their teachers *only* in the context of positive teacher-child interactions. Although the effect sizes were small, findings from this study highlight the role that preschool teachers can play in intentionally supporting the classroom adaptation of children perceived as displaying externalizing behaviors, particularly their positive engagement with the teacher.

Frequency of Teachers' Emotion Talk

Consistent with prior work by Morris and colleagues (2013), one descriptive finding was that teachers' use of emotion talk was scarce. In fact, half of the teachers labeled emotions once at the most and were never observed to explain emotions or emotion-related behaviors to children. This finding is striking if we consider that teachers

read a book with explicit emotional content and illustrations (e.g., a Bear crying and feeling lonely, or a little boy scared when discovered by the Bear). Thus, we would have expected teachers to leverage this instructional opportunity to discuss emotions with children more frequently than they were observed to. Evidence from natural variation in parental emotion talk indicates that storybook reading is a context in which parents label emotions significantly more than during joint play (Drummond, Paul, Waugh, Hammond, & Brownell, 2014). Extrapolating this evidence to teachers, we could hypothesize that teachers' emotion talk in contexts outside of storybook reading will be even more infrequent. Indeed, in an examination of mental state talk during naturally occurring classroom interactions (King & La Paro, 2015), Head Start teachers were observed to use a rate of .29 emotion words per minute. Acknowledging that characteristics other than the activity setting could explain this difference, the fact that teachers in our study used a higher rate of emotion talk per minute (i.e., .48) provides preliminary evidence that teachers' emotion labeling and explaining in the storybook reading task was more frequent than what teachers normally do in the classroom. This suggests that young children perceived by their teachers as displaying externalizing behaviors are receiving limited opportunities to acquire emotion labels and explanations within their interactions with teachers. This may be a reflection that these children's need for extra opportunities to talk about emotions is not adequately being met in the preschool classroom. The observed low rates of teachers' emotion talk highlight the need for professional development aimed at supporting teachers to intentionally label and explain emotions to children, especially considering a recent meta-analysis revealing that teachers' emotion regulation instruction —a construct including using language to label emotions and

providing appropriate guidance on the regulation of emotions— is one of 14 practices deemed as essential to support social and emotional development of children in the early childhood classroom (McLeod et al., 2017).

Link Between Emotion Talk and Children's Positive Engagement with the Teacher

Although teachers' rate of emotion talk was linked to gains in children's observed positive engagement with the teacher, it is important to note that this finding was only marginally significant (p = .05) and the effect size was small. Yet, to our knowledge this is the first study providing empirical evidence of the association between emotion talk and children's outcomes. This finding is noteworthy for two reasons. First, it was robust even when several measures of teacher-child affective quality at the dyadic- and classroom-level and children's language skills were included in the model. In other words, even when the quality of teacher-child interactions and relationships and children's language skills are held constant, emotion talk is associated with gains in the degree to which a child emotionally connects to their teacher and uses language as a functional tool to express their needs and emotions. One possible explanation for this link is that because emotions are social in nature, talking about emotions foster children's connection to their teacher, and thus children are more likely to seek and enjoy interactions with them. Alternatively, when teachers talk about emotions and emotion-related behaviors, children may improve their emotion knowledge, which in turn allows them to become aware of their feelings and express them to the teacher using words. Second, empirical evidence on specific teaching practices such as emotion talk is aligned with calls (Jones & Bouffard, 2012) to help move the field from programs to processes that are likely to result in improved children's learning. To that end, the present study

adds to current efforts in education and prevention science research (e.g., Abry, Hulleman, & Rimm-Kaufman, 2015; Cook et al., 2017), by providing initial evidence for emotion talk as one discrete, simple, teaching practice that holds promise to support positive engagement with the teacher for preschoolers perceived as displaying elevated externalizing behaviors.

Importance of Considering the Affective Quality of Teacher-Child Interactions and Relationships

The small effect size found for the direct link between emotion talk and children's engagement with teachers indicates the need for further research and replication. Nonetheless, such finding could suggest the need for increasing the frequency with which early childhood teachers label and explain emotions in their interactions with children. Although this implication for practice could be possible, it is also likely that the relationship between emotion talk and children's gains in positive engagement with their teacher is nonlinear. In other words, when teachers talk "too much" about emotions, in a way that is not sensitive to a child's needs, they may not end up supporting children's connection and communication with them. Examining the moderating role of teacher-child affective qualities helped shed some light in this potential interpretation. Consistent with similar work in the parent-child research literature (Ensor & Hughes, 2008; Laible & Thompson, 2000), we found that higher rates of teachers' emotion talk were associated with children's gains in their positive engagement with the teacher *only* in the context of high quality teacher-child dyadic interactions. In other words, children who made the greatest gains in positive engagement with their teacher were those whose teachers talk more frequently about emotions *and* were observed to interact more sensitively and

responsively during free play. This finding highlights the complex and multidimensional nature of children's positive engagement with the teacher in the classroom; to be able to emotionally connect and communicate their needs to the teacher, children perceived by their teachers as displaying externalizing behaviors may need a combination of supports that include both more affective (e.g., sensitivity, positive affect, or support for autonomy) and linguistic aspects (e.g., emotions labels or explanations about causes and consequences). It also illustrates that research aimed at identifying specific, effective, social and emotional teaching practices such as emotion talk is important but not sufficient in that it misses the fact that social and emotional development is inherently relational. To that end, our study purposefully tried to contextualize emotion talk within the teacher-child interactional and relational context.

Limitations and Future Directions

Findings from the present study add to our understanding of emotion talk as one specific teaching practice that early childhood teachers use to support the positive classroom adaptation, —particularly engagement with the teacher— of children who they perceive them as displaying externalizing behaviors. Yet, several limitations that constrain our results should be noted. Our examination of these processes was correlational and thus results cannot be interpreted causally. The data for this study was collected in the context of a dyadic intervention to improve teacher-child relationships. Though all of our models controlled for intervention condition, window, and site to isolate any potential intervention effects, it is still possible that the intervention could have influenced any of the associations found. Although the time precedence and evidence from the parenting research support the directionality of the relationships tested,

it is also likely that children who are more engaged with their teachers elicit more emotion talk from them. To address this limitation, future work could benefit from measuring these constructs at several time points within a school year to test their potential bidirectional associations.

Regarding the dyadic tasks used in the present study, one limitation to consider is that the storybook reading occurred after teacher-child dyads had already engaged in free play and clean up tasks. Thus, it is possible that teachers' frequency of emotion talked was limited because they were being sensitive to children being tired, wanting to go back to the classroom, or other needs. To ensure that the sequence of the tasks did not influence teachers' frequency of emotion talk, future studies should consider either randomizing the task order or only conducting the storybook reading task. Additionally, the tasks used to measure teachers emotion talk (i.e., storybook reading) and the observed quality of dyadic interactions (i.e., free play and clean up) were selected because its standardized nature permitted us to examine how teachers' frequency of emotion talk and interaction quality differed across dyads under comparable circumstances, when contextual variables remained constant. Though this was beneficial for the internal validity of our study variables, it may challenge the external validity as teacher and children interact with each other within the classroom, where other children and dynamics are also in place. To address this challenge, future research should aim to observe more naturalistic classroom interactions to increase the ecological validity of these findings.

Conclusion

In conclusion, research focused on specific teaching practices that support preschoolers classroom adaptation advances our knowledge of how early childhood teachers play a role in the social and emotional development of young children (Denham et al., 2012). By describing teachers' emotion talk in the context of a storybook reading task, we discovered that children perceived by their teachers as displaying elevated externalizing behaviors are having limited opportunities to acquire emotion labels and discuss emotional experiences. Our findings showed that teachers who provide children with frequent opportunities to talk about emotions in the context of sensitive and responsive dyadic interactions have children who make greater gains, from the beginning to the end of the preschool year, in their observed positive engagement with the teacher in the classroom. This implies that when thinking about teacher-child emotion talk in the preschool classroom, both the frequency of emotion labeling and explaining (i.e., *what* the teacher says) and the affective quality of teacher-child interactions (i.e., *how* they say it) should be considered.

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Table 1.
Definitions and examples for individual emotion talk codes

Individual codes	Definition	Examples
Emotion labeling produced by the teacher	The teacher named an emotional state or behavior, without further elaborating on it	*"Look at the Bear's face. He is so surprised"* *"Eddie is laughing"*
Emotion labeling elicited from the child	The teacher requests the child to name an emotional state or behavior (regardless if the child provides an answer or not)	*"Do you think he is scared or do you think he is excited?"* *"How is the Bear feeling?"*
Emotion explaining produced by the teacher	The teacher names an emotional state or behavior *and* elaborates/provides more information about it (i.e., causal, contextual cues, behavioral indicators, links to the child experience)	*"Oh he's really scared. His legs are shaking!"* *"I think he is surprised because he picked up his bear and there was Eddie."*
Emotion explaining elicited from the child	The teacher requests the child to elaborate on an emotion or emotion-related behavior (regardless if the child provides an answer or not)	*"What do you do when you feel scared?"* *"Why are they not lonely anymore?"*

Table 2.
Descriptive statistics for raw frequencies of individual teacher emotion talk codes

	Raw frequencies						
Individual codes	*M*	*SD*	Median	75th perc.	90th perc.	Min	Max
Emotion labeling							
Produced by the teacher	1.53	1.91	1	2	4	0	11.5
Elicited from the child	1.45	2.06	.5	2	4	0	16.5
Emotion explaining							
Produced by the teacher	.47	.84	0	.5	1.5	0	5
Elicited from the child	.31	.72	0	0	1.5	0	5.5
Composite							
Emotion talk total	3.76	4.51	2	5.5	10	0	29.5

Table 3.
Descriptive statistics and Pearson correlation for study variables

	Emotion talk	Interactions free play	Interactions clean up	Relational closeness	Relational conflict	Positive engagement with teacher
Emotion talk rate per minute	1					
Teacher positive interactions free play	.22***	1				
Teacher positive interactions clean up	.27***	.43***	1			
Relational closeness	.01	.19***	.19***	1		
Relational conflict	-.04	-.23***	-.09	-.37***	1	
Positive engagement with the teacher	.16**	.18**	.11*	.27***	-.02	1
M	.48	3.92	3.45	4.32	2.28	2.38
SD	.52	.61	.79	.63	.98	.65
Min	0	1.92	1.42	2	1	1.06
Max	2.46	5	5	5	4.86	4.91
ICC	.45	.47	.38	.26	.16	.44

Note: Spearman correlations to account for non-normality in the teachers' rate of emotion talk were computed as a sensitivity check. Results were not sensitive to the method used to compute correlations and the pattern of results was the same.

Table 4.
Emotion talk, affective quality and their interactions predicting children's positive engagement with their teacher

	Engagement with teacher				Engagement with teacher			
	β	*SE*	*p*	f^2	β	*SE*	*p*	f^2
Emotion talk	0.12†	0.06	0.05	.02	0.11†	0.06	0.05	.02
Affective quality of interactions and relationships								
Teacher-reported closeness	0.12*	0.05	0.02	.01	0.10*	0.05	0.04	.00
Teacher-reported conflict	0.06	0.06	0.36		0.05	0.06	0.42	
Positive teacher interactions free play	0.003	0.06	0.95		0.03	0.06	0.58	
Positive teacher interactions clean up	-0.04	0.06	0.48		-0.02	0.06	0.70	
Child characteristics								
Age in months	-0.04	0.06	0.55		-0.04	0.06	0.51	
Externalizing behavior	0.09	0.06	0.15		0.08	0.06	0.17	
Family income-to-needs ratio	-0.02	0.08	0.81		-0.01	0.08	0.86	
Parents years of education	0.01	0.07	0.91		-0.01	0.07	0.94	
Receptive vocabulary	0.01	0.06	0.85		0.02	0.06	0.77	
Baseline outcome	0.42***	0.05	<.001	.19	0.42***	0.05	<.001	.16
Teacher and classroom characteristics								
Classroom mean externalizing behavior	-0.14*	0.06	0.01	.03	-0.14*	0.05	0.01	.03
Emotional support	-0.05	0.09	0.56		-0.02	0.10	0.87	
Classroom organization	-0.07	0.08	0.38		-0.10	0.08	0.23	
Instructional support	0.11	0.08	0.13		0.11	0.07	0.12	
Interaction terms								
Emotion talk x Closeness					0.05	0.04	0.22	
Emotion talk x Positive interactions free play					0.18**	0.06	0.002	.04
Emotion talk x Positive interactions clean up					-0.04	0.06	0.50	
R^2	0.37***	0.05	<.001		0.40***	0.05	<.001	

†$p < .10$, * $p < .05$; ** $p < .01$; *** $p < .001$

Note. Models also control for intervention status, window, and site. Coefficients are standardized

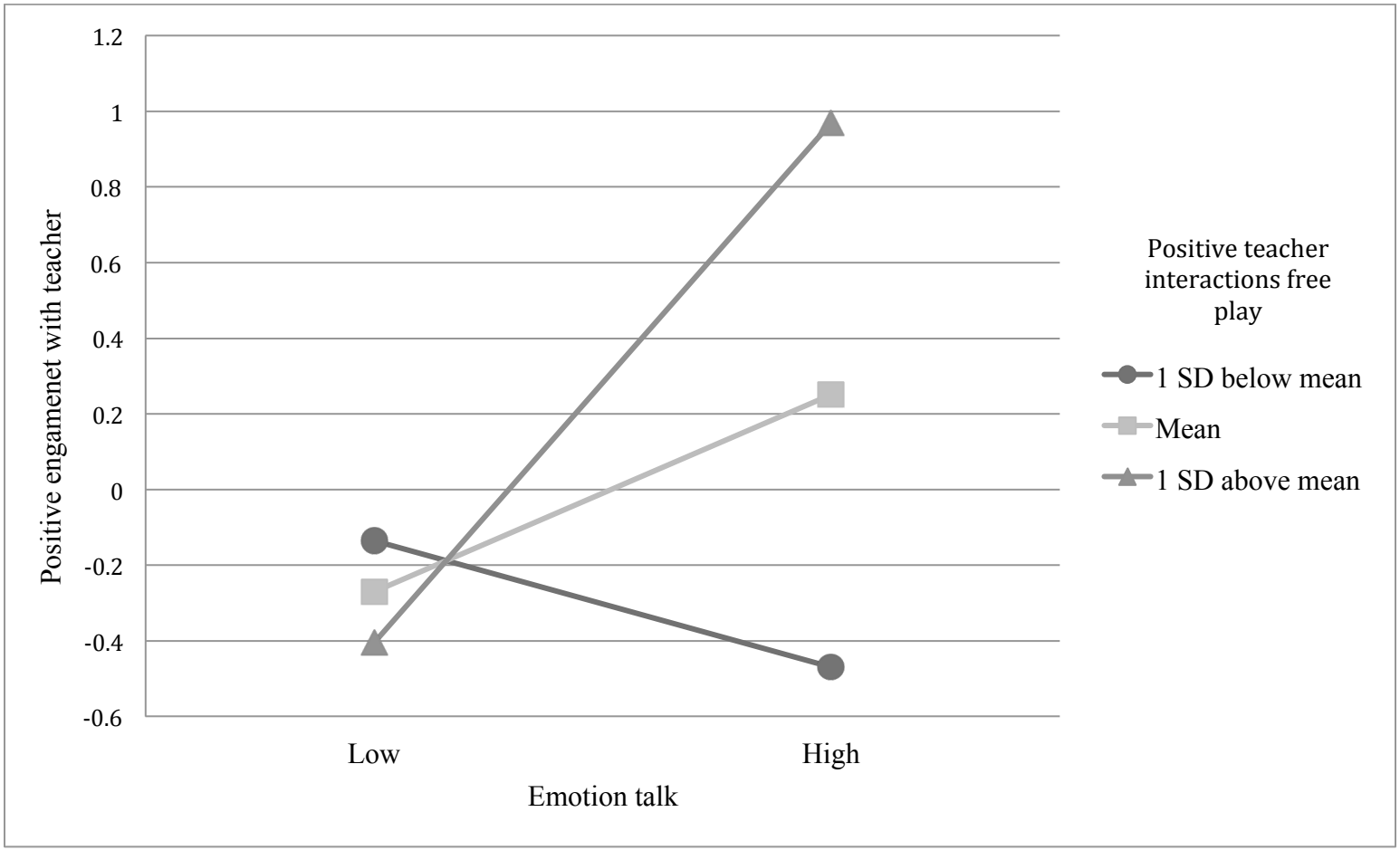

Figure 1. Graphical representation of the interaction between teachers' emotion talk rate and teacher positive interactions during free play. All variables in the model including the interaction term were standardized to be on the same scale to facilitate interpretation.

Emotion Talk Coding Manual

Definitions and examples to guide the emotion talk coding of the storybook reading portion of the Teacher-Child Structured Play Task are provided in this manual. To ensure accuracy, this manual should be consistently referenced when coding. As a coder, it is your responsibility to: (1) understand the content of this manual and (2) ask questions when you have any doubts about the explanations in this manual or interactions in a video.

General Instructions

Each time you code a video, be sure to register the following information:

- Teacher ID (TID)

You can find the teacher ID in the first four digits of the video ID. These four digits precede the underscore. For example: in video 4082_1961_08222012, the TID is 4082.

- Child ID (CID)

The child ID is the second group of four digits. For example, in video 4082_1961_08222012, the CID is 1961.

- Date

The date is comprised of the final digits in the video. It follows the Child ID, and comes after the second underscore. For example, in video 4082_1961_08222012, the date is 08222012.

- Coder

Enter your capitalized first initial, followed by your last name, with the first letter capitalized. For example, John Smith would be JSmith.

- Date Coded

Enter the date you coded the video, in the following format: monthdayyear. For example, November 20, 2018 will be 11202018.

- Start Time

Register the time in minutes and seconds in which the storybook reading task starts (e.g., 15:32). The start time should be the exact time in which the data collector finishes giving the instructions to teachers (i.e., "*I'll like you to read this book to [child's name] and I'll be back when you're finished*"). Therefore, the start time of the video is after the data collector says the word "*finished*".

- End Time

Register the time in minutes and seconds in which the storybook reading task finishes (e.g., 23:18). The end time should be the exact time in which the data collector comes back to the room.

- Quality of Footage

The purpose of this question is to record whether the video is at a level of visual and auditory quality for it to be coded: Can you hear the teacher and child? (Note: Be sure to try watching the video using headphones before you answer this question) Is the image clear?

  - Unable to code: the video was unclear to view *or* you could not hear the teacher the entire time
  - Able to code some portions: only portions of the video were viewable and/or understandable.
  - Easily coded: the video was clear to view *and* you could hear the teacher the entire time

Defining An Utterance

For this coding, an utterance is defined as a section of a teacher's speech between pauses, usually a sentence. "That bear is surprised" or "What is he doing?" are examples of utterances.

If an utterance stands alone as a separate clause, the sentence contains two utterances rather than one. For example:

- "The bear is scared, isn't him?" will be considered two total utterances: "The Bear is scared" is one utterance (i.e., the teacher is labeling a book character's emotion) and "isn't him?" is a separate utterance (i.e., the teacher is eliciting from the a child a response to the question 'is the bear scared?').
- "Do you think he is sad? I'll say he's kind of mad because of his frown" will be considered two total utterances: "Do you think he is crying?" is one utterance (i.e., the teacher is eliciting from the a child a response to the question 'is the bear crying?) and "I'll say he's kind of mad because of his frown" is a separate utterance (i.e., the teacher is explaining an emotion by linking it to a facial cue).
- "He is surprised. What is he surprised of?" will be considered two total utterances. "He is surprised" is one utterance (i.e., the teacher is labeling a book character's emotion) and "What is he surprised of?" is a separate utterance (i.e., the teacher is requesting the child to explain why is the Bear surprised).

Identifying Emotion Talk Utterances

You will code any and all utterances in which teachers refer to an emotion *or* behavior associated with an emotion. Below you can find a list to help you identify emotions and emotion-related behaviors that you should code. As a coder, it is your responsibility to ask questions when you have any doubts about whether a certain word or interaction should be considered emotion talk.

Emotions words:

Sad	Scared	Surprised	Lonely
Happy	Silly	Mad	Angry
Excited	Upset	Worried	Love
Fear	Concern	Mean	Spooky
Like/Enjoy	Upset	Shock	

Emotion-related behaviors:

Sighed	Laughing	Crying	Hugging
Shake	Smiling	Suck your thumb	Frown
Dancing	Singing	Brush a tear	Sore tummy
Scream	Sniff	Bite	Scratch head

It is important to notice that emotion-related behaviors depend on the context. This means that the same behavior can be related to emotions or not, depending on the context of the story and the interactions between the teacher and the child. For example, the Bear and Freddy *wave their hands* of happiness in one page of the book. When teachers talk about or dramatize this behavior, this should be coded as an emotion-related behavior because it is expressing an emotional state. However, later in the book the Bear and Freddy *wave their hands* to say goodbye. This should NOT be coded as an emotion-related behavior.

Coding for Emotion Talk Utterances

Frequency counts of emotion imitation, emotion labeling, or emotion explanation.

1. Emotion Imitation

You will carefully observe, mark, and tally every utterance the teacher makes that it's a teacher-produced emotion imitation, or a child elicited emotion imitation.

1.1. Emotion Imitation - Produced By The Teacher

Emotion imitation teacher-produced is any teacher's non-verbal communication effort to draw a child's attention to an emotion or emotion-related behavior. Imitation comprises:

- Emotion sound effect (e.g., "waaaah" for crying, or "hahaha" for laughing, "uh-oh" when scared)
- Emotion facial expression (e.g., frown for anger, opened mouth for surprise)
- Emotion dramatizing using gestures (e.g., give the child a hug for a cuddle, brush a tear from the eye for crying, touch the tummy for laughing)
- Emotion pointing (e.g., the teacher points to a character's facial/body expression)

In order to count an utterance of emotion imitation, you should be able to identify the emotional state or behavior that the teacher is highlighting.

Example of utterances that should NOT be coded as emotion imitation:

- "Woooow! Let's see what's going to happen" is not teacher-produced emotion imitation. "Woooow!" is not representing any specific emotional state.
- "Look at the Bear [teacher points the Bear in the book], he is Big!" is not teacher-produced emotion imitation. Pointing the Bear is not focused on the Bear's facial/body expression.
- The teacher smiling as a reaction to one page of the book is not teacher-produced emotion imitation. The teacher's smile probably represents that he/she is enjoying the story, but it is not intended to emphasize an emotional state or behavior.

Examples of utterances that should be coded as emotion imitation:

- The teacher is reading: "Eddie sighed [*dramatized a sigh*] again" is teacher-produced emotion imitation. The sigh draws the child's attention to Eddie's feelings of sadness/giving up because his teddy is not talking.
- When reading "Just as he brushed a tear from his eye [*the teacher brushes a tear from the child's eye*]" is teacher-produced emotion imitation. The gesture draws the child's attention to a specific emotion-related behavior (i.e., crying).
- "Look *AAAAAAH*, he is scared!" is teacher-produced emotion imitation. This sound effect is identifying a specific emotional state.

This code captures teacher's *intentional* use of non-verbal communication to help the child make meaning of emotions. To count an interaction as emotion imitation, you need to observe that the teacher is doing it *on purpose*. For example, if a teacher is just naturally more expressive, you should NOT code each time they use a facial expression as emotion imitation.

1.2. Emotion Imitation – Elicited From The Child

Emotion imitation child-elicited is any utterance in which the teacher explicitly requests the child to non-verbally (i.e., sound effect, facial expression, gestures or pointing) refer to an emotion or emotion-related behavior. For example:

- "Show me your *sad* face" is child-elicited emotion imitation. The teacher is requesting the child to imitate the facial expression of sadness.
- "How do you look when you're *surprised*" is child-elicited emotion imitation. The teacher is requesting the child to imitate the facial expression of surprise.
- "Who is *scared* in this page? Point it for me" is child-elicited emotion imitation. The teacher is requesting the child to point to the characters who is feeling scared.

There are occasional utterances in which the child replies as if they have been asked to imitate an emotion. For example, the teacher asks, "How is that Bear feeling?" and the child replies non-verbally, imitating a surprised facial expression. These cases SHOULD be coded as emotion imitation child-elicited.

2. Emotion Labeling

You will carefully observe, mark, and tally every statement the teacher makes that it's a teacher-produced emotion labeling, or a child elicited emotion labeling.

2.1. Emotion Labeling - Produced By The Teacher

Emotion labeling teacher-produced is any utterance in which the teacher communicates out loud her own, the child's, or a book character's emotions or emotion-related behaviors. When coding for labeling, be sure to identify that the teacher named an emotional state or behavior, without further elaborating on it. For example:

- "Look at the Bear's face. He is so *surprised*" is teacher-produced emotion labeling. The teacher is communicating out loud the Bear's emotion (i.e., surprised).
- "Eddie is *laughing*" is teacher-produced emotion labeling. The teacher is communicating out loud an emotion-related behavior (i.e., laughing).
- "That big bear is *scared*" is teacher-produced emotion labeling. The teacher is communicating out loud the Bear's emotion (i.e., scared).
- "You are *excited* with this book" is teacher-produced emotion labeling. The teacher is communicating out loud the child's emotion (i.e., excitement).

If a teacher communicates out loud an emotional state or behavior *and* elaborates on it, this should be coded as emotion explaining (see definition and examples below). Do not count this as emotion labeling. It would be coded as emotion explaining only. For example, if a teacher says, "He is *surprised* that it was Eddie and not the teddy bear who was talking" that is counted as an emotion explanation, and not as emotion labeling.

2.2. Emotion Labeling – Elicited From The Child

Emotion labeling child-elicited is any utterance in which the teacher explicitly requests the child to communicate out loud his/her own or a character's emotions or emotion-related behaviors. Any and all utterances should be counted, regardless if the child provides an answer or not. When coding for labeling, be sure to identify that the teacher is requesting the child to name an emotional state or behavior, without further elaboration. For example:

- "What is that face, *surprised*?" is child-elicited emotion labeling. The teacher is requesting the child to confirm that the facial expression represents surprise.
- "What is that bear *feeling*?" is child-elicited emotion labeling. The teacher is requesting the child to name the emotional expression of a character of the book.
- "Do you think he is *scared* or do you think he is *excited*?" is child-elicited emotion labeling. The teacher is requesting the child to label an emotion based on two options.

There are occasional utterances in which the child replies as if they have been asked to label an emotion or emotion-related behavior. For example, the teacher asks, "What is the bear doing?" and the child replies "He is *crying*". Or the teachers asks, "What kind of expression does he have on his face?" and the child answers "*Happy*". A teacher could also say, "What do you think is happening here?" and th child replies "He *scared* the Bear". These cases SHOULD be coded as emotion labeling child-elicited, even though there is no explicit emotion word in the teacher's question.

3. Emotion Explaining

You will carefully observe, mark, and tally every statement the teacher makes that it's a teacher-produced emotion explaining, or a child elicited emotion explaining.

3.1. Emotion Explaining - Produced By The Teacher

Emotion explaining teacher-produced is any teacher's verbal effort to elaborate on an emotion or emotion-related behavior. Elaborate means going beyond naming an

emotion. Any utterance in which the teacher names an emotion *and* provides additional information about an emotion or emotion-related behavior should be coded as explaining. Emotion explaining can include:

- Causal information about an emotion (e.g., explaining why someone is feeling in a particular way)
- Contextual cues (e.g., explaining contextual features used to identify an emotion)
- Behavioral indicators (e.g., explaining behavioral indicators linked to an emotion)
- Connections to the child's experiences (e.g., explaining that a book character is feeling in a way similar to what the child has felt before)

Typically, teacher-produced emotion explanations contain the word <u>because</u>, although they don't have to. For example:

- "I think he is *surprised* because he picked up his bear and there was Eddie" is emotion explaining. The teacher is providing causal information to explain why the character is surprised.
- "Oh he's really *scared*. His legs are shaking!" is emotion explaining. The teacher is connecting an emotion (i.e., scared) with behavioral indicators (e.g., legs shaking).
- "They won't feel lonely anymore because they now have friends" is emotion explaining. The teacher is providing causal information to explain why the character won't feel lonely.

3.2. Emotion Explaining – Elicited From The Child

Emotion explaining child-elicited is any utterance in which the teacher explicitly requests the child to elaborate on an emotion or emotion-related behavior. Elaborate means going beyond naming an emotion. Any utterance in which the teacher requests the child to provide information about an emotion or emotion-related behavior should be coded as explaining. Any and all utterances should be counted, <u>regardless</u> if the child provides an answer or not.

Typically, child-elicited emotion explanations are questions that start with <u>"why"</u>, although they don't have to. For example:

- "Why do you think they are *laughing* here?" is emotion explaining. The teacher is requesting the child to explain why the book characters are laughing

- "Why do you think they are not *lonely* anymore?" is emotion explaining. The teacher is requesting the child to explain why the book characters are not feeling lonely.
- "What do you do when you feel *scared*?" is emotion explaining. The teacher is requesting the teacher to elaborate on what they do when feeling scared.

TeacherID: _____ ChildID: _____ Date: _____

Coder: _____ Date coded: _____

Emotion Talk Coding Sheet

Start time: _____ End time: _____

Quality of footage (circle one):

Easily coded Able to code some portion Unable to code

Notes:

_____

_____

1. Emotion imitation

	Tally notes	Total instances
1.1. Produced by the teacher		
1.2. Elicited from the child		

2. Emotion labeling

	Tally notes	Total instances
2.1. Produced by the teacher		
2.2. Elicited from the child		

3. Emotion explaining

	Tally notes	Total instances
3.1. Produced by the teacher		
3.2. Elicited from the child		

4. Others

Write the exact quote(s)