Implementing *Banking Time* with teachers and preschoolers displaying disruptive behaviors: Links between consultant-teacher relationship quality, implementation fidelity and dosage, and dyadic teacher-child interactions

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Acknowledgments

This manuscript was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant #R305B140026 to the Rectors and Visitors of the University of Virginia. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

Published online in *School Mental Health*, July 2021

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Abstract

Teacher consultation is commonly used to ensure that classroom-based interventions are implemented with fidelity to achieve targeted outcomes, yet the consultation process is not well-understood. Consultant-teacher relationship quality is one feature of consultation that may promote intervention outcomes—both directly and indirectly via teachers' implementation. The current study used mediation models to examine the direct links between consultant-teacher relationship quality, assessed from the perspective of the consultant and teacher, and observed dyadic teacher-child interactions, as well as the indirect effect through teachers' implementation fidelity and dosage. Implementation data come from the *Banking Time* intervention (N =168 children, 57 teachers), a dyadic teacher-child intervention that targets the quality of interactions between teachers and preschoolers perceived to display disruptive behavior. Consultants (N = 4) worked with teachers to support their implementation of specific *Banking Time* practices. Findings supported a direct link between consultant-reported relationship quality and teachers' observed interactions with children, however, no evidence for an indirect effect was found. Consultant-reported relationship quality predicted implementation dosage but not fidelity. Across findings, consultant-reported relationship quality emerged as a stronger predictor of outcomes than teacher-reported relationship quality. Results have implications for school-based interventions that employ teacher consultation to support teachers.

Keywords: Teacher Consultation, Consultant-Teacher Relationship Quality, Implementation Fidelity, Implementation Dosage, Teacher-Child Interactions, Preschool

Implementing *Banking Time* with teachers and preschoolers displaying disruptive behaviors: Links between consultant-teacher relationship quality, implementation fidelity and dosage, and dyadic teacher-child interactions

Teacher consultation is a common component of classroom-based interventions, including those that focus on improving children's social-emotional and behavioral outcomes in preschool settings (Domitrovich et al., 2009; Mattera et al., 2013; Raver et al., 2009; Snyder et al., 2015; Williford et al., 2017). Consultants support teachers to implement the intervention's core components as intended (Fixsen et al., 2005; Pas et al., 2014; Reinke et al., 2014). Supporting teachers' successful implementation of interventions' core components is important, given that high-quality implementation is necessary to achieve favorable intervention outcomes (Durlak & DuPre, 2008). Although consultation is a widely used strategy to promote teachers' implementation and intervention outcomes (Stormont et al., 2015), the consultation process is not well-understood (Pas et al., 2014), limiting our capacity to design effective consultation supports for teachers. In this study we investigated consultant-teacher relationship quality as one specific consultation process.

Grounded in findings from the therapeutic literature that a trusting and collaborative relationship between a therapist and client is instrumental to achieving clinical goals (Flückiger et al., 2018), recent work has pointed to the quality of the consultant-teacher relationship as an important feature of the consultation process in classroom-based interventions (Johnson et al., 2016; Wehby et al., 2012). To conceptualize and measure the "black box" of consultation, Johnson and colleagues (2016) administered parallel measures of alliance to coaches and teachers in the context of a classroom management and student engagement intervention. Their confirmatory factor analysis found that consultation alliance can be organized into four dimensions—working relationship, coaching process, investment, and benefits of coaching—

with each reported from the perspective of the teacher and the coach or consultant. A fifth dimension, barriers to coaching, was also reported, but only from the coach perspective. The quality of the relationship, the focus of the current study, encompasses the degree of connection, enjoyment, and partnership present in the relationship between a consultant and teacher. Johnson et al (2016) found that while consultant and teacher reports of relationship quality were moderately related, each reporter contributed unique information, indicating that assessing relationship quality from both perspectives is valuable.

Responding to calls to unpack consultation processes (Cappella et al., 2011; Powell & Diamond, 2013; Sheridan et al., 2009), the goal of the present study was to advance our understanding of how consultation relates to teachers' implementation of a classroom-based intervention and teacher and child outcomes. Specifically, we investigated the extent to which the quality of the consultant-teacher relationship directly relates to dyadic teacher-child interactions and whether relationship quality indirectly contributes to outcomes through teachers' implementation fidelity and dosage. Following Johnson et al (2016), we assessed relationship quality using ratings from both the consultant and teacher, to capture the transactional nature of the consultation process. To answer our research questions, we leveraged implementation data from *Banking Time,* a relationship-focused intervention aimed at improving dyadic interactions among teachers and preschoolers perceived to display elevated levels of disruptive behaviors (Williford et al., 2017). Findings from this study can support the design, delivery, and impacts of social and behavioral classroom-based interventions that employ teacher consultation.

Implementation of Interventions with Teacher Consultation

Implementation is broadly defined as a description of intervention delivery in a given setting (Durlak & DuPre, 2008). Implementation fidelity concerns how well implementers

adhere to an intervention's activities as prescribed by intervention developers, while dosage reflects the frequency or amount of delivery. Implementation can pertain to two distinct systems: the core programmatic components of an intervention and the support system (Domitrovich et al., 2008). The purpose of the support system is to facilitate effective implementation of the intervention's core components by providing the consultation, training, assistance, and problem-solving necessary for the implementer to execute the core components (Domitrovich et al., 2008). Teacher consultation (i.e., support system) is theorized to support teachers to implement the intervention's core components with sufficient fidelity and dosage, which then leads to improvements in the outcomes targeted by the intervention (Dunst et al., 2013). In addition to this indirect pathway, teacher consultation may operate directly to promote teacher and child outcomes targeted by the intervention (Dunst et al., 2013), depending on the specific features of consultation being investigated and their conceptual alignment to intervention outcomes. The current study tested the relations between one dimension of consultation (i.e., consultant-teacher relationship quality), teachers' implementation fidelity and dosage in the *Banking Time* intervention, and outcomes targeted by the intervention (i.e., dyadic teacher-child interactions).

Direct Links Between Relationship Quality and Dyadic Teacher-Child Interactions

The direct links between consultant-teacher relationship quality and dyadic teacher-child interactions have not been investigated, however, there is conceptual and empirical support for this hypothesized link. Given that teacher consultation is inherently a relational process, the working relationship between a consultant and teacher may directly influence intervention outcomes that are likewise relational or emotionally-salient in nature (Johnson et al., 2016; Powell & Diamond, 2013). Recent research on an infant and early childhood mental health consultation program supports this notion of a parallel process. Specifically, a stronger

consultative alliance (defined as the quality of the partnership between a consultant and teacher) was linked to greater improvements in teachers' perceptions of close relationships with children (Davis et al., 2021). A strong relationship between a consultant and teacher could similarly influence dyadic teacher-child interactions. For example, early childhood teachers report experiencing challenging work conditions, including stress induced by children's disruptive behaviors and no designated break time throughout the day (Kwon et al., 2020). When a consultant and teacher share a positive relationship, the teacher may share their feelings of frustration or stress. A consultant may validate these feelings and support teachers to regulate their emotions (Raver et al., 2012), contributing to more positive dyadic teacher-child interactions (Buettner et al., 2016). Strong relationships with consultants may also support effective teacher-child interactions by contributing to preschool teachers' overall perceptions of a supportive work environment. Preschool teachers who perceive positive work conditions, including positive relationships with supervisors and coworkers, report lower levels of depression, stress, and emotional exhaustion (Jeon et al., 2018), which have been linked to effective teacher-child interactions. Finally, when teachers and consultants enjoy a warm and trusting relationship, consultants may be more effective at prompting teachers to consider different perspectives that help shift their ways of interacting with children (Lee et al., 2014). This strategy may be especially relevant in the case of improving dyadic interactions with young children whom teachers perceive to display elevated levels of disruptive behaviors, since teachers tend to develop negative representation models of these children that can both undermine interaction quality and be difficult for teachers to alter (Spilt et al., 2012).

Indirect Links Between Relationship Quality and Dyadic Teacher-Child Interactions Through Implementation Fidelity and Dosage

The quality of the consultant-teacher relationship may also contribute to dyadic teacher-child interactions indirectly through promoting teachers' implementation fidelity and dosage of the intervention's core components (Dunst et al., 2013). For instance, a high-quality relationship may afford consultants with relational capital that facilitates the provision of constructive feedback on teachers' implementation; improved implementation would then lead to positive intervention outcomes. Indeed, among school-based interventions for preschoolers, fidelity is linked to positive child and teacher outcomes (Domitrovich et al., 2010; Marti et al., 2018; Sutherland et al., 2018), including prior work finding that fidelity to *Banking Time* practices contributed to positive dyadic teacher-child interactions (Alamos et al., 2018; LoCasale-Crouch et al., 2018). When children experienced high-fidelity *Banking Time* sessions—characterized by observing the child, labeling emotions, and following the child's lead—they showed greater gains in their observed positive engagement with the teacher compared to children in low-quality sessions (Alamos et al., 2018). The links between teachers' dosage of *Banking Time* sessions and intervention outcomes have not been empirically tested, however, two studies have examined dosage in another social-emotional intervention, the Preschool PATHS curriculum. In one study, teachers reported weekly on the frequency with which they implemented the curriculum's activities, and these reports were summed across the year to create an overall count. Dosage in this study was not linked to any child outcomes (Domitrovich et al., 2010), which may have been due to insufficient variability as most teachers reported very high dosage. In another study, in which teachers reported at the end of their year on their activity usage across the year (i.e., not at all, once per week, daily use), higher dosage was linked to increases in children's social competence (Hamre et al., 2012).

A few studies have examined the links between consultant-teacher relationship quality and teachers' implementation fidelity and dosage, although none in the early childhood context, despite the emphasis on creating collaborative partnerships for promoting outcomes in early childhood consultation settings (Chu, 2014). When elementary school teachers perceived a positive working relationship with their coach, they implemented intervention activities more frequently compared to teachers who perceive a less positive relationship, however, there was no difference in implementation quality (Johnson et al., 2018). In another study among elementary school teachers, teacher-reported working relationship buffered against the negative influence of teacher burnout on consultant-reported fidelity (Wehby et al., 2012), suggesting that the consultant-teacher relationship quality may play a protective role in supporting intervention fidelity among teachers experiencing high stress. In a mixed-methods study with elementary school teachers, relationship quality emerged a factor promoting successful implementation (Cappella et al., 2016). However, another study in elementary schools found that teacher-reported relationship quality did not influence teachers' implementation (Domitrovich et al., 2015). Although theory and some empirical work supports these two pathways (relationship quality to implementation fidelity and dosage and implementation fidelity and dosage to outcomes), to our knowledge, the extent to which relationship quality operates indirectly to influence intervention outcomes via fidelity and dosage has not been examined in the context of classroom-based interventions or in preschool settings.

Banking Time **as an Intervention for Improving Dyadic Teacher-Child Interactions**

Banking Time (Pianta & Hamre, 2001) is a dyadic, attachment-focused intervention to improve the quality of interactions and relationships between a teacher and child. The intervention aims to disrupt negative cycles of interactions by supporting the teacher-child dyad

to interact in new ways and in a different setting, apart from the typical classroom environment, which often involves demands and stress (Pianta, 1999). By establishing new cycles of interaction in which the teacher engages in specific practices (e.g., observe the child's play, narrate aloud the children's actions, allow the child to lead the session), each individual is more likely to perceive the other differently (i.e., more positively), which is theorized to shift internal working models and improve the teacher-child relationship and children's behavior (Pianta, 1999).

Banking Time involves short (10-15 minutes), regularly-occurring (2-3 times/week for a period of seven weeks), one-on-one sessions in which a teacher and child spend time together and interact in specified, positive ways. A randomized controlled trial (RCT) of the *Banking Time* intervention employed three conditions: *Banking Time*, *Child Time*, and business-as-usual (Williford et al., 2017). In both the *Banking Time* and *Child Time* conditions, teachers participated in the short, regularly occurring, one-on-one sessions with a child. However, teachers were instructed and supported to use specific practices designed to enhance the relational interactions between teachers and children only in the *Banking Time* condition. Teachers in the *Child Time* condition spent the same amount of time with an individual child but were not instructed or supported on how to spend the time or interact with the child. The third condition was business-as-usual for which no treatment was administered.

Results from the impact study indicated that children in the *Banking Time* condition displayed fewer disruptive behaviors as reported by their teacher, compared to children in the business-as-usual condition. In terms of teacher behavior, only teachers from the *Banking Time* condition were observed to show fewer negative interactions during a structured task at post-intervention compared to teachers in the other two conditions (Williford et al., 2017). Effect

sizes for both child and teacher behaviors were in the moderate range (d = -.29). A quasi-experimental design was embedded within the larger RCT to examine children's cortisol, a hormone that helps the body respond to stress. Children in the *Banking Time* condition showed significantly greater declines in their cortisol levels, compared to children in the business-as-usual condition (Hatfield & Williford, 2017). These positive findings extend preliminary studies of *Banking Time* that found its use was associated with greater teacher-reported closeness with children (Driscoll et al., 2011) and reduced conduct problems (Driscoll & Pianta, 2010).

Present Study

In the present study, we leveraged implementation data from the *Banking Time* trial to explore whether the quality of the consultant-teacher relationship shapes teacher and child outcomes directly and indirectly through implementation fidelity and dosage. Findings from this study contribute to the literature in two ways. First, we focus on the intervention support system (i.e., consultation process), which has received relatively little attention within implementation science compared to efforts to understand implementation of intervention core components (Stormont et al., 2015). Specifically, we extend previous work by bringing together the support system (i.e., consultation process), the intervention's core components (i.e., implementation fidelity and dosage), and outcomes by examining the entire implementation process in a mediating pathway. Unpacking this consultation process contributes to our understanding of how consultation operates as an implementation support in school-based interventions (Nadeem et al., 2013). Second, we examine consultant-teacher relationship quality, as reported by the consultant and teacher (Johnson et al., 2016), which theory and practice suggest is foundational to the success of consultation yet is only an emerging line of inquiry in the school-based consultation literature. We view the current study's sample (i.e., preschool teachers and children perceived to

display elevated levels of disruptive behaviors) as a strength for examining consultant-teacher relationship quality, since relationships may be an especially important aspect of consultation when the content and outcomes of the intervention are affective in nature, as with *Banking Time*.

We addressed two research questions: (1) To what extent does consultant-teacher relationship quality, as reported by the consultant and teacher, directly influence the quality of dyadic teacher-child interactions? (2) Are these associations mediated by teachers' fidelity to *Banking Time* practices and dosage of intervention sessions? We expected the quality of the consultant-teacher relationship to positively relate to dyadic teacher-child interactions (Johnson et al., 2016; Powell & Diamond, 2013) and anticipated that this relation will be mediated, at least in part, by teachers' implementation fidelity and dosage (Alamos et al., 2018; Johnson et al., 2018; LoCasale-Crouch et al., 2018; Wehby et al., 2012).

Method

Overview

Data for this study data come from a larger impact study of the *Banking Time* intervention (Williford et al., 2017). Recruitment occurred in three urban or semi-urban geographical sites within two Mid-Atlantic states in the United States. Directors from preschool centers of various types (e.g., Head Start, state funded PreK, and privately funded) were asked permission to invite teachers to participate in the study. After teachers consented to participate, parental consent was then requested for all children in the classroom (76% consent rate). Six weeks into the school year, teachers rated all children in their classroom on two disruptive behavior rating scales, Attention-Deficit/Hyperactivity Disorder Rating Scale-IV (ADHDRS-IV; DuPaul et al., 1998) and Oppositional Defiant Disorder Rating Scale (ODDRS; Hommersen et al., 2006). Items from both measures were summed, and the two boys and one girl (for better

gender distribution) with the highest disruptive behavior ratings and who had caregiver consent participated in the larger intervention study (N = 470 children). Classrooms were randomized into one of three treatment conditions—*Banking Time*, *Child Time*, or business-as-usual—such that all children in a classroom were assigned to the same intervention condition. The three participating children in the *Banking Time* and *Child Time* conditions were then randomly assigned to one of three seven-week intervention windows. Teachers worked with one child at a time, for the duration of the seven-week intervention window, before repeating the process with a second and, finally, third child. Although children in the business-as-usual condition did not receive treatment, they were also assigned a seven-week window for assessment purposes. This research was approved by the Institutional Review Board at the researchers' institution.

Participants

Participants for the current study include only those randomly assigned to the *Banking Time* condition (N = 168 children, N = 57 teachers), since implementation fidelity and dosage are only relevant for this condition. All children randomly assigned to the *Banking Time* condition were retained in the current study. There were no significant differences between the intervention conditions on baseline program, teacher, or child demographic variables (see Williford et al., 2017 for more detailed information). Classrooms had a mix of funding sources, with 22% being federally-funded, 22% state-funded, and 55% privately-funded. Children were 48 months old on average (SD = 6.67, range = 34-66) and 66% were male. Most children were either Black/African American (49%) or White (36%), with the remainder being Latino (7%), multiracial (6%), or Asian, Native American, or other race (all less than 1%). Children came from a broad range of economic backgrounds but the majority were from low-income families (M income-to-needs ratio = 1.74, SD = 1.43, range = .22-5.27). The vast majority of teachers

were female (94%), were 41-years-old on average (*SD* = 11.79, range = 23-67), and had an average of 11 years of experience (*SD* = 7.95, range = 0-31). Regarding teachers' highest level of education, 15% had some college, 13% had a two-year degree, 57% had a bachelor's degree, and 15% had a master's degree. Forty-three percent of teachers majored in early childhood, while 57% majored in an area other than early childhood. Teachers' racial composition was 48% identifying as White, 43% identifying as Black/African American, 4% Latino, with the remaining 5% identifying Native American, Asian, or multiracial.

Intervention Description

In the *Banking Time* condition, teachers met one-on-one with a child perceived to display disruptive behaviors for 10-15 minutes, two to three times per week, during the child's seven-week intervention window. The sessions were intended to facilitate a context in which the child and teacher could interact in positive ways and engage in activities of interest to the child. As such, the teacher was instructed to allow the child to lead the play (e.g., pretend play with figurines, arts and crafts, blocks) and refrain from actively teaching skills or engaging in activities that promoted the teacher's role (e.g., reading books). Teachers were also instructed to implement specific practices theorized to promote the quality of teacher-child interactions. These practices included observing the child's behaviors, narrating the child's actions, labeling the child's emotions, and promoting positive relational themes to the child (e.g., "I can be a helper."). To ensure that the child led the session, teacher-directed behaviors were discouraged, including questioning, making direct comments or issuing indirect commands, teaching skills, and praising children.

Teacher Consultation

Teachers in the *Banking Time* condition worked with a consultant ($N = 4$) to promote implementation of the intervention as intended. Immediately after baseline data collection, consultants met individually with each teacher for about 1.5 hours to provide teachers with a *Banking Time* manual and briefly describe the intervention. Following this initial meeting, teachers met with their consultant in-person every other week and had a phone call on the alternate weeks. Teachers videotaped an individual *Banking Time* session once a week and sent this footage to their consultant. Consultants then reviewed the video footage of *Banking Time* sessions and used short clips in their face-to-face meetings with teachers to improve teachers' implementation of *Banking Time*. Consultants held a Master's degree in education or psychology and had experience working in early childhood settings. Consultants participated in a week-long training before meeting with teachers and continued to receive group or individual supervision each week with a supervisor who had extensive early childhood experience and prior training in *Banking Time*.

Data Collection

Data for this study were primarily collected at four time points throughout the year: at the beginning of the year in October, at which point no treatment had been introduced (baseline), and following each of the three, seven-week intervention windows which corresponded to January (post-Window 1), March (post-Window 2), and May (post-Window 3), depending on the intervention window to which the child was randomly assigned. Teacher and child demographic data were collected at baseline through teacher and family surveys. Variables related to consultant-teacher relationship quality and child and teacher outcome data (i.e., the individualized Classroom Assessment Scoring System [inCLASS] and the Teacher-Child Structured Play Task [TC-SPT], see "Measures" section) were collected at the end of a child's

seven-week intervention window (i.e., post-window). The inCLASS was also collected at pre-window, so that changes from pre- to post-window could be measured. Teachers' fidelity to *Banking Time* practices and implementation dosage were collected throughout a child's seven-week intervention window.

Field-based data collectors participated in a two-day training on the inCLASS. At the conclusion of the training, coders had to demonstrate reliability by coding five video clips independently and score within one point of a master code on 80% of the dimensions in order to conduct live classroom observations using the inCLASS. Children were observed using the inCLASS for approximately eight 15-minute cycles (M = 8.40, SD = 1.54). During this training, the data collectors also learned how to administer the TC-SPT, a video-taped observation measure. Undergraduate research assistants who were not involved in any aspect of data collection coded videotapes of the TC-SPT and *Banking Time* sessions. One group of coders was assigned to code interactive behaviors for teacher-child dyads from the TC-SPT. A separate group of coders was assigned to code teachers' fidelity to *Banking Time* practices from videos submitted of the intervention sessions. Coders were trained by senior researchers on the respective coding scheme and attended weekly calibration meetings to ensure adequate coding reliability.

Measures

Teacher and Child Characteristics

In the fall, parents or guardians and teachers completed a survey that provided child/family and teacher demographic characteristics, respectively. Variables used in the current study include child income-to-needs ratio, teacher age, teacher ethnicity, and teacher early childhood major. The income-to-needs ratio was calculated by dividing a family's reported

income by the appropriate poverty threshold based on the size of the family and age of the family members. Additionally, as previously mentioned, teachers rated children's disruptive behavior using the ADHDRS-IV (DuPaul et al., 1998) and the ODDRS (Hommersen et al., 2006), and scores were summed across both rating scales to select children into the intervention. The ADHDRS-IV and ODDRS scales have shown moderate-to-high test-retest reliability and correlate as expected with teacher ratings of hyperactivity and mother ratings of aggressive behaviors, respectively (Hommersen et al., 2006; McGoey et al., 2007). Cronbach's alpha for the summed score of children's disruptive behavior was .96. In the current study, children's disruptive behavior was included as a covariate.

Consultant-Teacher Relationship Quality

Consultant-teacher relationship quality was assessed using surveys completed by consultants and teachers at post-window. These surveys were developed for the *Banking Time* context but are conceptually aligned to the *Measure of Coach and Teacher Alliance-Coach Report* (Bradshaw et al., 2009b) and *Measure of Coach and Teacher Alliance-Teacher Report* (Bradshaw et al., 2009a), the measures from which the Johnson et al. (2016) consultant-teacher alliance framework was derived. The quality of the consultant-teacher relationship was assessed from the consultant perspective using 9 items such as "I feel comfortable sharing my ideas/thoughts with this teacher" and "The teacher and I are partners in this process" on a 5-point Likert scale (1 = definitely disagree, 2 = slightly disagree, 3 = neutral, 4 = slightly agree, and 5 = definitely agree). Cronbach's alpha was .91, indicating strong internal consistency. The quality of the consultant-teacher relationship was assessed from the teacher perspective using 7 parallel items such as "I feel comfortable sharing my ideas/thoughts with my consultant" and "I feel supported by my consultant" on the same 5-point Likert scale. Cronbach's alpha was .70,

indicating acceptable internal consistency. Correlations between consultant and teacher reports of relationship quality in the present study replicate those found by Johnson and colleagues, providing preliminary support for the measure's validity: r = .42 in present study and r = 0.41 in Johnson et al (2016).

Children's Observed Positive Engagement with the Teacher in the Classroom

The Individualized Classroom Assessment Scoring System (inCLASS; Downer et al., 2010) measures an individual child's observed interactions with teachers, peers, and tasks in the typical preschool setting. The inCLASS is comprised of ten dimensions: (1) positive engagement with teacher, (2) communication with teacher, (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. The dimensions positive engagement with teacher (i.e., child's attunement to the teacher, proximity seeking, and shared positive affect) and communication with teacher (i.e., child initiates communication with the teacher, sustains conversations and uses speech for varied purposes) were averaged to create the domain score Positive Engagement with Teacher, which was used in this study. Scores are rated on a 7-point Likert scale with higher scores reflecting more positive engagement with the teacher. Intraclass correlations (ICCs) were calculated for 20% of observations to determine the inter-rater reliability of two data collectors who independently observed and rated the same child. The ICC for the Positive Engagement with Teacher domain was .80, reflecting good reliability. In an initial validation study, the domain Positive Engagement with Teacher was positively correlated with teacher-reported closeness, demonstrating concurrent validity, and unrelated to teacher ratings of task orientation, peer social skills, and conflict, demonstrating discriminant validity (Downer et al., 2010). The inCLASS has also shown predictive validity across recent

studies, with children's observed engagement predicting their language and literacy skills and self-regulation (Sabol et al., 2018; Williford et al., 2013).

Teacher and Child Observed Positive Interactions in a Structured Play Task

The quality of interactions between teacher-child dyads in a standardized play task was assessed using the Teacher-Child Structured Play Task (TC-SPT; Whittaker et al., 2018) at post-window. In this play task, the teacher and child participated in two activities that were consistent across all dyads. The teacher and child first played together with toys for seven minutes (i.e., free play portion) and then had three minutes to clean up the toys (i.e., clean up portion). The quality of interactive behaviors was measured for teachers and children separately. Coders who were blind to the intervention condition and did not work as field-based data collectors coded either teacher interactive behaviors or child interactive behaviors, within either the free play or clean up portion of the task (i.e., videos were split among four separate coding teams). This study uses teacher and child interactive behaviors from the clean-up portion only. All behaviors were rated on a 5-point Likert scale with higher scores reflecting more positive behaviors.

Within the clean-up portion of the structured play task, two composites were formed for teacher interactive behaviors, and two composites were formed for child interactive behaviors. For teachers, the composites were Positive Teacher Interactions with Child (sensitive and responsive presence, positive affect, teacher confidence, teacher encourages stimulating environment, teacher support for child autonomy, and affective mutuality) and Negative Teacher Interactions with Child (teacher directiveness and teacher negativity). For children, the composites were Child Active Engagement (child enthusiasm, child reliance on the teacher for help [reverse scored], child persistence, compliance, child's negative emotions [reverse scored], and behavior control) and Child Positive Interactions with Teacher (child experience, child

affection toward teacher, child negativity toward teacher [reverse scored], avoidance of the teacher [reverse scored], and affective mutuality/felt security). In this study, two composites were used: Positive Teacher Interactions with Child (α = .90) and Child Positive Interactions with Teacher (α = .72). Twenty percent of videos were double-coded for teacher interactive behaviors, and all videos were double-coded for child interactive behaviors. Interrater reliability was good for both composites used in this study, as measured by ICCs (Positive Teacher Interactions with Child = .80; Child Positive Interactions with Teacher = .85). In a validation study, these composites were associated with theoretically aligned measures in expected ways, providing evidence of concurrent validity. The composite Positive Teacher Interactions with Child was positively associated with teachers' classroom-wide emotional support, while the composite Child Positive Interactions with Teacher was positive associated with children's engagement with the teacher as measured by the inCLASS (Whittaker et al., 2018).

Fidelity of Implementation

Teachers' fidelity, capturing both the frequency and quality of expected *Banking Time* practices, was coded from videotapes of *Banking Time* sessions submitted each week during each child's seven-week intervention window. From the total number of videos submitted (ideally 7), up to four videos per child were randomly selected for double coding. This study used a composite fidelity score (α = .74). The specific teacher practices included in this composite are the quality with which teachers observed and narrated the child's actions (1 = very poor to 5 = very good), the frequency with which teachers imitated the child (1 = none/never to 5 = frequently/often), the extent to which the teacher let the child lead the session (1 = strongly disagree to 5 = strongly agree), and the extent to which the teacher used controlling language (1 = none/never to 5 = frequently/often [reverse scored]). In the case that four or fewer videos were

submitted for a child (N = 35), all videos were coded. On average, 3.53 videos per child were coded (SD = .91). The ICC across all fidelity scores was .84.

Teacher Implementation Dosage

Teachers' implementation dosage was measured by aggregating three variables (α=.61): (a) the number of *Banking Time* session videos teachers submitted to their consultant, (b) the number of *Banking Time* session notes teachers submitted to their consultant, and (c) consultants' ratings of teachers' dosage of *Banking Time* sessions. While encouraged to implement *Banking Time* with a child 2-3 times/week over the seven-week intervention window, teachers were requested to submit a video of a *Banking Time* session once a week to their consultant (ideal number of videos per child was 7). Teachers were also asked to submit session notes after each *Banking Time* session (ideal number of notes per child was 21 [3/week*7 weeks]). Consultants also reported the frequency with which they thought teachers implemented *Banking Time* sessions with each child on a 5-point scale ranging from 1 (never or rarely) to 5 (very frequently – three times a week for most weeks).

Consultation Dosage

Consultants recorded the number of sessions, face-to-face and via phone, they had with a teacher. This information was collected separately for each child (i.e., for each seven-week intervention window).

Analytic Strategy

Mediation analyses examined the direct relation between consultant-teacher relationship quality and dyadic teacher-child interactions and the extent to which this link operated indirectly through implementation fidelity and dosage. Measures of consultant- and teacher-reported relationship quality were always modeled simultaneously, while each of the two mediators was

run in a separate model for the three outcomes, resulting in a total of six models. Figure 1 visually displays the direct and indirect pathways modeled.

Data were analyzed using Mplus version 8.5 (Muthén & Muthén, 2012-2020). Missing data ranged from 2-39% across key study variables. Analysis of missing data revealed several patterns. Child disruptive behavior was associated with missingness on dosage (r = -.16, p <.05) and total number of consultation sessions (r = -.15, p <.05); teacher ethnicity was associated with missingness on consultant- (r = .19, p <.05) and teacher-reported relationship quality (r = .21, p <.05) and missingness on teachers' (r = .17, p <.05) and children's observed positive interactions in the structured play task (r = .17, p <.05). Teacher age was associated with missingness on total number of consultation sessions (r = .16, p <.05), implementation fidelity (r = .16, p <.05), and dosage (r = .16, p <.05). Additionally, intervention window and consultant were associated with missingness on some key variables. Full information maximum likelihood (FIML) was used to handle missing data. FIML uses all available data to account for any bias introduced from missing data (Enders, 2001). Teacher ethnicity, teacher age, intervention window, and consultant were included in our FIML analysis to account for the missing data patterns. To obtain a non-biased estimate of the indirect effect, we computed bootstrap standard errors with 2,000 draws (Muthén et al., 2016). Bootstrap standard errors correct for the non-normality of the indirect effect which is a product term (MacKinnon, 2008). Additionally, since children are nested in teachers, we specified the TYPE = COMPLEX command in Mplus, which is a sandwich estimator that adjusts the standard errors to account for the dependence of the data (Muthén & Muthén, 1998-2017). Standardized betas are presented.

All models included a set of covariates and fixed effects to account for factors that could be confounded with our variables of interest and result in biased associations. To isolate the

unique contributions of the consultant-teacher relationship quality and implementation fidelity and dosage to dyadic teacher-child interactions, we controlled for the total number of consultation sessions (in-person and phone) held between a consultant and a teacher (see Figure 1). We controlled for the total number of consultation sessions since contact between the consultant and teacher may influence perceptions of relationship quality, teachers' implementation fidelity and dosage, and the quality of dyadic teacher-child interactions. A set of child and teacher demographic covariates were also included to account for individual characteristics that may influence the associations examined in this study. Specifically, we controlled for children's baseline disruptive behaviors, child income-to-needs ratio, teacher age, teacher ethnicity, and whether the teacher majored in early childhood education. At the child-level, children who display disruptive behaviors are more likely to have conflictual interactions with teachers (Doumen et al., 2008), and family poverty can undermine children's healthy development, including their behavior, through various mechanisms including stress physiology (Blair & Raver, 2012). At the teacher-level, Williford et al (2015) found that teachers who identified as non-White implemented *Banking Time* at lower levels of dosage and consultant-rated quality compared to teachers who identified as White, possibly due to a lack of social validity, while teachers with an early childhood major implemented *Banking Time* with higher levels of dosage. Other work has found poorer implementation among older teachers versus younger teachers, as older teachers may be less open to trying new intervention practices (Domitrovich et al., 2015). We also controlled for the pre-window score, collected at the beginning of the child's intervention window, of one outcome (i.e., child's positive engagement with the teacher in the classroom), which allows us to predict change in this outcome. Pre-scores for the other two outcomes were not measured and thus could not be included. Finally, we

included as fixed effects the child's selected intervention window (i.e., one of three seven-week windows in which the intervention occurred) and a dummy variable for consultant. By including consultant fixed effects, we indirectly controlled for site, since consultants worked within only one site.

Results

Descriptive Results

Table 1 presents means and standard deviations for all variables in this study. Consultants reported that they had positive relationships with teachers (M = 4.35, SD = .81, range = 1.56-5.00). Teacher reports of relationship quality were slightly higher than consultants' reports (M = 4.77, SD = .40, range = 3.00-5.00). Bivariate correlations among consultant-teacher relationship quality, implementation fidelity and dosage, dyadic teacher-child interactions, and covariates are presented in Table 2. Consultant and teacher reports of relationship quality were moderately correlated (r = .42, p < .001). Teachers' implementation fidelity was moderately correlated with relationship quality (r = .25 for consultant-reported quality and .28 for teacher-reported quality, p <.001) and teachers' dosage was correlated with consultant-report of relationship quality (r = .38, p <.001). Fidelity of implementation was moderately correlated with children's positive interactions with the teacher during a structured play task (r = .30, p < .001), but all other relations between implementation variables and dyadic interactions were small.

Direct Links Between Relationship Quality and Dyadic Teacher-Child Interactions

As shown in Table 3, we found that when consultants reported a stronger working relationship, teachers were observed to interact more positively with the child in the context of a structured play task (β = .31, SE = .12, p = .01). We did not find any significant direct associations between consultant-teacher relationship quality and children's observed positive

interactions with the teacher in the play task (i.e., TC-SPT) or in typical classroom setting (i.e., inCLASS measure).

Indirect Links Between Relationship Quality and Dyadic Teacher-Child Interactions Through Implementation Fidelity and Dosage

We observed consistent significant relations between consultant-reported relationship quality and implementation dosage (β = .33, SE = .11, p = .004) but not fidelity. We also found a significant association between implementation fidelity and children's positive interactions with the teacher (β = .32, SE = .13, p = .01). We did not find any evidence supporting the hypothesized mediation model that consultant-teacher relationship quality influences dyadic teacher-child interactions via teachers' implementation fidelity or dosage.

Discussion

Intervention support systems, including teacher consultation, remain an under-studied aspect of implementation, despite their primary purpose of enhancing implementation quality. To address this gap, we examined the direct and indirect contributions of teacher consultation to implementation and intervention outcomes. Using implementation data from *Banking Time*, a relationship-focused intervention previously shown to improve the quality of dyadic teacher-child interactions (Williford et al., 2017), we examined the direct relation between consultant-teacher relationship quality, as reported by consultants and teachers, and the quality of dyadic teacher-child interactions. We also tested whether this link operated indirectly via teachers' implementation fidelity and dosage. That is, we tested whether having a high-quality relationship in consultation contributed to positive dyadic teacher-child interactions through its influence on teachers' implementation of *Banking Time.* Our findings indicated that the quality of the consultant-teacher relationship, as reported by consultants, was positively linked to

implementation dosage and teachers' positive interactions with children in a structured play task. Consultant-teacher relationship quality did not contribute to dyadic teacher-child interactions indirectly through teachers' implementation fidelity or dosage. Across our results, we found that consultant-reported relationship quality was a stronger predictor of both implementation and dyadic interactions than teacher-reported relationship quality. These findings and related implications are discussed in more detail below.

Direct Links Between Relationship Quality and Dyadic Teacher-Child Interactions

We found that consultant-reported relationship quality contributed to teachers' interactions with children during a standardized play task in which teachers and children cleaned up a set of toys, providing some confirmation for our first hypothesis. When consultants perceived having a closer relationship with teachers, teachers were observed to be more sensitive and responsive to children's needs and promote their engagement in the structured play task. One potential explanation for the link between relationship quality and teachers' positive interactions with children during the structured play task—but not children's interactions—is that teacher interactions are the most proximal outcome since only teachers directly participate in the consultation. An effect of consultant-teacher relationship quality on children's behaviors would have to operate indirectly through teachers. In this study, both teacher and child behaviors were measured at the same time—at the end of the child's seven-week intervention window—so it may be that our measurement of the child's interactive behavior occurred before sufficient time had elapsed for teachers' behaviors to translate to children (Han & Weiss, 2005).

This finding suggests that taking a relational perspective to teacher consultation may support the ultimate goals of the intervention—apart from their influence on implementation—and therefore should not be overlooked by intervention developers. While this concept is not new

(Chu, 2014), and is likely implied among consultation models, it has thus far not been a primary focus in implementation research of school-based interventions. For instance, among 49 studies on early childhood coaching, only 6 (12.2%) explicitly reported that building a positive and collaborative partnership was an intentional part of the coaching model (Artman-Meeker et al., 2015). Intervention developers and researchers may have a greater desire to focus on and investigate the effectiveness of specific coaching behaviors, such as conducting observations, providing feedback, and action planning with teachers (Reinke et al., 2014). Although we were not able to test this hypothesis in the current study, consultant-teacher relationship quality may be especially important for interventions that cover topics known to elicit feelings of stress or anxiety from teachers (e.g., responding to disruptive behaviors), as the consultant can help to de-escalate teachers' stress and serve as an emotional support, even if this is not part of the intervention's core activities. Future work should continue to unpack the links between consultation and intervention outcomes and examine whether certain features are more or less relevant depending on the goals of the intervention.

Indirect Links Between Relationship Quality and Dyadic Teacher-Child Interactions Through Implementation Fidelity and Dosage

We found no evidence for our second hypothesis that consultant-teacher relationship quality operates indirectly via teachers' implementation fidelity or dosage to promote dyadic teacher-child interactions. This finding was unexpected given that the primary role of teacher consultation, and support systems more broadly, is to support teachers' implementation of evidence-based practices (Domitrovich et al., 2008), and the substantial research that links stronger implementation to better outcomes among interventions for preschool teachers and children (Alamos et al., 2018; Domitrovich et al., 2010; LoCasale-Crouch et al., 2018; Marti et

al., 2018; Sutherland et al., 2018). However, interesting patterns between these constructs emerged that may help to explain the null indirect effects. First, consultant-reported relationship quality was positively linked to implementation dosage, though dosage was not linked to dyadic teacher-child interactions. Further, relationship quality was not associated with fidelity, but fidelity was associated with children's positive interactions in the play task. Thus, relationship quality was associated with implementation, but not the dimension of implementation that matters most for promoting outcomes. These patterns naturally raise questions regarding why relationship quality influenced dosage but not fidelity. In another study, when teachers perceived a more positive working relationship with a coach, they implemented activities with greater dosage but not quality, somewhat replicating the current study's findings with consultant-reported relationship quality (Johnson et al., 2018). Together, these findings suggest that a strong consultant-teacher relationship may stir teachers to be compliant with their consultant's requests (i.e., implement with desired dosage), but does not contribute to teachers' skills in implementing intervention activities (i.e., implement with fidelity). It is also possible that if a consultant perceives a strong relationship with a teacher, they may be less inclined to provide constructive feedback or suggest areas for improvement that would enhance fidelity, to avoid undermining the relationship. Future research is needed to investigate these possibilities. Given that this study is one of the first to examine a mediated pathway from consultant-teacher relationship quality to intervention outcomes via implementation, our null indirect effects should be interpreted cautiously until more work on this topic has been conducted.

Finally, a notable strength of this study is the inclusion of both teacher and consultant reports of relationship quality, as previous research has only included teacher reports in predictive analyses (Domitrovich et al., 2015; Johnson et al., 2018; Wehby et al., 2012). Across

our findings, consultant-reported relationship quality emerged as a stronger predictor of implementation and dyadic interactions over and above teacher reports. As others have noted, consultants generally work with multiple teachers, which perhaps provides the consultant with a broader perspective on the consultation process than teachers (Johnson et al., 2016). Indeed, in these data, consultants discriminated relationship quality to a greater extent than teachers, as evidenced by consultants' slightly lower quality ratings and greater variability in ratings. We do not interpret the current study's findings to mean that teacher perspectives do not matter, though, as teachers in this study overwhelmingly reported high-quality relationships with consultants. While it is encouraging that teachers perceive such positive working relationships, it would be worthwhile for future work to consider how to better differentiate teachers' perspectives of relationship quality.

Limitations and Future Directions

This study has several limitations to note. First, we were not able to establish strict time precedence across the variables of interest. All outcome measures were collected at the end of each child's intervention window. Consultant-teacher relationship quality was also reported at the end of each intervention window, but consultants and teachers reported retrospectively, considering their relationship quality over the past seven weeks. Implementation fidelity and dosage were also an aggregate of teachers' implementation across the seven-week window. Thus, the direct and indirect associations between consultant-teacher relationship quality and dyadic teacher-child interactions are correlational and cannot be interpreted from a causal lens. Future work should design mediation analyses of teacher consultation with an eye toward time precedence, to develop stronger causal claims. Second, related to the observed fidelity of implementation measure, we were not able to code four randomly selected videos for each child

as desired, because not all teachers submitted a total of seven videos (one for each week of the intervention window) to their consultant. It is possible that teachers chose to submit videos they felt positively about, which would introduce bias in the fidelity of implementation scores. Third, relationship quality was rated very high overall with limited variability, particularly from the teacher perspective. Future work should aim to create measures that better capture nuances in relationship quality, including interviews with teachers and consultants, to further unpack teacher consultation processes. Finally, in this study we focused on consultant-teacher relationship quality as one dimension of the consultation process. Investigating other dimensions conceptualized by Johnson et al. (2016) is an area of needed research.

Conclusion

Prevention and implementation scientists have called for the field to develop a deeper understanding of the consultation process to better support teachers' implementation of evidence-based practices to ultimately promote children's learning and development (Pas et al., 2014; Powell & Diamond, 2013). This study explored consultant-teacher relationship quality in the context of *Banking Time*, a dyadic intervention designed to improve the quality of interactions between the teacher and a child perceived to display elevated levels of disruptive behaviors. Building relationships with teachers is not always stated as a specific goal of teacher consultation, perhaps because consultants want to pursue more practical strategies such as observing teachers, providing feedback, or modeling practices. However, our findings indicate that consultants should not overlook the importance of developing high-quality relationships with teachers, as these relationships may directly promote intervention outcomes apart from teachers' implementation. Given the prevalence of teacher consultation in school-based interventions, it is necessary to fully attend to not only the intervention itself, but also the role of

the support system for promoting successful outcomes.

Table 1. Descriptive Statistics for Key Study Variables

	N = 57 teachers *N* = 168 children	
	Mean (SD)	Range
Quality of consultant-teacher relationship		
Consultant report	4.35 (.81)	1.56 – 5.00
Teacher report	4.77 (.40)	3.00 – 5.00
Implementation mediators		
Fidelity to *Banking Time* practices	3.71 (.51)	2.56 – 4.72
Teacher Dosage		
Number of videos submitted	5.93 (2.33)	1.00 – 11.00
Number of session notes submitted	13.21 (6.71)	1.00 – 26.00
Frequency of *Banking Time* sessions	3.22 (1.55)	1.00 – 5.00
Outcomes at post-window		
Teacher positive interactions with child in play task	3.27 (.87)	1.67 – 5.00
Child positive interactions with teacher in play task	3.58 (.70)	1.70 – 5.00
Child positive engagement with teacher in classroom	2.30 (.66)	1.06 – 4.19
Outcomes at pre-window [a]		
Child positive engagement with teacher in classroom	2.28 (.63)	1.13 – 4.50
Covariates		
Total number of consultation sessions	6.23 (1.95)	1 – 10
Child disruptive behavior	28.2 (16.0)	0 – 71
Child income-to-needs ratio	1.74 (1.43)	.22 – 5.27
Teacher age	41.04 (11.79)	23 – 67
Teacher ethnicity [b]	.50 (.50)	0 – 1
Teacher early childhood major [c]	.43 (.50)	0 – 1

Notes.

[a] Child's positive engagement with the teacher was the only outcome assessed at pre-window.

[b] Indicates proportion of teachers in sample who report their ethnicity as non-White.

[c] Indicates proportion of teachers in sample who majored in early childhood education.

Table 2. Bivariate Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Consultant-report of relationship quality	-													
2. Teacher-report of relationship quality	.42***	-												
3. Fidelity to *Banking Time* practices	.25**	.28**	-											
4. Teacher Dosage	.38***	.14	.07	-										
5. Teacher positive interactions with child in play task (post)	.24*	.16	.16	.03	-									
6. Child positive interactions with teacher in play task (post)	.16	.05	.30***	.10	.59***	-								
7. Child positive engagement with teacher in classroom (post)	.07	.12	.14	.11	.26**	.29**	-							
8. Child positive engagement with teacher in classroom (pre)	.12	.22*	.14	.08	.38***	.35***	.42***	-						
9. Total number of consultation sessions	.21*	.12	.15	.47***	-.12	-.05	.09	.05	-					
10. Child disruptive behavior	-.07	-.02	-.24**	-.00	-.02	-.20	-.16	-.13	.05	-				
11. Child income-to-needs ratio	.07	.08	.21*	.23**	.09	.24**	.02	.21*	.17*	-.19*	-			
12. Teacher age	-.18	-.20*	-.46***	-.09	.11	-.11	-.11	-.08	-.09	.12	-.11	-		
13. Teacher ethnicity	-.37***	-.25*	-.31***	-.29***	-.10	-.03	-.24**	-.26**	-.24**	.12	-.16	.13	-	
14. Teacher early childhood major	-.03	.09	-.04	.01	.27**	.13	.02	-.02	-.16	-.04	.02	.07	.21**	-

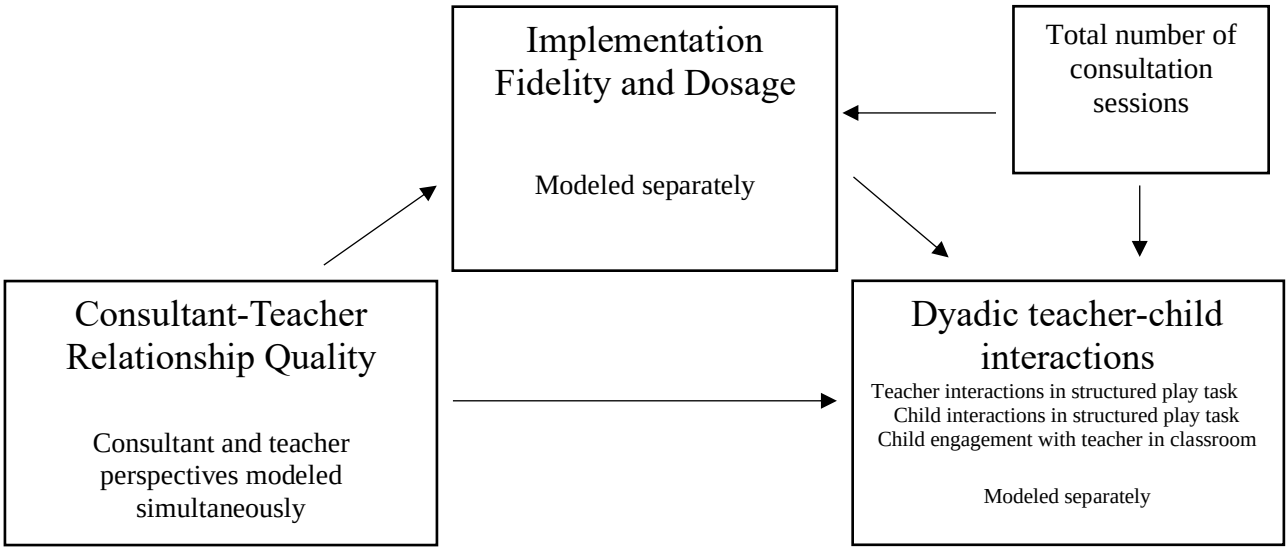
Notes.
*** $p < .001$. ** $p < .01$. * $p < .05$.

Table 3. Mediation models for consultant-teacher relationship quality predicting dyadic teacher-child interactions through fidelity of implementation and dosage

Outcome		Relationship quality on fidelity	Fidelity on outcome	Relationship quality on outcome	Indirect effect
		Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Teacher positive interactions in play task					
	Consultant report	-.00 (.16)	.22 (.16)	.31* (.12)	.00 (.04)
	Teacher report	.13 (.13)		-.15 (.12)	.03 (.04)
Child positive interactions in play task					
	Consultant report	.00 (.16)	.32* (.13)	.16 (.16)	.00 (.05)
	Teacher report	.12 (.13)		-.15 (.15)	.04 (.05)
Child positive engagement with teacher in classroom					
	Consultant report	-.00 (.16)	.01 (.12)	.00 (.13)	.00 (.02)
	Teacher report	.08 (.13)		-.04 (.14)	.00 (.02)
		Relationship quality on dosage	Dosage on outcome	Relationship quality on outcome	Indirect effect
		Estimate (SE)	Estimate (SE)	Estimate (SE)	Estimate (SE)
Teacher positive interactions in play task					
	Consultant report	.33** (.11)	-.08 (.14)	.33* (.13)	-.03 (.05)
	Teacher report	-.02 (.12)		-.09 (.12)	.00 (.02)
Child positive interactions in play task					
	Consultant report	.34** (.11)	.06 (.17)	.16 (.17)	.02 (.06)
	Teacher report	-.02 (.12)		-.09 (.14)	-.00 (.02)
Child positive engagement with teacher in classroom					
	Consultant report	.33** (.12)	.04 (.11)	.002 (.14)	.01 (.04)
	Teacher report	-.01 (.12)		-.04 (.14)	.00 (.02)

Notes.
Standardized coefficients are presented.
All models control for child characteristics (disruptive behavior, income-to-needs ratio, selected intervention window), teacher characteristics (age, ethnicity, early childhood major), total number of consultation sessions, and consultant fixed effects. Pre-score was included for the outcome positive engagement with teacher.
** p <.01. * p <.05.

Figure 1. Graphical representation of the indirect association between consultant-teacher relationship quality and dyadic teacher-child interactions via implementation fidelity and dosage



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