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EFFECTS OF CONJOINT BEHAVIORAL CONSULTATION ON STUDENT-TEACHER
INTERACTIONS

by

Sonya A. Bhatia

A DISSERTATION

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EFFECTS OF CONJOINT BEHAVIORAL CONSULTATION ON STUDENT-TEACHER INTERACTIONS

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University of Nebraska, 2019

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Young children with disruptive classroom behaviors are at-risk for negative interactions with their teachers (Nelson & Roberts, 2000), which put children at increased risk for long-term negative social, academic, and behavioral outcomes (Sutherland & Oswald, 2005). Conjoint Behavioral Consultation (CBC) is an evidence-based family-school partnership intervention focused on strengthening relationships and promoting continuity and consistency between children's key environments (Sheridan & Kratochwill, 2008). The efficacy of CBC on child outcomes and parent-teacher relationships has been demonstrated (Sheridan et al., 2017); however, no research has determined whether CBC improves student-teacher interactions.

This study examined CBC's effect on student-teacher interactions using a new interaction observation measure (the Student-Teacher Interaction Measure; STIM). This study includes video observations of 71 rural children with significant behavior problems (42 treatment, 29 control) and 41 teachers (22 treatment, 19 control). Eight video observations were collected per child participant (i.e., three baseline videos and five intervention videos for children in the CBC condition). Multilevel modeling was used to examine CBC's effect on the rate of positive, negative, and unreciprocated student-teacher interactions within each time point accounting for nesting within students. Results from the study indicated that there was no main effect of CBC on positive, negative, or unreciprocated interactions at Time 2. Secondary findings, study limitations, and directions for future research are presented.

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Chapter 1: Introduction

Student-Teacher Interactions

Student-teacher interaction quality is associated with a host of child outcomes, including behavioral engagement in class (Rimm-Kaufman, Larsen, Baroody, Curby, & Abry, 2015) and academic skill development (Hamre, Pianta, Hatfield, & Jamil, 2014). Interactions are defined as mutual or reciprocal actions that can have positive or negative emotional tones (Pianta, 1999). Student-teacher interactions form patterns (Pianta, Hamre, & Allen, 2012), which influence the quality of student-teacher relationships over time (Pianta, 1999). Strong student-teacher relationships may serve as a protective factor for student behavior and achievement (Crosnoe, Johnson, & Elder, 2004); however, students with behavior problems are at risk of having negative interactions (Nelson & Roberts, 2000) and relationships (Murray & Murray, 2004) with their teachers. Unfortunately, children in rural communities have higher rates of behavior problems than children in non-rural communities (Sheridan, Koziel, Clarke, Rispoli, & Coutts, 2014), which may place them at greater risk for negative student-teacher interactions and relationships. Fortunately, student-teacher interactions are malleable and may improve through intervention (Rimm-Kaufman et al., 2015). Given the significant impact that student-teacher interactions have on student outcomes, there is a critical need to identify interventions that promote positive student-teacher interactions.

Conjoint Behavioral Consultation

Conjoint Behavioral Consultation (CBC) is a strengths-based, relationship-focused family-school partnership intervention (Sheridan & Kratochwill, 2008) that may be particularly effective at strengthening the quality of student-teacher interactions. Through CBC, parents and teachers work together to develop individualized intervention plans designed to meet each

child's unique needs. Intervention plans are developed using evidence-based behavioral strategies including positive reinforcement for desired behaviors, antecedent control and environmental restructuring, skill building, and reductive techniques (e.g., removing tangible items from the child, withdrawing privileges, and time-out) for undesired behaviors (Sheridan et al., 2017). CBC's strategies may provide teachers and students with opportunities for positive student-teacher interactions, which may influence the quality of their relationship over time.

CBC has been shown to promote positive outcomes for both rural (Sheridan et al., 2017) and non-rural (Sheridan et al., 2012) children. CBC is associated with decreases in children's problem behaviors (e.g., noncompliance; Sheridan, Ryoo, Garbacz, Kunz, & Chumney, 2013; Sheridan et al., 2017), increases in desired behaviors (e.g., appropriate social skills; Sheridan et al., 2012; Sheridan et al., 2017), increases in teachers' use of effective reinforcement strategies (e.g., positive attention; Sheridan et al., 2018), and stronger parent-teacher relationships (Sheridan et al., 2012; Sheridan et al., 2017). Additional research is needed to determine CBC's effect on the quality of student-teacher interactions.

The Present Study

The present study examined the effects of CBC on student-teacher interaction quality. To assess CBC's effects on student-teacher interactions, 426 30-minute video observations from a larger, randomized controlled study examining CBC's effects on rural student outcomes, were coded. The study's sample included 71 rural children aged five to eight (42 treatment, 29 control), and 41 teachers (22 treatment, 19 control) for whom there are video observations. Video observations were collected once per week over a period of eight weeks. A combined planned missing wave and simple matrix design was used to reduce number of videos coded per participant.

Specific student and teacher behaviors were coded continuously using a new interaction measure, the Student-Teacher Interaction Measure (STIM), which generates data on the rates of positive, negative, and unreciprocated student-teacher interactions for each observation session. For each interaction type, data from each student's first three observations were summed and averaged (i.e., pre-treatment for the CBC group). Data from each student's last five observations were also summed and averaged (i.e., treatment for the CBC group). Two-level multilevel modeling was used to determine CBC's effects on positive and negative student-teacher interactions, accounting for nesting within students. Student observations were treated as level 1, and students were treated as level 2. Teachers' years of teaching experience, child gender, child age, special education status, and target behavior served as covariates. Teachers' years of teaching experience, child gender, and target behavior were examined as potential moderators.

The long-term goal of this line of work is to uncover interventions aimed at strengthening student-teacher interactions and promoting positive outcomes for young children with significant behavioral and social-emotional difficulties. The specific aim of this study was to determine CBC's effects on student-teacher interactions, an essential first step in this line of research. Results from the study indicated that there was no main effect of CBC on positive, negative, or unreciprocated interactions at Time 2. Results of the study also indicate that target behavior is a significant predictor for positive interactions. Students with positively framed target behaviors had higher rates of positive student-teacher interactions at baseline. Results also indicate that the rate of negative student-teacher interactions and the rate of unreciprocated student-teacher interactions increase as teachers became more experienced. Results also indicate that gender moderated CBC's effect on positive interactions based on time, such that female students' who

participated in CBC has lower rates of change in positive interactions than female students in the control group. Study limitations and directions for future research are discussed.

Chapter 2: Literature Review

Early intervention is essential for young children with behavior problems, because challenging behaviors exacerbate over time (Broidy et al., 2003). Early intervention, which involves the early identification and treatment of behavior problems (Lamar & Gatfield, 2007), helps reduce current problem behaviors and prevent future problem behaviors (Webster-Stratton & Taylor, 2001). Children whose behavior problems are not addressed early are at risk for a host of negative academic, behavioral, and social outcomes (Bradshaw, Schaeffer, Petras, & Ialongo, 2010; Reinke, Herman, Petras, & Ialongo, 2008). Early interventions designed to target malleable risk factors, such as student-teacher interaction quality, and/or promote protective factors across environments are desirable to prevent future behavior problems (Greenberg, Domitrovich, & Bumbarger, 2001). The role of student-teacher interactions in children's academic experience is reviewed next, followed by a discussion of student-teacher relationships and a summary of Conjoint Behavioral Consultation (CBC), a family-school partnership intervention that may positively impact student-teacher interactions and relationships. Current student-teacher interaction measures and their limitations are presented to provide a rationale for the development of the Student-Teacher Interaction Measure (STIM). The STIM was used to measure direct observations of student-teacher interactions in rural elementary classrooms to determine if the rate of positive student-teacher interactions increases, if the rate of negative student-teacher interactions decreases, and if the rate of unreciprocated student-teacher interactions changes as a function of CBC.

Student-Teacher Interactions

Children with disruptive behaviors are at-risk for engaging in negative interactions with their teachers (Nelson & Roberts, 2000). Interactions are defined as mutual or reciprocal actions

that can have positive or negative emotional tones (Pianta, 1999). Improving the quality of student-teacher interactions may be one way to increase human capital for supporting young children with behavior problems, especially in rural communities where mental health services may be limited (Monk, 2007).

Factors that influence interaction quality. Understanding factors that contribute to student-teacher interaction quality is critical for informing intervention development. Several factors influence student-teacher interaction quality, including child behavior, teachers' perceptions of child behavior, and teachers' self-efficacy.

Child behavior. Children's behavior may influence the amount of closeness, conflict, and dependency in student-teacher interactions (Nurmi, 2012). Children who are engaged and motivated in the classroom have interactions with teachers that are characterized by high levels of closeness and low levels of conflict (Nurmi, 2012). Conversely, children who have high levels of externalizing behavior and/or internalizing behavior often have interactions with teachers that are characterized by more conflict and dependency and less closeness than children without externalizing and/or internalizing behavior (Nurmi, 2012). Children with externalizing problems also have more negative interactions with their teachers than children with internalizing problems, and children without externalizing and/or internalizing problems (Henricsson & Rydell, 2004).

Teachers often have more negative behaviors towards students with externalizing problems (e.g., threats, punishments, criticism) than those without externalizing problems (Hagekull & Hammarberg, 2004). Negative teacher behaviors towards students may impact the quality of the student's response to the teacher, thus influencing the quality of the student-teacher interactions. Child behavior may also influence the frequency of student-teacher interactions.

Observations of preschool and early elementary children with externalizing behaviors indicate that children with externalizing behaviors receive more commands (i.e., verbal statements intended to direct the child's behavior) from their teachers, even when they are not engaging in problem behavior, than children without externalizing concerns (Dobbs, Arnold, & Doctoroff, 2004; Hagekull & Hammarberg, 2004). These findings suggest that children's problem behavior may influence the quality and frequency of future student-teacher interactions, even when students are not engaging in problem behavior.

Teachers' perceptions of child behavior. Teachers' perceptions of children's behavior may influence the quality of their interactions with students (Dobbs & Arnold, 2009). Teachers provide more commands to students they perceive as having externalizing behavior problems than those they do not perceive as having behavior problems (Dobbs & Arnold, 2009; Hagekull & Hammarberg, 2004). Additionally, a teacher's perceptions of a child's behavior may impact the individual's affect when talking about and interacting with the child (Stuhlman & Pianta, 2001). Interviews with kindergarten and first grade teachers indicate that teachers have more positive affect when talking about children who have positive affect in the classroom than those who don't (Stuhlman & Pianta, 2001). Additionally, teachers express more negative and less positive affect when talking about children who engage in noncompliant behaviors than they do about children who do not engage in noncompliant behaviors (Stuhlman & Pianta, 2001). Teachers' perceptions of behavior not only impact their affect when talking about children, but also their interactions with children. Teachers have less positive affect when they are focused on compliance during their interactions with children than teachers who are focused on other skills (Stuhlman & Pianta, 2001). Teachers who have more negative affect when talking about children

also have more negative behaviors towards the child in the classroom, and more interactions with that child overall (Stuhlman & Pianta, 2001).

Teacher self-efficacy. Teachers' beliefs about their ability to control child behavior may influence the quality of their interactions with students. Teachers who have low perceptions of their control over student behavior use more commands to direct student behavior (Hagekull & Hammarberg, 2004). Additionally, teachers who have low perceptions of control use more commands with children who have externalizing problems, and with males, than teachers who have high perceptions of control over student behavior (Hagekull & Hammarberg, 2004). Furthermore, teachers engage in more positive, supportive interactions with off-task students who have internalizing behaviors when they have high perceptions of control than teachers who do not have high perceptions of control (Hagekull & Hammarberg, 2004).

Academic outcomes associated with student-teacher interaction quality. Student-teacher interaction quality is associated with higher levels of behavioral engagement in class (Rimm-Kaufman et al., 2015). Children are more cognitively, emotionally, and socially engaged when they have positive interactions with their teachers (Rimm-Kaufman et al., 2015). Student-teacher interactions are positively associated with children's academic outcomes (Curby, Rimm-Kaufman, & Ponitz, 2009), including phonological awareness (Curby et al., 2009), vocabulary acquisition (Cadmira, Leal, & Burchinal, 2010), and literacy skills (Hamre et al., 2014).

Relational outcomes associated with student-teacher interaction quality. Student-teacher interaction quality is associated with student-teacher relationship quality (Henricsson & Rydell, 2004). Negative student-teacher interactions are associated with negative student-teacher relationships (Henricsson & Rydell, 2004). More teacher-initiated interactions predict fewer child-initiated interactions, and more child-initiated interactions predict more teacher-initiated

interactions (Rudasill & Rimm-Kaufman, 2009). The frequency of child-initiated interactions is positively associated with closeness in the teacher-child relationship, such that more child-initiated interactions are associated with closer teacher-child relationships (Rudasill & Rimm-Kaufman, 2009). Teachers often report having more interactions with boys than girls, and have more conflict with boys (Rudasill, 2011). Additionally, teachers have more positive interactions with girls, and provide more rewards to girls for engaging in appropriate behaviors than they do boys who engage in appropriate behaviors (Dobbs, Arnold, & Doctoroff, 2004).

Children with externalizing problems have more negative perceptions of student-teacher relationship quality than children without externalizing problems (Henricsson & Rydell, 2004). Teachers also have less positive perceptions of relationship quality with children who present with externalizing behaviors than children without externalizing behaviors (Henricsson & Rydell, 2004). Teachers report relationships with higher levels of conflict with children who have externalizing behaviors than with children who do not have externalizing behaviors (Henricsson & Rydell, 2004). These findings suggest that children's pattern of behavior and history of student-teacher interactions may influence future student-teacher interactions and relationships. Student-teacher interactions are malleable and may improve with the use of specific intervention strategies (Rimm-Kaufman et al., 2015). Strengths-based, relationship-focused interventions aimed at reducing children's behavior problems through evidence-based strategies may provide teachers and students with opportunities to interact in positive ways.

Student-Teacher Relationships

Children with disruptive behavior problems are not only at risk for negative student-teacher interactions but also negative student-teacher relationships (Murray & Murray, 2004). Student-teacher relationships are complex, dyadic systems characterized by many factors

including individual characteristics, history, beliefs, and information feedback processes (Pianta, 1999). Teacher and student characteristics, such as temperament and personality, can influence how teachers and students interact with one another (Pianta, 1999). An individual's beliefs and previous experiences could also influence student-teacher relationships (Pianta, 1999). For example, a teacher's beliefs about teaching and her own experiences with previous teachers might influence her teaching practice and the way she interacts with students, which could influence her relationships with students over time.

Interactive teacher and student behaviors form information feedback processes over time (Pianta, 1999). Information feedback processes involve exchanges of information between teachers and students, and influence the student-teacher relationship when a pattern of interactions is formed (Pianta, 1999). Behaviors can have positive or negative tones, and the tone of one individual's behavior (e.g., the teacher) can influence the tone of the individual's response (e.g., the student; Pianta, 1999). Over time, the student-teacher information feedback process informs and predicts future thoughts, behaviors, and interactions, which influence the student-teacher relationship (Pianta, 1999).

Dimensions of student-teacher relationships. Student-teacher relationship quality can vary greatly and have varying degrees of conflict, closeness, and dependency (Pianta, 1999). High-quality student-teacher relationships are characterized by low levels of conflict and high levels of closeness (O'Connor, 2010). When students have high-quality relationships with their teachers, they are often able to play and work independently because they know their teacher will support them if they need help (Hamre & Pianta, 2006). Low quality student-teacher relationships are typically characterized by high levels of conflict in the relationship. A student's level of dependency on the teacher can also contribute to low quality student-teacher

relationships if the student is over-dependent on the teacher or has difficulty separating from the teacher (Hamre & Pianta, 2001). Both conflict and dependency in the student-teacher relationship are associated with a host of negative academic, behavioral, and social outcomes (Hamre & Pianta, 2001; Hamre & Pianta, 2006). These factors are important to consider when selecting intervention strategies because certain strategies may be more or less effective based on the nature of the student-teacher relationship pre-intervention. Furthermore, targeting a specific dimension (e.g., increasing closeness) may be essential for meeting each student's unique needs and promoting optimal student outcomes.

Empirical research on the student-teacher relationship. High-quality student-teacher relationships are associated with high academic performance, few externalizing problems, and improved social skills (Crosnoe et al., 2004; Hamre & Pianta, 2001; Merritt, Wanless, Rimm-Kaufman, Cameron, & Peugh, 2012; Pianta & Stuhlman, 2004). Conversely, low-quality student-teacher relationships are associated with negative child outcomes including internalizing problems, externalizing problems, and lower achievement (Hamre & Pianta, 2005; Pianta & Stuhlman, 2004; Murray & Greenberg, 2006).

Children with externalizing problems may particularly benefit from interventions that promote strong student-teacher relationships (Hamre & Pianta, 2001; Hamre & Pianta, 2005; Hamre & Pianta, 2006), as they may serve as a protective factor for at-risk youth (Murray & Murray, 2004). Unfortunately, student-teacher relationships often become less close (Madill, Gest, & Rodkin, 2014) and have more conflict as children get older (Jerome, Hamre & Pianta, 2008). Although student-teacher relationship quality tends to decrease as children age, high quality student-teacher relationships in early elementary school are associated with high quality student-teacher relationships in the later elementary years (O'Connor, 2010). Early relationships

with teachers predict later academic and behavior problems (Hamre & Pianta, 2001), and influence future student-teacher relationships (Rudasill, 2011); thus, interventions aimed at strengthening relationships and promoting positive child outcomes are essential.

Rural Context

Teachers in rural communities report having low quality student-teacher relationships (i.e., high levels of conflict, low levels of closeness) with young children who have behavior problems (Gallagher, Kainz, Vernon-Feagans, & White, 2013). Rural children have higher levels of behavior problems than non-rural children (Sheridan et al., 2014), and might particularly benefit from interventions focused on strengthening student-teacher interactions and relationships. Despite the need, many rural communities have limited access to mental health support services (Monk, 2007). Schools provide a potential pool of trained professionals (i.e., teachers) who may be able to effectively meet the needs of children with challenging behaviors; however, rural schools are often geographically isolated and have few professional development opportunities to strengthen teachers' skill sets for addressing disruptive behaviors (Monk, 2007). Given these challenges, interventions aimed at improving the quality of student-teacher interactions while promoting positive student outcomes may be particularly conducive for rural communities.

Theoretical Framework

Student-teacher interactions and relationships are grounded in developmental systems theory, which posits that an individual's development is influenced by levels of interactions in the environment over time (Hamre & Pianta, 2006). Developmental systems theory suggests that dyadic student-teacher interactions and student-teacher relationships are influenced by each

individual's unique characteristics, interaction quality over time, and external influences. Please see Figure 1 for a visual depiction of the theory.

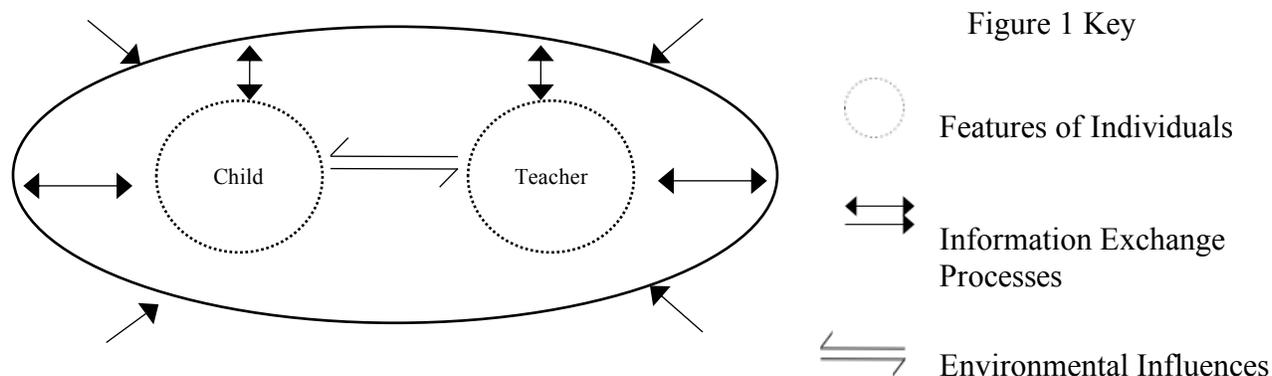


Figure 1. Developmental systems model of student-teacher relationships. Adapted from *Children's needs III: Development, prevention, and intervention* (p. 50), by B. K. Hamre & R. C. Pianta, 2006, Bethesda, MD: National Association of School Psychologists.

Individual characteristics. Teacher characteristics, including their beliefs about learning, their role as educators, and their perceptions of the student, can influence student-teacher interactions (Pianta, Hamre, & Stuhlman, 2003) and relationships (Hamre & Pianta, 2006). Individual characteristics such as teachers' mental health can influence the quality of interactions they have with students (Hamre & Pianta, 2004), thus influencing the relationship over time. For example, teachers experiencing depression may be more withdrawn, less sensitive, and engage in more negative interactions with students than teachers without depression (Hamre & Pianta, 2004).

Student characteristics can also influence the student-teacher relationship. Biological factors such as gender can influence the relationship (Hamre & Pianta, 2006). Girls often perceive more closeness in their relationships with their teachers than boys (Madill et al., 2014). Children's gender and temperament can impact the frequency of teacher-initiated interactions, which is related to more conflict in the student-teacher relationship (Rudasill, 2011). Shy students initiate fewer interactions with their teachers than children who are not (Rudasill, 2011).

Boys are more likely to initiate and receive teacher-initiated interactions than girls (Rudasill, 2011). They are also more likely to have conflictual relationships with teachers than girls (Rudasill, 2011). Children perceived as aggressive by their teachers have more frequent and more negative interactions with their teachers (Coplan & Prakash, 2003). Additionally, shy and anxious children are often perceived as more dependent on their teachers, which may increase the frequency of teacher-initiated interactions (Coplan & Prakash, 2003). Furthermore, children's behavior can also influence the quality of the student-teacher relationship (Hamre & Pianta, 2006). Children with externalizing and internalizing problems have student-teacher interactions and relationships characterized with higher levels of conflict than children without externalizing and internalizing problems (Henricsson & Rydell, 2004). Children's academic and behavior problems are associated with student-teacher relationships characterized by increased levels of conflict, rather than closeness (Hamre & Pianta, 2001).

Information exchange processes. Student-teacher interactions and relationships can be influenced by information exchange processes (Hamre & Pianta, 2006). In information exchange processes, dyadic student-teacher interactions are interpreted by both the teacher and student. These interpretations, or perceptions of the interaction, inform future student-teacher interactions and each individual's perception of the relationship (Hamre & Pianta, 2006). An individual's perception of an interaction can be influenced by malleable behaviors such as proximity and tone of voice (Hamre & Pianta, 2006). As such, *how* teachers and students interact may be more important than *what* they communicate (i.e., the information they share with each other) when forming relationships. For example, a teachers' use of praise in the form of a high-five may have a greater impact on the child's response (e.g., a smile) and the student-teacher relationship than if the child saw a note from his teacher saying that he answered something correctly on his paper.

External influences. Student-teacher interactions and relationships can also be influenced by external factors such as school characteristics (Crosnoe et al., 2004) and school climate (Hamre & Pianta, 2006). Schools that support students and promote a sense of community may also foster positive student-teacher interactions and relationships (Hamre & Pianta, 2006). Classrooms with positive classroom relational environments are positively associated with student achievement (Mantzicopoulos, 2005). Student-teacher interactions may moderate the relationship between a positive classroom environment and student achievement. Additionally, schools that promote positive parent-school involvement are associated with less conflict in the student-teacher relationships (Mantzicopoulos, 2005). Students may have more positive interactions with their teachers if they perceive that their families are valued and respected at school. Given the influence that school climate can have on student-teacher interactions and relationships, uncovering interventions that may strengthen a school's climate by promoting positive relationships is essential.

Family-School Partnerships

One way to strengthen student-teacher interactions may be through family-school partnerships. Children exhibiting behavior problems often do so across multiple settings such as home and school (Sheridan et al., 2012). Family-school partnerships are child-focused approaches wherein parents and teachers work together to promote positive child outcomes (Christenson & Sheridan, 2001; Sheridan & Kratochwill, 2008), and are an effective way to address child behavior problems across home and school (Sheridan, Kratochwill, & Elliott, 1990). Within the context of family-school partnerships, parents and teachers have clear roles, develop goals for children together, and share responsibility for student success (Sheridan & Kratochwill, 2008). Family-school partnerships promote consistency and coordination across

children's key environments, and offer a strength-based approach to problem solving. Through partnerships, parents and teachers develop additional skills to help them effectively work with children who have challenging behaviors, and children develop skills that promote positive behavioral, social, and academic outcomes (Sheridan & Kratochwill, 2008).

Conjoint Behavioral Consultation

One family-school partnership model that has consistently demonstrated positive child outcomes is Conjoint Behavioral Consultation (i.e., CBC; Sheridan & Kratochwill, 2008). CBC is defined as, "a strength-based, cross-system problem-solving and decision making model wherein parents, teachers, and other caregivers or service providers work as partners and share responsibility for promoting positive and consistent outcomes related to a child's academic, behavioral, and social-emotional development" (Sheridan & Kratochwill, 2008, p. 25). Through CBC, parents and teachers work together to design and implement individualized interventions across home and school (Sheridan & Kratochwill, 2008).

CBC aligns well with developmental systems theory, as it accounts for multiple levels of interactions influencing child development. Consistent with developmental systems theory, CBC considers the impact that individual differences have on child outcomes (Sheridan & Kratochwill, 2008). During CBC, parents and teachers meet to create individualized intervention plans based on each child's unique strengths and needs. CBC also improves relationships between parents and teachers (Sheridan et al., 2012), and may improve interactions between teachers and students. Furthermore, CBC's framework, the 5A's, acknowledges that there are many external influences that can impact a child's development (Sheridan, Clarke, & Christenson, 2014). For example, the framework highlights the importance of engaging parents through a partnership-oriented *approach*. Schools that have a systems-level, partnership-oriented

approach towards working with parents may increase parental engagement in school and positively influence children's learning and development. CBC's framework also emphasizes the importance of educators having *attitudes* that value family engagement in children's learning. Additionally, schools that promote welcoming physical and affective *atmospheres* are inviting to families and send the message that families are valuable and have unique contributions to children's education and development. Schools that engage in partnership-focused *actions* use strategies that promote parental engagement and collaborative problem-solving. When parents and teachers work together as partners, their use of goal-oriented and student-focused actions promote positive student outcomes. Together, partnership-oriented *approaches*, *attitudes*, *atmospheres*, and *actions* lead to a student's academic, social, and behavioral *achievement*.

CBC stages. CBC involves four problem-solving stages, which are designed to meet the unique needs of each target child (Sheridan & Kratochwill, 2008). The problem-solving stages are Conjoint Needs Identification, Conjoint Needs Analysis, Plan Implementation, and Conjoint Plan Evaluation.

Conjoint needs identification. During the first CBC stage, Conjoint Needs Identification, parents and teachers meet with a trained CBC consultant to discuss the target child's strengths and needs, identify a target behavior, and discuss their goals (Sheridan & Kratochwill, 2008). Parents and teachers collaboratively develop an operational definition of the target behavior to ensure they understand the problem and to promote accurate data collection. Target behaviors can be positively framed or negatively framed (Bass et al., in submission). Positively framed target behaviors are target behaviors that are framed as desirable behaviors to increase (e.g., compliance and engagement), whereas negatively framed target behaviors are framed as undesirable behaviors to decrease (e.g., interference and aggression). Parents and teachers also

discuss when and where the target behavior is most problematic, and identify a target time for data collection and future intervention. Data collection procedures are determined together to ensure that procedures are feasible for both partners. Following the first meeting, parents and teachers collect baseline data on the child's target behavior during his/her target time (Sheridan & Kratochwill, 2008).

Conjoint needs analysis. The second stage, Conjoint Needs Analysis, involves parents, teachers, and the CBC consultant meeting to evaluate the child's baseline data at home and at school (Sheridan & Kratochwill, 2008). They discuss data patterns across home and school, as well as unique factors (e.g., schedule changes) that may have influenced the child's behavior and data. Additionally, parents and teachers discuss the function of the child's behavior and develop intervention plans to address the child's target behavior in both settings. All intervention plans link intervention strategies to the function of the child's behavior, and include a method of home-school communication (e.g., daily home-school note). The intervention plans capitalize on each child's unique strengths and interests, while targeting their individual needs. For example, a child's interest in video games might become a part of a reward system for engaging in a desired behavior (e.g., complying with adult requests) at home and school. Using the baseline data, parents and teachers develop realistic goals for the child, which helps ensure that students will stay motivated to reach their goal. When possible, parents and teachers use similar strategies across home and school to promote consistency and continuity across environments.

Plan implementation. During the third stage, Plan Implementation, parents and teachers implement the intervention plans at home and at school, respectively (Sheridan & Kratochwill, 2008). They continue collecting data on the child's target behavior during the target time. The CBC consultant monitors plan implementation to ensure that all intervention plan steps are

implemented with fidelity. Additionally, the consultant provides performance feedback to parents and teachers regarding plan implementation to ensure that plans are implemented correctly and to strengthen their skills related to effectively addressing the child's target behavior (Sheridan & Kratochwill, 2008).

Conjoint plan evaluation. The final CBC stage, Conjoint Plan Evaluation, involves parents, teachers, and the CBC consultant meeting to compare the child's baseline and intervention data to determine if the home and school plans helped the child meet his/her goal (Sheridan & Kratochwill, 2008). They also discuss their perspectives on the CBC process, intervention strategies, and their partnership. Additionally, they determine next steps (e.g., continue the intervention plan, modify the intervention plan, terminate the intervention plan) and additional ways to continue partnering in the future (Sheridan & Kratochwill, 2008).

CBC's relational objectives. CBC not only addresses what parents and teachers *do* to help children achieve their social, academic, and behavioral goals (i.e., through CBC's problem-solving stages), but also *how* they help them achieve those goals such as through relationship building objectives (Sheridan & Kratochwill, 2008). CBC's relationship building objectives are designed to improve relationships between parents and teachers, and include enhancing communication and relationships between family and school, focusing on joint responsibility for problem-solving and student outcomes, taking perspective, and respecting diversity. CBC's joint problem-solving meetings help parents and teachers communicate with one another, learn from one another, support each other, and brainstorm effective strategies for addressing children's needs together. CBC's focus on strengths and perspective taking helps ensure that each partner's voice is heard and valued. Rather than placing blame on a parent or a teacher when a child's behavior is challenging, parents and teachers are viewed as experts on the child's behavior at

home and at school, respectively. Their experiences and knowledge are seen as valuable sources of information that, together, might help effectively address the presenting concern.

One element of every child's plan is daily home-school communication (e.g., a home-school note), which helps parents and teachers update each other about what happened on a particular day, and also serves as a way to help reinforce plans at home and at school. For example, a child might not receive a privilege at home if he did not meet his goal at school. The collaborative and supportive nature of CBC meetings and intervention plans may strengthen relationships between parents and teachers.

Given CBC's emphasis on relationship building, CBC may not only improve parent-teacher relationships (Sheridan et al., 2012), but also student-teacher relationships (Mautone et al., 2012) and interactions. Mautone et al. (2012) conducted a study that examined the effectiveness of a new family-school intervention, the Family-School Success- Early Elementary (FSS-EE) on early elementary students with Attention Deficit Hyperactivity Disorder (ADHD). The FSS-EE intervention is a 12-session family-school intervention designed to strengthen the home-school relationship and parenting practices. The intervention adopted elements of CBC (e.g., family-school behavioral consultation and daily home-school communication) to strengthen the home-school relationship. A comparison intervention, the Coping with ADHD through Relationships and Education (CARE) intervention, was a 12-session intervention program that included psychoeducation about ADHD, monitoring the child's behavior, and a supportive environment for parents. The CARE program did not include CBC elements or parent training on behavior management strategies.

Parents in the FSS-EE group (i.e., parents who received elements of CBC) were observed using more positive parenting behaviors when interacting with their children compared to parents

in the control group. Additionally, children in the FSS-EE group had fewer ADHD and ODD symptoms at post-intervention and at the two-month follow-up, as reported by teachers. Teachers in the FSS-EE group also reported having stronger student-teacher relationships relative those who did not receive FSS-EE. These results are promising given the use of CBC elements in the FSS-EE intervention. CBC may not only be responsible for changes in parents' use of positive interactive behaviors with their children, but also teachers' use of positive interactive behaviors with students in the classroom. Furthermore, positive changes in student-teacher interactions may also result in positive changes in the student-teacher relationship.

CBC outcomes. Decades of research have highlighted the positive outcomes of CBC on child outcomes (Sheridan & Kratochwill, 2008). In more recent research, CBC has been found to effectively impact positive teacher practices (Sheridan et al., 2018), and to produce improvements in the parent-teacher relationship (Sheridan et al., 2006a; Sheridan et al., 2012).

Research on child outcomes. CBC is associated with a host of positive child outcomes across developmental ranges and environmental contexts (Clarke, Sheridan, & Woods, 2014; Sheridan, Clarke, Knoche, & Edwards, 2006a). CBC is associated with decreases in problem behaviors including arguing, noncompliance, off-task behavior, and inappropriate motor activity (Sheridan et al., 2013; Sheridan et al., 2017); and increases in adaptive behaviors, appropriate social skills, and on-task behavior (Sheridan et al., 2012; Sheridan et al., 2017). It is also particularly effective with young children who have extreme problem behaviors (Sheridan, Eagle, Cowan, & Michelson, 2001), and children with multiple risk factors (e.g., fewer than two adults in the home, maternal education less than a high school degree; Sheridan, Eagle, & Doll, 2006b; Sheridan et al., 2013). Although problematic behaviors in older students can be successfully addressed through family-school partnerships (Sheridan et al., 2001), developing

effective family-school partnerships early is ideal as they may serve as protective factors for children progressing through school (Sheridan & Kratochwill, 2008).

Research on teacher outcomes. CBC is also associated with increases in teachers' use of positive attention and positive tangible consequences (Sheridan et al., 2018). In a recent study, the teaching practices of CBC and control teachers were assessed to determine if there were observable changes in CBC teachers' use of effective classroom teaching strategies. Teachers were observed eight times over a period of eight weeks (three baseline observations, five treatment observations). Results indicate that teachers who participated in CBC gave students more positive attention (e.g., praise) and positive tangible consequences (e.g., stickers) for desired behaviors than teachers who did not participate in CBC. These findings suggest that the quality of student-teacher interactions may improve when the teachers and students participate in CBC.

Relationship outcomes. CBC is also associated with outcomes associated with the parent-teacher relationship. CBC increases bi-directional communication between parents and teachers (Sheridan et al., 2013), which is important because frequent communication between parents and teachers is associated with a slower decline in student-teacher relationship quality as children get older (O'Connor, 2010). Frequent communication between parents and teachers may help teachers gain a deeper understanding of a child and his behavior, which may help the teacher interact with him in a more positive, effective way thus promoting a high-quality student-teacher relationship.

CBC also strengthens the parent-teacher relationship (Sheridan et al., 2006a; Sheridan et al., 2012), which is one mechanism through which CBC promotes positive student outcomes (Sheridan et al., 2012; Sheridan et al., 2017). The parent-teacher relationship has been found to

mediate CBC's effects on student outcomes (Sheridan et al., 2012; Sheridan et al., 2017). Specifically, CBC's effects on rural children's school problems, including learning problems and attention problems, were stronger when teachers reported better relationships with parents (Sheridan et al., 2017). CBC's effects on children's adaptive skills and social skills are also stronger when parents and teachers have better relationships (Sheridan et al., 2012). These findings indicate that the parent-teacher relationship plays a pivotal role on CBC's effects on student outcomes. The student-teacher relationship may play a similar role on CBC's effects on student outcomes, but these effects have not yet been tested.

Acceptability outcomes. Not only is CBC a highly effective intervention, it is also highly acceptable to parents and teachers (Sheridan et al., 2001; Sheridan et al., 2006a). Parents and teachers adhere to CBC intervention steps with a high degree of fidelity (Clarke et al., 2014; Sheridan et al., 2012), and report that the CBC process successfully meets their goals (Sheridan et al., 2001).

Direct Observations of Interactions

Direct observations are useful for gaining objective data on specific intervention outcomes (Aspland & Gardner, 2003). Direct observations are a systematic method for gathering objective information about a behavior's frequency, rate, duration, and/or latency, and can be used to observe a student's social interactions (Chafouleas, Christ, Riley-Tillman, Briesch, & Chanese, 2007). Direct observations are sensitive to change and can be used to monitor intervention effects (Volpe, DiPerna, Hintze, & Shapiro, 2005).

Current student-teacher interaction measures. Student-teacher interactions are commonly measured using the Classroom Assessment Scoring System (i.e., the CLASS), the

Individualized Classroom Assessment Scoring System (i.e., the inCLASS), and the Teacher-Pupil Observation Tool (T-POT).

CLASS. The CLASS measures the quality of classroom level student-teacher interactions by assessing classroom quality based on three domains: emotional support, classroom organization, and instructional support (Pianta, La Paro, & Hamre, 2008). The CLASS is designed for coders to make judgments on the frequency, range, intent, and interpersonal nature of behaviors during 30-minute observation periods (20 minutes of observation, 10 minutes of note taking and scoring). Classroom observations are approximately two hours long, and include multiple observation periods. The CLASS yields global scores for each dimension using a 7-point scale (1 = *minimally characteristic*, 7 = *highly characteristic*). The CLASS cannot measure the student-teacher interaction quality of specific student-teacher dyads. Additionally, given its use of global scoring, the CLASS may be subject to observer bias (Aspland & Gardner, 2003), which could adversely impact the accuracy of how particular teacher and student behaviors are coded (Volpe et al, 2005).

inCLASS. The inCLASS is a measure designed to observe and assess preschool children's interactions with teachers, other children, and learning activities (Center for Advanced Study of Teaching and Learning, 2016). The inCLASS was designed to be used with children aged three to five, and has not been validated for use with children older than age five. Children are observed in 15-minute observation periods (ten minutes of observation, five minutes of note taking and scoring). Although the inCLASS yields individual child data, global scores are assigned to each dimension (e.g., positive engagement with the teacher) after each observation period. Given the inCLASS's validation and scoring limitations, it is not an appropriate tool for assessing CBC's effect on student-teacher interactions with students in elementary school.

T-POT. The T-POT is a classroom observation measure designed to capture the quality of student-student and student-teacher interactions within early childhood classrooms (Martin et al., 2010). Seventy-five teacher and student behaviors are coded continuously. After coding, behaviors are collapsed into eight composite categories. Although the T-POT is an effective tool for capturing the frequency of a variety of teacher and student behaviors, it does not capture interactions between teachers and students. Instead, it measures how one member in the dyad acts towards the other (e.g., positive teacher behaviors toward a target student). T-POT codes may, however, be capable for adaptation for such purposes.

Current student-teacher interaction measures largely rely on teacher reports and global measures of interaction quality. They do not capture specific instances of discrete teacher and student interactive behaviors, which form interaction patterns and influence relationships over time (Pianta, 1999). The quality of interactive behaviors is influenced by their emotional tone, which can be positive or negative. Evaluating the interaction quality of specific dyads may provide valuable information necessary for developing appropriate, individualized supports aimed at strengthening the relationship and improving student outcomes.

Purpose

To date, no studies have examined how student-teacher interactions function within the context of Conjoint Behavioral Consultation (CBC). Research is needed to determine if CBC results in improved student-teacher interaction quality over time. A new measure, the Student-Teacher Interaction Measure (STIM) was developed for this study to address limitations of other student-teacher interaction measures (e.g., teacher reports of interaction quality, global measures of interaction quality, and frequency of student and teacher behaviors towards the other rather than interaction quality). The STIM is intended to measure specific instances of positive,

negative, and unreciprocated (i.e., positive teacher behavior to negative student behavior, negative student behavior to positive teacher behavior) student-teacher interactions through direct observations of teachers and students in elementary classrooms.

The purpose of the present study was to examine CBC's effect on the quality of interactions. Specifically, this study examined CBC's effect on positive, negative, and unreciprocated student-teacher interactions with a sample of rural teachers and kindergarten through third grade students using the STIM. The following research questions were examined in the present study:

1. Does the rate of positive student-teacher interactions increase as a function of CBC?
2. Does the rate of negative student-teacher interactions decrease as a function of CBC?
3. Does the rate of unreciprocated student-teacher interactions change as a function of CBC?

Given CBC's focus on strengths, skill building, and relationships, the Principal Investigator hypothesized that the rate of positive student-teacher interactions would increase and that the rate of negative student-teacher interactions would decrease as a function of CBC. The Principal Investigator also hypothesized that the rate of unreciprocated student-interactions would decrease as a function of CBC, particularly if positive interactions increased (i.e., teachers and students both engaged in more positive behaviors towards the other) and negative interactions decreased (i.e., teachers and students engaged fewer negative behaviors towards the other) over time.

Chapter 3: Method

The primary objective of this study was to examine CBC's effect on the quality of student-teacher interactions. Videos from a previously completed, large-scale randomized controlled trial that investigated CBC's effects on young rural children's behavior problems (CBC in Rural Communities; IES Award # R305C090022) were coded to determine CBC's effect on student-teacher interactions. The large-scale randomized controlled trial included 5 cohorts of Kindergarten through 3rd grade children. During the previously completed, large-scale randomized controlled trial, live observations of children and teachers from the first 3 cohorts and video observations of the last 2 cohorts were conducted. Video observations were used to reduce the time and cost of collecting data through live observations. The current study examined CBC's effects on positive, negative, and unreciprocated student-teacher interactions for the last two cohorts of the larger study (i.e., the children for whom there are video observations). During the present study, a planned missing data approach was used to reduce the time and cost of coding (Graham, Taylor, Olchowski, & Cumsille, 2006; Little & Rhemtulla, 2013). The videos were coded using the Student-Teacher Interaction Measure (STIM), a new measure developed to collect objective data on student-teacher interaction quality. The current study's demographic data is presented below. The current study's demographics approximate figures from the larger study (Sheridan et al., 2017).

Participants

Children. This study's sample was 71 rural children aged five to eight (42 treatment, 29 control), and 41 teachers (22 treatment, 19 control) from the larger study for whom there are video observations of student-teacher interactions. Children in the current study had an average of 6.90 years ($SD = 1.364$); 70.4% were male; 46.0% met criteria for free and reduced lunch;

12.7% had only one adult residing in their home; and 25.3% were formally diagnosed with a disability. Please refer to Table 1 for child demographic data by group.

Table 1
Child Demographic Data

Characteristic	Total (SD)	CBC	Control
Number of Participants	71	42	29
Average Age	6.90 (1.364)	6.95 (1.19)	6.83 (1.63)
Grade			
Kindergarten	29.7%	25.0%	37.5%
First	20.3%	15.0%	29.2%
Second	25.0%	40.0%	0.0%
Third	25.0%	20.0%	33.3%
Gender: Male	70.4%	61.9%	82.8%
Ethnicity			
White, non-Hispanic	92.3%	90.2%	95.8%
African-American	3.1%	5.0%	0.0%
Hispanic or Latino	1.5%	2.4%	0.0%
Asian or Other	3.1%	2.4%	4.2%
Eligible for Free/Reduced Lunch	46.0%	46.1%	45.8%
Maternal Education			
Less than high school	16.4%	13.5%	20.8%
High School/GED	23.0%	19.0%	29.2%
Some college	26.2%	29.7%	20.80%
College degree or more	34.4%	37.8%	29.2%
Single parent household	12.7%	16.6%	8.3%
Disability status	25.3%	26.2%	24.1%

Recruitment. Children were recruited for the larger study by teacher nomination over a period of five years, creating five cohorts. Video observations of the last two cohorts were available and coded for the present study. Video observations of the first three cohorts were conducted live; as such, there were no recordings available for secondary data analysis. Thus, the participants in the present study were drawn from cohorts four and five of the original study.

Teachers nominated the top five children in their classrooms who had disruptive classroom behaviors, and provided information on the frequency and severity of each child's problem behaviors, as well as the need for intervention. Children met criteria for the original,

large-scale randomized controlled trial if they (a) were identified by teachers as having moderate to severe behavior problems that occurred on a moderate to extreme level, and (b) if the behavior problems warranted need for intervention.

In each participating classroom, a maximum of three children who met inclusion criteria were randomly selected to participate in the larger study. Parents of children who met inclusion criteria were invited to participate, and consented to have their children videotaped as part of the larger study. Classroom teachers were randomly assigned to either treatment (CBC condition) or control (business as usual) conditions. There was not a statistically significant difference in the severity of children's behavior problems between experimental conditions [$t(69) = .608, p = 0.545$].

Parents. There were 71 parent participants in the current study. Per self-report, 90.6% of parent participants were female ($M = 32.84$ years, $SD = 7.351$); 95.3% were White/non-Hispanic; 16.4% had less than a high school diploma; 65.6% had less than a college degree; and 34.4% had a college degree or higher. Please refer to Table 2 for parent demographic data by group.

Table 2
Parent Demographic Data

Characteristic	Total (SD)	CBC	Control
Number of Participants	71	42	29
Average Age	32.84 (7.351)	33.40 (7.218)	31.92 (7.623)
Gender: Female	90.6%	87.5%	95.8%
Ethnicity			
White, non-Hispanic	95.3%	95.0%	95.8%
African-American	0.0%	0.0%	0.0%
Hispanic or Latino	3.1%	2.5%	4.2%
Asian or Other	1.6%	2.5%	0.0%

Teachers. There were 41 teacher participants in the current study (22 treatment, 19 control). Ninety-eight percent of teachers from the current study were female ($M = 41.85$ years, $SD = 13.42$); 100% were White/non-Hispanic; 26.8% held a bachelor's as their highest degree;

43.9% had completed some graduate coursework; and 29.3% had an advanced graduate degree.

Please refer to Table 3 for teacher demographic data by group.

Table 3

Teacher Demographic Data

Characteristic	Total (SD)	CBC	Control
Number of Participants	41	22	19
Average Age	41.85 (13.42)	41.09 (13.32)	42.78 (13.87)
Gender: Female	98%	95.4%	100%
Ethnicity			
White/non-Hispanic	100%	100%	100%
Degree:			
Bachelor's	26.8%	27.3%	26.3%
Some Graduate	43.9%	40.9%	47.4%
Graduate Degree	29.3%	31.8%	26.3%
Average Years Experience	14.96 (10.73)	13.91 (9.65)	16.18 (12.02)

Consultants. There were five CBC consultants in the present study. CBC consultants were clinicians who had Master's level training or higher in the areas of school psychology, educational administration, special education, or counseling psychology. CBC consultants had an average of 31 years ($SD = 4.64$). All CBC consultants were female and identified as White/non-Hispanic. Consultant demographic data are presented in Table 4.

Table 4

Consultant Demographic Data

Characteristic	Total (SD)
Master Level Education or Higher	100%
Average Age	31 (4.64)
Gender: Female	100%
Ethnicity: White, non-Hispanic	100%

CBC consultants participated in a rigorous, 64-hour training program across four weeks. Training elements included didactic information and assigned readings on CBC and evidence-based interventions, video observations of CBC meetings, role-playing, self-monitoring, performance feedback, and individualized supervision (Sheridan et al., 2017). Additionally, to

ensure CBC consultants effectively adhered to CBC procedures throughout the consultation process, CBC consultants received one hour of individual supervision per week, and two hours of group supervision from a licensed psychologist per month.

Setting

The setting of the present study was 41 classrooms (22 treatment, 19 control) in 16 rural schools in the Midwest. There were 12 kindergarten classrooms (seven treatment, five control), nine-first grade classrooms (three treatment, six control), nine-second grade classrooms (eight treatment, one control), and 11 third grade classrooms (four treatment, seven control). The average class size was 17 students ($SD= 4.37$).

Study Variables

The independent variable in this study was random assignment to condition, either CBC or the control group. The dependent variables were positive, negative, and unreciprocated student-teacher interactions. Teachers' years of teaching experience, child gender, child age, special education status, and target behavior served as covariates. Teachers' years of teaching experience, child gender, and target behavior were examined as potential moderators.

CBC. CBC procedures followed the guidelines in Sheridan and Kratochwill (2008). As previously described, parents and teachers met with a trained CBC consultant during four structured problem-solving stages over a period of eight weeks. During the first stage, Conjoint Needs Identification, parents and teachers identified the target child's strengths and needs; identified a target behavior, a target time, and a target setting at home and at school; and developed an agreed-upon data collection method for the target behavior. During the second stage, Conjoint Needs Analysis, parents and teachers discussed patterns in the baseline data; identified the function of the child's target behavior; and developed a feasible intervention plan

to address the child's behavior in both settings. The third stage, Plan Implementation, involved parents and teachers implementing the intervention plans at home and at school, with continued data collection on the target behavior. During the final stage, Conjoint Plan Evaluation, parents and teachers met to discuss the intervention's effectiveness by comparing baseline and treatment data, their views on family-school partnerships, and next steps.

Business as usual. Students in the control group received typical school supports (e.g., office referrals), as well as any other services provided by outside professionals.

Student-teacher interactions. Student-teacher interactions were measured using the Student-Teacher Interaction Measure (STIM), which was developed by the Principal Investigator. Interactions were defined as mutual or reciprocal actions, and can have positive or negative emotional tones (Pianta, 1999). Interactions were coded as "positive" when both the teacher and the student engaged in a positive behavior towards the other. Positive teacher behavior codes were specific praise, unlabeled praise, positive gesture, teacher acknowledgement, positive touch, question, and direct command. Positive student behavior codes were prosocial talk, positive touch, positive gesture, and positive academic behavior. Interactions were coded as "negative" when both the teacher and the student engaged in a negative behavior towards the other. Negative teacher behavior codes were negative touch, negative gesture, negative talk, and indirect command. Negative student behavior codes were negative touch, negative gesture, negative talk, and negative academic behavior. Interactions were coded as "unreciprocated" when the tone of the teacher and student behaviors did not match (e.g., teacher positive to student negative, student positive to teacher negative). Please refer to Tables 5 and 6 for definitions of the teacher and student behavior codes, respectively, and Appendix A for the STIM's complete coding manual.

Table 5
STIM Teacher Behavior Codes and Definitions

Interactive Behavior Code	Definition
Positive Interactive Behaviors	
Specific Praise ^{1,3}	A positive evaluation of a specific behavior, activity, or product of the student
Unlabeled Praise ^{1,3}	A positive, nonspecific evaluation of the student, an attribute of the child, or a nonspecific activity, behavior, or product of the student
Positive Gesture ^{2,3}	Any positive, nonverbal gesture directed at the student
Teacher acknowledgment ³	Includes brief acknowledgments, reflective statements and questions, and descriptive comments that ensure that the pupil is aware that the teacher values his/her contribution
Positive touch ^{1,2,3}	Any intentional positive physical contact between the teacher and the child
Question ^{1,3}	A basic question, not asking the child to do anything other than think, answer or offer an opinion
Direct Command ^{1,2,3}	A specific clear order, demand, or direction so the child is in no doubt as to what is being requested of him/her
Negative Interactive Behaviors	
Negative touch ^{1,2,3}	Any physical touch that is intended to be directive, antagonistic, aversive, hurtful or restrictive to the student's activity (includes physical redirection)
Negative gesture ²	Any negative, nonverbal gesture directed at the student
Negative talk ^{1,2,3}	A verbal expression of disapproval of the student's attributes, activities, products, or choices. Includes reprimands, warning/threats, comments of disapproval, and sassy, sarcastic, rude, or imprudent speech
Indirect Command ^{1,2,3}	An order, direction or demand for a particular behavioral response that is nonspecific, implied, or in a question form (except for when the teacher is asking for a verbal response in answer to a question)

Sources: (1) Eyberg, S. M., Nelson, M. M., Duke, M. & Boggs, S. R. (2009). *Manual for the parent-child interaction coding system* (3rd ed). Retrieved from <https://www.researchgate.net>; (2) Sheridan, S. M. (n.d.). *CBC in rural communities: Project codebook*. Unpublished manuscript, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln, Lincoln, NE.; (3) Martin-Forbes, P. (n.d.). *The teacher-pupil observation tool (T-POT): Coding manual*. Unpublished manuscript.

Table 6
STIM Student Behavior Codes and Definitions

Interactive Behavior Code	Definition
Positive Interactive Behaviors	
Prosocial talk ^{1,3}	All statements that positively evaluate an attribute, product, or behavior of the other (specifically or generally); describe the other's behavior, provide neutral information, reflect the teacher's verbalizations; or acknowledge the teacher
Positive touch ^{1,3}	Any intentional positive physical contact between the teacher and the child
Positive gesture ^{2,3}	Any positive, nonverbal gesture directed at the teacher
Positive academic behavior ^{1,2,3}	Compliance and/or continuing the current activity if this is what the teacher requests (does not include times when the child continues the activity in a bid to ignore the teacher)
Negative Interactive Behaviors	
Negative touch ^{1,2,3}	Any physical touch that is intended to be directive, antagonistic, aversive, hurtful or restrictive to the teacher's activity.
Negative gesture ²	Any negative, nonverbal gesture directed at the teacher.
Negative talk ^{1,2,3}	A verbal expression of disapproval of the teacher's attributes, activities, products, or choices. Negative talk also includes sassy, sarcastic, rude, or impudent speech.
Negative academic behavior ^{1,2,3}	Noncompliance and ignoring the teacher

Sources: (1) Eyberg, S. M., Nelson, M. M., Duke, M. & Boggs, S. R. (2009). *Manual for the parent-child interaction coding system* (3rd ed). Retrieved from <https://www.researchgate.net>; (2) Sheridan, S. M. (n.d.). *CBC in rural communities: Project codebook*. Unpublished manuscript, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln, Lincoln, NE.; (3) Martin-Forbes, P. (n.d.). *The teacher-pupil observation tool (T-POT): Coding manual*. Unpublished manuscript.

Covariates. Teachers' years of teaching experience served as a teacher covariate in the study. Teachers' years of teaching experience may be important because teacher self-efficacy for addressing student behaviors increases over time for early and mid-career teachers (Klassen & Chiu, 2010), and higher teacher self-efficacy might positively impact the quality of student-teacher interactions. Gender, age, target behavior, and special education status served as child covariates in the study. Research consistently shows that female students have closer relationships to teachers than male students, and that emotionally supportive student-teacher

interactions are associated with closer student-teacher relationships (Madil et al., 2014). Age may serve as an important covariate because student-teacher relationships often become less close as children get older (Madil et al., 2014). Type of target behavior may be an important covariate as some target behaviors, such as aggressive and disruptive behaviors, are associated with less close student-teacher relationships than other types of target behaviors (Madil et al., 2014). Target behaviors that are easily or quickly addressed may be associated with better student-teacher interactions and relationships. Special education status may serve as an important covariate because student disability status is positively associated with more conflict in the student-teacher relationship (Nurmi, 2012), and negative student-teacher interactions (e.g., interactions characterized by conflict) may negatively influence student-teacher relationship quality over time (Pianta, 1999). With the exception of target behavior, all covariate data was collected before CBC began (i.e., pre-test). Positively framed (e.g., compliance and engagement) and negatively framed target behaviors (e.g., interference and aggression), as defined in the larger randomized controlled trial, were identified during the first CBC meeting for students in the treatment group, and at the time of study enrollment for student in the control group (Bass et al., in submission).

Measure

Measure development. The Student-Teacher Interaction Measure (STIM) was developed to address measurement limitations of interaction measures. The STIM's codes were informed by the CLASS, the inCLASS, the Student-Teacher Relationship Scale (STRS), the Dyadic Parent-Child Interaction Coding System (DPICS), the Teacher-Pupil Observation Tool (T-POT), and behavior codes from the larger rural CBC study (Center for Advanced Study of Teaching and Learning, 2016; Eyberg, Nelson, Duke, & Boggs, 2009; Martin-Forbes, n.d.;

Sheridan, n.d.; Pianta, n.d.; Pianta, La Paro, & Hamre, 2008). The development of the STIM occurred in four steps over three years. The development of the STIM was informed by student-teacher relationship and student-teacher interaction measures because interactions influence future interactions (Pianta, Hamre, & Allen, 2012) and relationships (Pianta, 1999) over time.

First, the Principal Investigator examined existing student-teacher relationship measures (i.e., the CLASS and the STRS), and a global measure of interaction quality (i.e., the inCLASS) to determine which adult and child behaviors within those measures are observable and potentially contribute to interaction and relationship quality (Center for Advanced Study of Teaching and Learning, 2016; Pianta, n.d.; Pianta, La Paro, & Hamre, 2008). The Principal Investigator examined the CLASS's Emotional Support Domain because observable teacher and student behaviors might influence the degree to which a student-teacher relationship is emotionally supportive (Pianta, La Paro, & Hamre, 2008). The Principal Investigator examined the Teacher Interactions Domain of the inCLASS measure because it assesses the quality of early childhood classroom-level interactions quality (Center for Advanced Study of Teaching and Learning, 2016). Some classroom level interactions might be similar to dyadic student-teacher interactions that occur in kindergarten through third grade. The STRS was examined because it is frequently used in studies that examine student-teacher relationship quality, and because it characterized student-teacher relationship in terms of closeness, conflict, and dependency (Pianta, n.d.). Observable teacher and student behaviors that form student-teacher interactions may contribute to dimensions of student-teacher relationships (i.e., closeness, conflict, and dependency). The Principal Investigator created a comprehensive list of potentially observable positive and negative teacher and child behaviors using those measures.

Second, the Principal Investigator examined behavior codes from other adult-child interaction observation systems (i.e., the DPICS, T-POT, and the coding system used in the larger CBC study) to determine which codes were similar to the teacher and student behaviors that were selected from the CLASS, inCLASS, and STRS measures (i.e., observable teacher and student behaviors that may form interactions and impact relationship quality; Eyberg, Nelson, Duke, & Boggs, 2009; Martin et al., 2010; Sheridan, n.d.). The DPICS, TPOT, and rural CBC codes were examined because they include observable adult and child behaviors that could be used to assess dyadic student-teacher interactions. The Principal Investigator created a list of teacher and student behavior codes from the DPICS, TPOT, and rural CBC codes. The operational definitions of observable behaviors of interest from the DPICS, TPOT, and rural CBC codes were adapted for the STIM. When a behavior of interest was on more than one measure (e.g., a “teacher unlabeled praise” code is part of the DPICS and TPOT coding systems; Eyberg et al., 2009; Martin-Forbes, n.d.), the definitions were combined and simplified.

The Principal Investigator added additional teacher and student behaviors from the DPICS, TPOT, and rural CBC measures that could help answer the research questions and eliminated codes that did not help answer the research questions. For example, the T-POT’s “Teacher Acknowledgment” code (Martin-Forbes, n.d.) was added to the STIM because teachers may verbally acknowledge a student behavior that occurs in the classroom (e.g., describe the student’s behavior) without specifically praising that behavior, and students may engage in positive or negative behaviors towards teachers following these acknowledgments (e.g., smiling or frowning at the teacher). Thus, the “Teacher Acknowledgement” code was included in the STIM’s coding scheme because it may be associated with positive, negative, or unreciprocated student-teacher interactions depending on the student’s response. The “Destructive” code is a

child code on the T-POT measure and was not included in the STIM coding scheme because it measures a child's destructive behavior towards an object (e.g., throwing blocks at a wall; Martin-Forbes, n.d.) rather than the teacher. Although destructive child behaviors may influence the quality of student-teacher interactions, this code was not included on the STIM because the STIM's coding scheme is solely focused on measuring interactive student and teacher behaviors with one another.

Third, the Principal Investigator reduced the list of positive and negative teacher and student behaviors by removing behaviors that could not be observed in a large classroom setting through video. The resulting list of teacher and student behaviors became the Student-Teacher Interaction Measure (STIM) codes. Fourth, the Principal Investigator conducted pilot testing of the STIM to determine the feasibility of using the coding scheme with video observations. Codes for teacher and student behaviors that were too difficult to capture through video (e.g., eye contact and no opportunity to respond to a question or instruction) were removed from the STIM's coding scheme. As the Principal Investigator pilot tested the measure, she also clarified and simplified codes to increase chances of inter-rater reliability.

Coding interactions. The Student-Teacher Interaction Measure (STIM) was used to observe each student-teacher dyad's positive, negative, and unreciprocated interactions. The STIM had a two-step coding process. During the first step, positive and negative student and teacher behaviors (i.e., all teacher and student behavior codes in Tables 5 and 6, respectively) were coded using continuous event sampling, which allowed for specific teacher and student behaviors to be marked (i.e., tallied) each time they occurred during an observation session (Yoder & Symons, 2010). Continuous event sampling has been used to code other forms of dyadic interactions (e.g., dyadic parent-child interactions) and ensures that all teacher and

interactions (i.e., positive behavior pairs are positive interactions, negative behavior pairs are negative interactions, and positive to negative and negative to positive behavior pairs are mixed interactions). Eight types of behavior pairs were coded in the current study. Positive pairs (i.e., positive interactions) were (1) positive teacher-initiated behavior and positive student behavior response, and (2) positive student-initiated behavior and positive teacher behavior response. Negative pairs (i.e., negative interactions) were (1) negative teacher-initiated behavior and negative student response, and (2) negative student-initiated behavior and negative teacher response. Unreciprocated pairs (i.e., unreciprocated interactions) were (1) positive teacher-initiated behavior to negative student response, (2) negative teacher-initiated behavior to positive student response, (3) positive student-initiated behavior to negative teacher response, and (4) negative student-initiated behavior to positive student response. If an individual's behavior was not followed by a response by the other individual within 10-seconds, the behavior was not be considered part of a behavior pair (i.e., no interaction occurred).

Behavior pair examples. Examples of positive, negative, and unreciprocated behavior pairs (i.e., positive, negative, and unreciprocated interactions) are described in the following paragraphs. Please refer to Table 7 for all possible positive behavior pairs, negative behavior pairs, and unreciprocated behavior pairs.

Table 7
Types of Coded Interactions

Type of Interaction	Behavior Pairs	
	Teacher Behaviors	Student Behaviors
Positive	Teacher Specific Praise	Student Prosocial Talk
	Teacher Unlabeled Praise	Student Positive Touch
	Teacher Positive Gesture	Student Positive Gesture
	Teacher Acknowledgement	Positive Student Academic Behavior
	Teacher Positive Touch	Simultaneous Positive Student Behavior
	Teacher Question	
	Teacher Direct Command	
	Simultaneous Positive Teacher Behavior	
Negative	Teacher Negative Touch	Student Negative Touch
	Teacher Negative Gesture	Student Negative Gesture
	Teacher Negative Talk	Student Negative Talk
	Teacher Indirect Command	Student Negative Academic Behavior
	Simultaneous Negative Teacher Behavior	Simultaneous Negative Student Behavior
Unreciprocated	Teacher Specific Praise	Student Negative Touch
	Teacher Unlabeled Praise	Student Negative Gesture
	Teacher Positive Gesture	Student Negative Talk
	Teacher Acknowledgement	Student Negative Academic Behavior
	Teacher Positive Touch	Simultaneous Negative Student Behavior
	Teacher Question	
	Teacher Direct Command	Simultaneous Unreciprocated Student Behavior
	Simultaneous Positive Teacher Behavior	Student Prosocial Talk
	Teacher Negative Touch	Student Positive Touch
	Teacher Negative Gesture	Student Positive Gesture
	Teacher Negative Talk	Positive Student Academic Behavior
	Teacher Indirect Command	Simultaneous Positive Student Behavior
	Simultaneous Negative Teacher Behavior	
	Simultaneous Unreciprocated Teacher Behavior	

Note. This table shows all possible interaction types generated from the STIM's coding system. Any positive teacher behavior paired with any positive student behavior was considered a positive interaction, regardless of who initiated the interaction. The same strategy was used for negative and unreciprocated behavior pairs and interactions.

Positive behavior pairs. Positive behavior pairs (i.e., positive student-teacher interactions) were coded when both the teacher and the student engaged in a positive behavior

towards the other, regardless of who initiated the interaction. One example of a positive behavior pair is a teacher giving a student a direct command, and the student complying with the instruction. In this example, the teacher's behavior code is "Direct Command" and the student's behavior code is "Positive Academic Behavior." Another example of a positive behavior pair is a student raising his/her hand, and the teacher providing praise to the student for raising his/her hand before speaking. In this example, the student's behavior code is "Positive Gesture" and the teacher's behavior code is "Specific Praise."

Negative behavior pairs. Negative behavior pairs (i.e., negative student-teacher interactions) were coded when both the teacher and the student engaged in a negative behavior towards the other, regardless of who initiated the interaction. One example of a negative behavior pair is a teacher giving a student an unclear command (e.g., observing the student's behavior and saying his/her name in an effort to get the child to stop engaging in the behavior), and the child arguing with the teacher. In this example, the teacher behavior code is "Indirect Command" and the student behavior code is "Negative Talk." Another example of a negative behavior pair is a student frowning at the teacher, and the teacher providing a negatively framed command (e.g., "You better not do that again"). In this example, the student's behavior code is "Negative Gesture" and the teacher's behavior code is "Negative Talk."

Unreciprocated behavior pairs. Unreciprocated behavior pairs were coded when the tone of the teacher and student behaviors towards one another did not match (i.e., positive to negative behaviors and negative to positive behaviors), regardless of who initiated the interaction. Teacher-initiated and student-initiated interactions were examined within the same unreciprocated behavior pair category because pilot testing revealed challenges associated with determining which individual initiated some interactions (e.g., a high five) from video

observation. As such, teacher-initiated and student-initiated unreciprocated behavior pairs were combined into the same unreciprocated behavior pair category to increase chances of inter-rater reliability.

An example of an unreciprocated behavior pair is a teacher praising a student for sitting quietly, and the student saying, “You’re not fair.” In this example, the teacher’s behavior code is “Specific Praise,” which is a positive teacher behavior; the student’s behavior code is “Negative Talk,” which is a negative student behavior. Another example of an unreciprocated behavior pair is a teacher saying “Come on” to the student, and the student saying, “What do I need to do?” In this example, the teacher’s behavior code is “Indirect Command,” which is a negative teacher behavior; the student’s behavior code is “Prosocial Talk,” which is a positive student behavior.

Overlapping behavior pairs. A behavior was used to code two interactions when behavior pairs overlapped. For example, a positive teacher-initiated behavior (Behavior A) could be followed by a positive student behavior (Behavior B), which is then followed by another positive teacher behavior (Behavior C). In this case, behavior pairs overlapped, such that Behavior A served as the “antecedent” behavior and Behavior B served as the “consequent” behavior in the AB pair, and Behavior B also served as the “antecedent behavior” in the BC pair. Thus, two interactions were coded for behaviors A, B, and C (i.e., positive teacher-initiated behavior to positive student behavior, and positive student-initiated behavior to positive teacher behavior). The use of overlapping pairs had the advantage of increasing the number of student-teacher interactions (i.e., behavior pairs) in the observation period (Bakeman & Dorval, 1989).

Following the coding of each behavior pair, behavior pairs were collapsed into the following composites: positive interactions, negative interactions, unreciprocated interactions. All positive pairs were combined to form the positive interaction composite. All negative pairs

were combined to form the negative interaction composite. All unreciprocated pairs were combined to form the unreciprocated composite.

Procedure

CBC intervention procedures. CBC procedures in the larger study followed the guidelines described in Sheridan and Kratochwill (2008; Sheridan et al., 2017). Specifically, CBC procedures were implemented in a series of four stages across 8 weeks, and included three problem-solving meetings. A majority of the CBC meetings (81%) occurred in a small group format wherein consultants met with a teacher and two to three parents. Thirty-one classrooms (19%) had only one child participant. When there was only one child participant in the classroom, the CBC consultant met with that child's parent and teacher to address their concerns about the child without additional parent group members. CBC meetings occurred in the teacher's classroom or in another room in the school and lasted approximately 45 to 90 minutes.

The three problem-solving meetings were (1) Needs Identification/ Analysis, (2) Plan Development and Implementation, and (3) Plan Evaluation. During the first meeting, CBC consultants met with each child's parent and teacher dyad individually (i.e., without other children's parents) to identify the child's strengths and needs; identify a target behavior; develop goals for the child across home and school; discuss patterns in the child's behavior; and determine data collection procedures for the target behavior during a specific time (i.e., the target time). Following the first meeting, parents and teachers collected data on the child's target behavior using an agreed-upon data collection procedure until the next CBC meeting.

During the Plan Development and Implementation meeting, the consultant, parent(s), and teacher met in a small group format to discuss baseline data and co-create intervention plans to effectively address the child's target behavior (Sheridan et al., 2017). Following the second

meeting, parents and teachers implemented the intervention plans and continued collecting data at home and at school, respectively. Consultants observed plan implementation and provided immediate feedback, modeling, and support. Consultants also monitored student progress towards agreed upon goals, and helped parents and teachers make intervention plan modifications, when necessary.

During the third meeting, Plan Evaluation, parents and teachers met in a small group format to evaluate the effectiveness of the home and school intervention plans using baseline and treatment data (Sheridan et al., 2017). The consultant, parent(s), and teacher determined if the child's home and school goals had been met; discussed which intervention plan steps seemed particularly helpful and effective; and determined next steps (i.e., continue the plan, modify the plan, or terminate the plan).

Classroom intervention plans. Consultants, teachers, and parents collaboratively developed intervention plans designed to address each target child's unique needs (Sheridan et al., 2017). Intervention plans were designed to address the function of each child's target behavior, reduce problem behaviors, and increase prosocial behaviors. Intervention strategies included one or more of the following: positive reinforcement, environmental structuring, skills training, and reductive techniques. Additionally, all intervention plans included home-school communication (e.g., daily home school notes).

Plans across children were structured similarly but incorporated different intervention strategies, based on the child's needs, as well as what was feasible for the parent(s) and teacher. CBC consultants referenced the CBC Behavioral Strategies Toolkit (Sheridan et al., 2013), a collection of 80 intervention strategies, when considering intervention plan strategies. The toolkit helped standardize CBC casework and ensure that effective interventions were always used to

address each child's target behavior. After selecting intervention strategies, the consultant, parent(s), and teacher collaboratively developed individualized plan summary forms, which included specific plan steps for home and school. In the larger study, 100% of school-based intervention plans included positive consequences, 100% included home school communication, 89% included antecedent control strategies, 25% included skill building, and 11% included reductive techniques. Given the fact that the school-based CBC intervention plans were individualized to meet each child's unique needs, the intervention plans may have provided opportunities for different types of student-teacher interactions, which may have changed the quality of those interactions and the student-teacher relationship.

Fidelity data. CBC procedures in the original study were implemented with a high degree of fidelity (Sheridan et al., 2017). Consultants' adherence to each CBC meeting's problem-solving objectives was evaluated using a new measure, CBC Fidelity Matrices, which was developed for this study. CBC consultants adhered to 93% to 96% of CBC objectives during the meetings. Fidelity data were also collected on teachers' fidelity to intervention plan steps (i.e., overall adherence to plan steps). CBC consultants evaluated teachers' quality of plan implementation via direct observation four times throughout the treatment phase for teachers in the treatment group. Fidelity data indicates that teachers followed 82% of the observable intervention plan steps. Consultants also evaluated the quality with which teachers completed the intervention plan steps on a 0 (not effective) to 2 (highly effective scale), with data revealing that teachers implemented plan steps with high quality (1.56 out of 2.0; SD= 0.38).

Classroom observation of student-teacher interactions. Four hundred twenty-six videos were coded during the present study. Thirty-minute videos of student-teacher interactions were collected once per week over eight weeks for each participant. Video observations were

collected during the child's target time, which was identified by the teacher as a time when the target child's problem behaviors usually occurred. For children in the CBC condition, the first three video observations were collected during baseline; the last five were collected during treatment. For children in the control group, eight videos were collected over eight weeks. Teachers placed video cameras in unobtrusive locations where video recordings of the target child and teacher could be captured. After recording each video, teachers mailed memory cards with the videos to the research staff, who saved the videos on a secure drive in the Nebraska Center for Research on Children, Youth, Families & Schools database for later coding and analysis.

Observer training and inter-rater agreement. Four undergraduate students blind to condition, and the Principal Investigator, served as coders for the proposed study. The trained observers coded student-teacher interactions using the STIM on Noldus Observer XT software. Observer training took approximately 85 hours over seven weeks. Observer training was led by the Principal Investigator and followed a systematic process used in the original study (Sheridan et al., 2017). Training involved (1) readings and discussions of behavioral codes, (2) the proposed study's observation procedures, (3) training on Noldus Observer XT software, and (4) video-based practice and feedback. During training, research assistants and the Principal Investigator met for two to four hours every week to discuss codes, practice identifying teacher and student behaviors in a group setting, and learn the Noldus Software. During training, research assistants practiced coding videos independently for 8-10 hours per week. They were able to compare their codes to the Principal Investigator's codes for each practice video. The practice videos were 21 videos that were assigned to be planned missing data and were not used as data in the present study.

In order to code videos for data independently, coders were required to earn 85% on a criterion-based assessment evaluating their knowledge of the study's behavior codes. Additionally, coders were required to code two video observations of student-teacher interactions and have inter-rater reliability of 0.85 or higher with the master coder (i.e., the Principal Investigator) for Stage 1 and Stage 2 before coding independently. To ensure videos were coded reliably throughout the study, twenty percent of the videos (i.e., 86 videos) were coded for inter-rater reliability between two observers. Reliability analyses were calculated throughout the study. If reliability between the assigned coder and the master coder (i.e., Principal Investigator) fell below 0.85, the assigned coder and the master coder met to discuss codes and reach an agreement about the codes.

The Principal Investigator and the research assistants met for 1-2 hours per week until August, 2018 to ensure that coders were coding video observations accurately and reliably, to ensure progress was being made, and to problem-solve project specific issues that may have arisen over the course of the study (e.g., computer issues). During team meetings, coding questions that were identified over the past week were discussed. When necessary, the team watched segments of the observation sessions together to reach consensus about coding decisions. After August, 2018, undergraduate research assistants were no longer available to meet and/or work on the project consistently. If a video was identified as unreliable after August, 2018, the Principal Investigator reviewed codes to identify disagreements between coders to determine the reason the videos were unreliable (e.g., code disagreement and/or a timing issue). If a research assistant was available to recode the video, the video was coded again. If a research assistant was not available to recode the video, the Principal Investigator's data was used instead.

Analytic Approach

This study had a two-cohort design, with teachers (classrooms) randomly assigned to experimental condition. The STIM generated data on the rates of each type of student-teacher interaction (i.e., positive, negative, and unreciprocated). For each interaction type, data from each student's first three video observations was averaged as Time 1 (i.e., baseline for students in the CBC condition) and data from the last five observations was averaged as Time 2 (i.e., intervention phase for students in the CBC condition).

Planned missing data. A combined planned missing wave and simple matrix design was used to reduce the number of videos that were coded for this study. The planned missing wave design and the simple matrix design were used because previous studies have found that planned missing wave designs do not significantly reduce power to detect effects, and because the use of both designs reduces the cost and time required to collect and process data (Graham et al., 2006; Little & Rhemtulla, 2013). In this study, the use of a combined missing wave and simple matrix design reduced the cost of and time needed to code videos. Eight videos per child participant were collected in the larger study. The first three videos for all child participants (i.e., baseline videos for those in the treatment group) were assigned to Wave 1. The last five videos for all child participants (i.e., treatment videos for those who received CBC) were assigned to Wave 2. Each child participant was randomly assigned to miss one measurement occasion (i.e., video) from Wave 1 and one measurement occasion from Wave 2. As such, 33.3% of the videos in Wave 1 were not coded and are planned missing data (i.e., data are missing at random [MAR]; modern analytic techniques, such as maximum likelihood estimation, adjust for MAR without bias; Graham et al., 2006; Little & Rhemtulla, 2013). Twenty percent of the videos in Wave 2 were not coded and are planned missing data.

The planned missing simple matrix design was used to randomly assign missing measurement occasions to child participants. The planned missing simple matrix design had eight blocks, or groups, of planned missing data. These blocks represent the pattern of missing data. Wave 1 was comprised of blocks A, B, and C (Table 8). Wave 2 was comprised of blocks D, E, F, G, and H (Table 9). Students were randomly assigned to a block in Wave 1 and a block in Wave 2. Block assignment determined which video was not coded during baseline and during treatment. For example, if a youth was assigned to Block A in Wave 1 and Block D in Wave 2, videos 3 and 8 were not coded for that child and are planned missing data. In Wave 1, 34.3% of Block A had planned missing data, 37.1% of Block B had planned missing data, and 28.6% of Block C had planned missing data. In Wave 2, 20% of Block D had planned missing data, 21.4% of Block E had planned missing data, 14.3% of Block F had planned missing data, 24.3% of Block G had planned missing data, and 20% of Block H had planned missing data. Table 10 presents the percent of planned missing data by wave and block.

Table 8
Wave 1 Pattern of Missing Data by Block

Block	Video 1	Video 2	Video 3
A	0	0	1
B	0	1	0
C	1	0	0

Note. This table shows the pattern of missing data by block in Wave 1. Cells with “0” represent videos that were coded. Cells with “1” represent videos that were not coded and are missing data.

Table 9
Wave 2 Pattern of Missing Data by Block

Block	Video 4	Video 5	Video 6	Video 7	Video 8
D	0	0	0	0	1
E	1	0	0	0	0
F	0	1	0	0	0
G	0	0	1	0	0
H	0	0	0	1	0

Note. This table shows the pattern of missing data by block in Wave 1. Cells with “0” represent videos that were coded. Cells with “1” represent videos that were not coded and are missing data.

Table 10
Percent of Planned Missing Data in Wave 1 and Wave 2 Blocks

Wave	Block	Percent of Missing Data
1	A	34.30%
1	B	37.10%
1	C	28.60%
2	D	20.00%
2	E	21.40%
2	F	14.30%
2	G	24.30%
2	H	20.00%

Model fit. The variables that were investigated in this study (i.e., positive, negative, and unreciprocated student-teacher interactions) are count variables and cannot be negative numbers. As such, the normal distribution method, the Poisson method, and the Generalized Linear Model were explored to determine a model that best fit the data.

Multilevel modeling. Multilevel modeling was used examine CBC's effect on the rates of positive, negative, and unreciprocated student-teacher interactions within each time point accounting for nesting within students. Multilevel modeling (MLM) is commonly used to account for shared variance in data that has a hierarchical structure (Woltman, Feldstain, MacKay, & Rocchi, 2012). The use of multilevel modeling is appropriate given this study's research aim because multilevel modeling separately estimates the variance in positive and negative student-teacher interactions that occurs both across student observations (i.e., repeated observations over time) and across students.

Three, two-level models were used to examine CBC's effects on positive, negative, and unreciprocated student-teacher interactions from Time 1 (i.e., baseline) to Time 2 (i.e., treatment). SAS PROC MIXED was used to perform the multilevel analyses for this study. Student observations (i.e., level 1) were nested within students (i.e., level 2). Teachers were explored as another level (e.g., students nested within teachers), but there was not enough

variability due to nesting within teachers to support another level in the model. Teachers' years of teaching experience and child gender, age, special education status, and target behavior served as covariates. Teachers' years of teaching experience and children's age were centered. The Kenward Rogers II adjustment was used to estimate fixed effects. This approach is appropriate for small samples with repeated measurements (Skene & Kenward, 2010). All models assumed balanced time between student observations.

Moderators. To date, no research has investigated how student-teacher interactions function within the context of CBC. Although the study's primary research questions do not address moderation, a decision was made to explore potential moderators after data collection was complete. Moderators of CBC's effect on positive, negative, and unreciprocated interactions were explored to gain a deeper understanding of variables that may influence the direction or strength of CBC's effects on student-teacher interactions (Frazier, Barron, & Tix, 2004). Child gender, target behavior, and teachers' years of teaching experience were explored to determine the degree to which they influence CBC's effects on positive and negative student-teacher interactions. Child gender was examined as a moderator to determine if gender influences CBC's effects on positive and negative student-teacher interactions since previous research has found that male students have more frequent interactions with their teachers than female students, and that they also have more conflictual relationships with teachers than female students (Rudasill, 2011). It is possible that frequent negative interactions between male students and their teachers increase conflict in their relationship. CBC, which is a strengths-based intervention focused on increasing desirable behaviors (Sheridan & Kratochwill, 2008), may change how teachers interact with male students.

Target behavior was examined as a moderator to determine if having a positively framed target behavior influences the strength of CBC' effect on positive and negative student-teacher interactions. Previous research indicates that target behavior moderates CBC's effects on child outcomes, such that the effects of CBC on child outcomes are greater when children's target behaviors are positively framed (Bass et al., in submission). Specifically, CBC's effects on children's externalizing behaviors, school problems, overall behavior symptoms, motor movement, and compliance are significantly greater when children have positively framed target behaviors (Bass et al., in submission). Thus, positively framed target behaviors may serve as an important moderator because the reduction in children's problem behaviors may alter the way students and teachers interact with one another.

Teachers' years of teaching experience was explored as a moderator to determine if having more years of teaching experience influences the strength of CBC's effect on positive, negative, and unreciprocated student-teacher interactions. Previous research suggests that more experienced teachers have more negative interactions with students when they have more negative narratives about students (i.e., higher levels of negativity when describing their interactions and relationship with a child to someone else; Stuhlman & Pianta, 2001). CBC's focus on strengths and skill building (Sheridan & Kratochwill, 2008) may change the way that teachers perceive and interact with students, which may modify the rates of positive and negative interactions between students and teachers. Teachers' years of teaching experience was also explored as a potential moderator for unreciprocated student-teacher interactions because teachers who participate in CBC may respond to negative student behaviors in more positive ways, which may influence the rate of unreciprocated student-teacher interactions.

Reliability analysis. Twenty percent ($n = 86$ videos) of the videos were coded for inter-rater reliability at both Stage 1 and Stage 2.

Stage 1. Stage 1 reliability involved calculating inter-rater agreement between observers regarding the teacher and student behaviors that they coded using Noldus Software. Inter-rater agreement of student-teacher interactions at Stage 1 was calculated using Cohen's Kappa, which accounts for agreement occurring by chance. For Stage 1 inter-rater reliability, codes between coders were considered reliable if they occurred within a three-second window. The three-second window is consistent with other studies using Noldus XT observation software (Lunkenheimer, Kemp, & Albrecht, 2013). Noldus Observer XT software was used to calculate Cohen's Kappa for Stage 1 reliability. Cohen's Kappa ranged from .45 to 1.00 in Stage 1 ($M = .90$, $SD = .07$). Videos were considered reliable at Stage 1 if Cohen's Kappa was above .85. If inter-rater reliability on a video fell below .85, the assigned coder and the Principal Investigator met to reach consensus about the codes. Inter-rater reliability generally fell below .85 when it was difficult to understand what the teacher or child was saying to the other individual, or when nonverbal language was difficult to observe clearly (e.g., the dyad was away from the camera). If the assigned coder was unavailable to recode a video, another coder was assigned. If no coders were available (i.e., after August, 2018), the Principal Investigator reviewed the videos independently to determine the reason the videos were unreliable. If the reason for the unreliability was due to a minor issue (e.g., one second off on the codes), the Principal Investigator corrected the issue. If the issue was not minor (e.g., larger timing issue and/or inconsistency with codes), the Principal Investigator's codes were used. The Principal Investigator's codes were used for 3.5% of the videos in Stage 1 (i.e., 3 videos that fell below a Kappa of .85 during coding).

Stage 2. Stage 2 reliability involved calculating inter-rater agreement between observers regarding the frequency of student-teacher interactions in each video. Consistent with other direct observation measures of student-teacher interactions (Martin et al., 2010), percentage agreement was calculated after coding each video to determine inter-rater reliability as coding progressed. Percentage agreement was calculated by dividing the number of agreements by the total number of agreements plus disagreements. The percentage of agreement for all student-teacher interactions (i.e., positive, negative, and unreciprocated interactions combined) ranged from .48 to 1 ($M = .93$, $SD = .09$). Videos were considered reliable at Stage 2 if percentage of agreement for total interactions was above .85. If inter-rater reliability was above .85 at Stage 1 and below .85 at Stage 2, the Principal Investigator's codes were used instead of the assigned coder. This decision was made to save time, as calculating reliability at two stages was very time intensive. The Principal Investigator's codes were used for 4.6% of the videos in Stage 2 (i.e., 4 videos for which the percentage of agreement between coders fell below .85 during coding).

After coding was complete, the percentage of agreement for positive, negative, and unreciprocated student-teacher interactions was calculated separately to provide additional information regarding the mean percentage of agreement and variability for each type of interaction. The percentage of agreement for positive, negative, and unreciprocated student-teacher interactions was not used to determine the need for recoding or to determine the need for using the Principal Investigator's codes instead of the assigned coder. The percentage of agreement for positive student-teacher interactions ranged from .44 to 1 ($M = .92$, $SD = .10$). The percentage of agreement for negative student-teacher interactions ranged from 0 to 1 ($M = .91$, $SD = .25$). The percentage of agreement for unreciprocated student-teacher interactions ranged from 0% to 100% ($M = .79$, $SD = .31$).

Chapter 4: Results

The primary purpose of the present study was to investigate the effects of CBC on positive, negative, and unreciprocated student-teacher interactions. A randomized experimental design with repeated measures (Time 1 and Time 2) was used in this study. Two-level multilevel models were used to answer the research questions. Students were originally proposed as Level 1 and teachers as Level 2. The multilevel model was changed such that student observations are at Level 1 and students are at Level 2 (i.e., student observations are nested within students) because there was not enough nesting with teachers at Time 2 for an appropriate model fit. Teachers' years of teaching experience, children's age, special education status, grade, and gender were used as covariates. A secondary purpose of the present study was to investigate if teachers' years of experience, child gender, and child target behavior moderate CBC's effects on positive and negative student-teacher interactions, and if teachers' years of experience moderates CBC's effect on unreciprocated student-teacher interactions. Mean frequency data on each interaction type will be presented first, followed by a discussion of model fit. Results will then be presented as they pertain to each research question, followed by the results of the moderation analyses.

Interaction Frequency

Descriptive statistics summarize the mean frequency and standard deviation of each interaction type by group and time point and appear in Table 11. Both groups had a generally high frequency of positive student-teacher interactions (i.e., 20 - 24%) within a 30-minute time frame (i.e., the duration of each video's observation period). There was also high variability in the frequency of positive student-teacher interactions for both groups at Time 1 and at Time 2, as indicated by standard deviation. Similarly, both groups had a relatively low frequency of negative student-teacher interactions (i.e., less than 1%) across group and time point. There was

more variability with unreciprocated student-teacher interactions than negative student-teacher interactions.

Table 11

Table of Mean Frequencies of Each Interaction Type by Group and Time

Interaction Type	Time 1 <i>M (SD)</i>	Time 2 <i>M (SD)</i>
Positive Interactions		
Control	23.76 (22.992)	21.86 (20.268)
Treatment	19.92 (19.548)	21.63 (19.945)
Negative Interactions		
Control	.62 (1.412)	.71 (2.087)
Treatment	.82 (2.747)	.53 (2.361)
Unreciprocated Interactions		
Control	4.66 (5.624)	3.62 (4.879)
Treatment	4.59 (6.619)	4.50 (8.349)

Note. The frequencies in this table represent percentages of each interaction type by group and time.

Model Fit

The normal distribution model, the Poisson method, and the Generalized Linear Model were explored to determine which model best fit the data. The data did not fit the normal distributions of the Poisson method or the General Linear Model well. As such, the data were analyzed linearly even though the data were count data (i.e., the frequency of student-teacher interactions cannot be a negative number). The decision to use the normal distribution method (i.e., conduct analyses assuming the data were normal) was made because other models were explored and did not fit the data well. Additionally, assuming the data were normal resulted in relatively valid outcomes (i.e., the estimates of the means were fairly accurate).

Research Question 1

A two-level multilevel model was calculated to determine if the rate of positive student-teacher interactions increase as a function of CBC. Student observations were at level 1 and students were at level 2 in the model. One hundred thirty-two videos at Time 1 (58 control and

74 treatment videos) and 266 videos at Time 2 (108 control and 158 treatment videos) were included in the analysis. The analyses were performed using SAS PROC MIXED (SAS 9.4). Results from this model are presented in Table 12. Results indicate that there is no effect of CBC on positive student-teacher interactions at Time 2 when controlling for children's age, special education status, gender, target behavior, and teachers' years of teaching experience ($\gamma = 4.8033$, $SE = 3.9975$, $p = .2306$). Results also indicate that target behavior is a significant predictor for positive interactions ($\gamma = 12.3216$, $SE = 4.8075$, $p = 0.0129$). Children with positively framed target behaviors have significantly more positive student-teacher interactions at Time 1 than children without positively framed target behaviors.

Table 12
Estimates of CBC's Effect on Positive Student-Teacher Interactions

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	21.4277	5.2279	<.0001
CBC	-11.1476	5.2117	0.0346
time*group	4.8033	3.9975	0.2306
Years Teaching	0.3232	0.1810	0.0791
Child Gender	0.5219	4.4131	0.9063
Child Age	1.5008	1.3576	0.2734
Special Education	-0.3718	4.3859	0.9327
Target Behavior	12.3216	4.8075	0.0129*
Least Square Means			
CBC Time 1	10.8018	4.9640	0.0325
Control Time 1	21.9496	4.0385	<.0001
CBC Time 2	12.0435	4.7280	0.0132
Control Time 2	18.3878	3.6658	<.0001

Research Question 2

A two-level multilevel model was calculated to determine if the rate of negative student-teacher interactions decreased as a function of CBC. Student observations were at level 1 and students were at level 2 in the model. One hundred thirty-two videos at Time 1 (58 control and

74 treatment videos) and 266 videos at Time 2 (108 control and 158 treatment videos) were included in the analysis. The analyses were performed using SAS PROC MIXED (SAS 9.4). Results from this model are presented in Table 13. Results indicate that there is no effect of CBC on negative student-teacher interactions at Time 2 when controlling for children's age, special education status, gender, target behavior, and teachers' years of teaching experience ($\gamma = -0.04500$, $SD = 0.5538$, $p = 0.9355$). Results indicate that negative student-teacher interactions increase significantly from Time 1 to Time 2 as teachers' years of teaching experience increase, regardless of group ($\gamma = 0.0474$, $SE = 0.1176$, $p = 0.0002$). Teachers' years of experience were centered in this model. As such, for a teacher with 10 years more than average we would anticipate seeing 0.4 more negative interactions than for the average teacher. These results indicate that rate of negative student-teacher interactions increases as teachers become more experienced.

Table 13
Estimates of CBC's Effect on Negative Student-Teacher Interactions

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	0.6505	0.4163	0.1222
CBC	0.4431	0.4620	0.3412
time*group	-0.0450	0.5538	0.9355
Years Teaching	0.0474	0.1176	0.0002*
Child Gender	0.0064	0.0285	0.9821
Child Age	0.9857	0.0881	0.2677
Special Education	0.0453	0.2778	0.8712
Target Behavior	-0.2752	0.3095	0.3779
Least Square Means			
CBC Time 1	1.1001	0.3786	0.0046
Control Time 1	0.6570	0.3552	0.0693
CBC Time 2	0.3207	0.3207	0.0089
Control Time 2	0.2724	0.2724	0.0914

Research Question 3

A two-level multilevel model was calculated to determine if the rate of unreciprocated student-teacher interactions change as a function of CBC. One hundred thirty-two videos at Time 1 (58 control and 74 treatment videos) and 266 videos at Time 2 (108 control and 158 treatment videos) were included in the analysis. Student observations were at level 1 and students were at level 2 in the model. The analyses were performed using SAS PROC MIXED (SAS 9.4). Results from this model are presented in Table 14. Results indicate that there is no effect of CBC on unreciprocated student-teacher interactions at Time 2 when controlling for children's age, special education status, gender, target behavior, and teachers' years of teaching experience ($\gamma = 0.1904$, $SE = 1.5444$, $p = 0.2188$). Results indicate that unreciprocated student-teacher interactions increase significantly from Time 1 to Time 2 as teachers' years of teaching experience increase, regardless of group ($\gamma = 0.1904$, $SE = 0.0463$, $p = .0001$).

Table 14

Estimates of CBC's Effect on Unreciprocated Student-Teacher Interactions

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	2.8330	1.4560	0.0542
CBC	-0.5491	1.5407	0.7220
time*group	0.1904	1.5444	0.2188
Years Teaching	0.1904	0.0463	0.0001*
Child Gender	0.6890	1.2210	0.5415
Child Age	-0.0379	0.3458	0.9132
Special Education	1.9875	1.1054	0.0776
Target Behavior	1.7238	1.2235	0.1642
Least Square Means			
CBC Time 1	2.9730	1.3598	0.0312
Control Time 1	3.5221	1.1837	0.0034
CBC Time 2	3.1958	1.2274	0.0114
Control Time 2	1.8414	0.9858	0.0652

Moderation

Child gender, target behavior, and teachers' years of teaching experience were explored as moderators to determine if they modify CBC's effects on positive and negative student-teacher interactions. Teachers' year of experience was also explored as a moderator to determine if more years of teaching experience impacts CBC's effects on unreciprocated student-teacher interactions.

Moderators of CBC's effect on positive student-teacher interactions. Three, three-way interactions were calculated to determine if child gender, target behavior, and teachers' years of teaching experience moderate CBC's effects on positive student-teacher interactions. One hundred thirty-two videos at Time 1 (58 control and 74 treatment videos) and 266 videos at Time 2 (108 control and 158 treatment videos) were included in the analysis. The analyses were performed using SAS PROC MIXED (SAS 9.4). Results of the gender moderator analyses are presented in Figure 3 and Table 15. Results indicate that gender is a significant moderator for CBC's effects on positive student-teacher interactions ($\gamma = 20.3654$, $SE = 9.4234$, $p = 0.0315$). Specifically, females in the CBC group have significantly lower rates of change in positive student-teacher interactions from Time 1 to Time 2, relative to females in the control group.

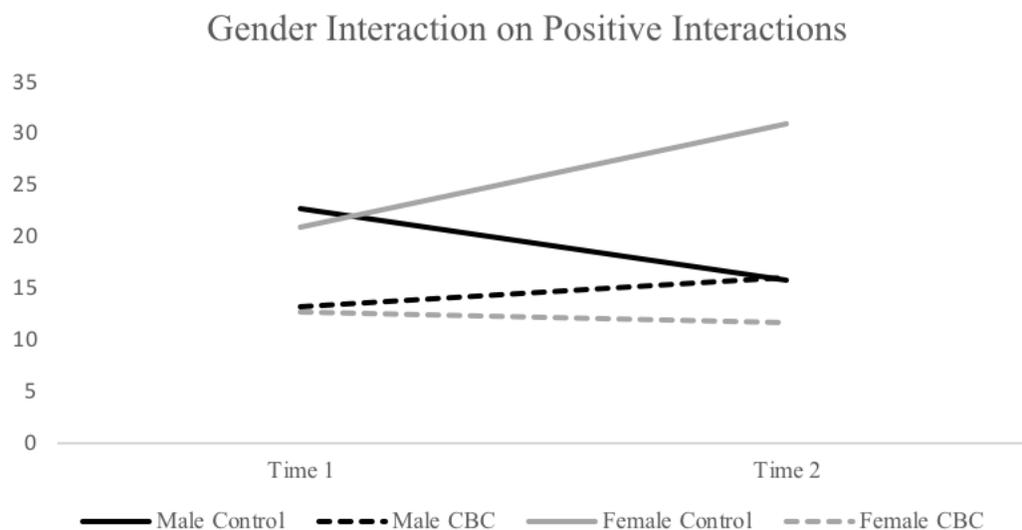


Figure 3. This figure presents the results of the time by group by gender interaction. Gender is being examined as a moderating variable on CBC's effects on positive student-teacher interactions.

Table 15

Time by Group by Gender Positive Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	20.8942	8.9187	0.0208
CBC	-8.1730	9.0500	0.3678
Time	9.8987	7.1622	0.1681
time*group	-10.9039	8.1978	0.1846
Gender	1.7877	9.6903	0.8539
gender*group	-1.2125	10.8841	0.9115
time*gender	-16.7587	7.9638	0.0363
time*gender*group	20.3654	9.4234	0.0315*
Least Square Means			
Time 1 Males CBC	13.2964	5.5258	0.0184
Time 1 Males Control	22.6682	4.1991	0.0001
Time 2 Males CBC	15.8979	5.1816	0.0032
Time 2 Males Control	15.8219	3.7714	0.0001
Time 1 Females CBC	12.7211	6.1033	0.0399
Time 1 Females Control	20.8942	8.9187	0.0208
Time 2 Females CBC	11.7159	5.5932	0.0400
Time 2 Females Control	30.7929	7.9370	0.0002

Child target behavior ($\gamma = -11.0316$, $SE = 9.9595$, $p = 0.2690$) was not found to significantly moderate CBC's effects on positive student-teacher interactions (Table 16).

Likewise, teachers' years of teaching experience did not significantly moderate CBC's effects on positive student-teacher interactions ($\gamma = 0.2178$, $SE = 0.4033$, $p = 0.5895$; Table 17).

Table 16

Time by Group by Target Behavior Positive Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	20.6720	5.7365	0.0005
CBC	-8.8820	8.7285	0.3108
Time	-5.8365	3.7142	0.1173
time*group	9.6424	7.5490	0.2026
Targetbx	12.0734	8.2333	0.1451
targetbx*group	-2.0543	11.4672	0.8581
time*targetbx	8.0478	7.0033	0.2515
time*targetbx*group	-11.0316	9.9595	0.2690
Least Square Means			
Time 1 Males CBC	13.4849	7.8747	0.0892
Time 1 Males Control	22.3711	4.3197	0.0001
Time 2 Males CBC	17.2949	6.7075	0.0120
Time 2 Males Control	16.5346	3.8384	0.0001
Time 1 Females CBC	23.5083	4.0471	0.0001
Time 1 Females Control	34.4445	7.5279	0.0001
Time 2 Females CBC	24.3304	3.7097	0.0001
Time 2 Females Control	36.6558	6.7823	0.0001

Table 17
Time by Group by Teachers' Years of Experience Positive Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	20.9124	4.7603	0.0001
CBC	-12.1237	4.8297	0.0133
Time	-2.9617	3.1664	0.3504
time*group	4.0977	4.0307	0.3102
centYrsTeach	-0.2813	0.3259	0.3896
centYrsTeach*group	1.1752	0.4309	0.0071
time*centYrsTeach	-0.2528	0.3095	0.4147
time*centYrsTeach*group	0.2178	0.4033	0.5895
Least Square Means			
CBC Time 1	9.6901	4.5258	0.0352
Control Time 1	21.8260	3.7207	0.0001
CBC Time 2	10.8260	4.2521	0.0133
Control Time 2	18.8653	3.3127	0.0001

Moderators of CBC's effect on negative student-teacher interactions. Three, three-way interactions were calculated to determine if child gender, target behavior, and teachers' years of teaching experience moderate CBC's effects on negative student-teacher interactions. One hundred thirty-two videos at Time 1 (58 control and 74 treatment videos) and 266 videos at Time 2 (108 control and 158 treatment videos) were included in the analysis. The analyses were performed using SAS PROC MIXED (SAS 9.4). Child gender did not significantly moderate CBC's effects on negative student-teacher interactions ($\gamma = 1.9953$, $SE = 1.2516$, $p = 0.1160$). Please refer to Table 18 for information about the time by group by gender interaction.

Table 18
Time by Group by Gender Negative Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	0.1731	0.7891	0.8271
CBC	1.5072	0.8549	0.0838
Time	0.2532	0.9533	0.7914
time*group	-1.3803	1.0867	0.2087
Gender	0.5742	0.8645	0.5092
gender*group	-1.6053	1.0058	0.1162
time*gender	-0.5467	1.0606	0.6081
time*gender*group	1.9953	1.2516	0.1160
Least Square Means			
Time 1 Males CBC	13.2964	5.5258	0.0184
Time 1 Males Control	22.6682	4.1991	0.0001
Time 2 Males CBC	15.8979	5.1816	0.0032
Time 2 Males Control	15.8219	3.7714	0.0001
Time 1 Females CBC	12.7211	6.1033	0.0399
Time 1 Females Control	20.8942	8.9187	0.0208
Time 2 Females CBC	11.7159	5.5932	0.0400
Time 2 Females Control	30.7929	7.9370	0.0002

Results also indicate that target behavior ($\gamma = -1.6042$, $SE = 1.3395$, $p = 0.2358$) does not significantly moderate CBC's effects on negative student-teacher interactions (Table 19). Additionally, teachers' years of teaching experience ($\gamma = -0.0430$, $SE = 0.0536$, $p = 0.4247$) did not significantly moderate CBC's effects on negative student-teacher interactions (Table 20).

Table 19

Time by Group by Target Behavior Negative Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	0.5408	0.4696	0.2532
CBC	-0.3511	0.8246	0.6719
Time	-0.1467	0.5019	0.7711
time*group	1.4208	1.0193	0.1685
Targetbx	0.0123	0.7545	0.9870
targetbx*group	0.7344	1.0793	0.4990
time*targetbx	-0.1464	0.9399	0.8768
time*targetbx*group	-1.6042	1.3395	0.2358
Least Square Means			
Time 1 CBC	0.1897	0.7302	0.7959
Time 1 Control	0.5408	0.4696	0.2532
Time 2 CBC	1.4648	0.4945	0.0046
Time 2 Control	0.3940	0.3874	0.3126

Table 20

Time by Group by Teachers' Years of Experience Negative Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	0.5799	0.3967	0.1478
CBC	0.5359	0.4390	0.2266
Time	-0.1344	0.4224	0.7515
time*group	-0.2491	0.5367	0.6442
centYrsTeach	0.0429	0.0310	0.1727
centYrsTeach*group	0.0733	0.0413	0.0813
time*centYrsTeach	-0.0323	0.0412	0.4352
time*centYrsTeach*group	-0.0430	0.0536	0.4247
Least Square Means			
Time 1 CBC	1.1158	0.4116	0.0082
Time 1 Control	0.5799	0.3967	0.1478
Time 2 CBC	0.7323	0.3678	0.0505
Time 2 Control	0.4550	0.3390	0.1930

Moderators of CBC's effect on unreciprocated student- teacher interactions. A

three-way interaction was calculated to determine if teachers' years of teaching experience

moderates CBC's effects on unreciprocated student-teacher interactions. One hundred thirty-two

videos at Time 1 (58 control and 74 treatment videos) and 266 videos at Time 2 (108 control and 158 treatment videos) were included in the analysis. The analysis was performed using SAS PROC MIXED (SAS 9.4). Teachers' years of teaching experience did not significantly moderate CBC's effect on unreciprocated student-teacher interactions between Time 1 and Time 2 ($\gamma = -0.1491$, $SE = 0.1553$, $p = 0.3380$; Table 21).

Table 21

Time by Group by Teachers' Years of Experience Unreciprocated Interaction Estimates

Variable	Estimate	Std. Error	Pr> t
Fixed Effects			
Intercept	2.7065	1.4385	0.0624
CBC	-0.3680	1.5286	0.8100
Time	-1.6103	1.2205	0.1881
time*group	1.4969	1.5531	0.3360
centYrsTeach	0.1259	0.1059	0.2359
centYrsTeach*group	0.2416	0.1404	0.0866
time*centYrsTeach	-0.0246	0.1192	0.8363
time*centYrsTeacher*group	-0.1491	0.1553	0.3380
Least Square Means			
Time 1 CBC	3.1349	1.3482	0.0221
Time 1 Control	3.5030	1.7116	0.0032
Time 2 CBC	3.0216	1.2086	0.0149
Time 2 Control	1.8927	0.9713	0.0545

Chapter 5: Discussion

The present study investigated the effects of an evidence-based family-school partnership intervention, Conjoint Behavioral Consultation (CBC), on student-teacher interactions. This is the first study to date to investigate CBC's effect on student-teacher interactions. This is also the first study to use the Student-Teacher Interaction Measure (STIM), which was developed to address limitations of other student-teacher interaction observation measures. Student and teacher variables that moderated CBC's effects on student-teacher interactions were explored.

Main Findings

The first research question investigated if the rate of positive student-teacher interactions increases as a function of CBC. Given CBC's focus on strengths, skill building, and relationships (Sheridan & Kratochwill, 2008), the Primary Investigator hypothesized that the rate of positive student-teacher interactions would increase significantly from Time 1 to Time 2. This hypothesis was not confirmed. Results from the study indicate that there is no main effect of CBC on positive student-teacher interactions at Time 2.

The CBC group and the control group had a relatively high frequency of positive student-teacher interactions. There was also high variability in the frequency of positive student-teacher interactions for both groups across time. Relative to negative and unreciprocated interaction styles, students and teachers had higher frequency of positive student-teacher interactions at baseline. CBC may not effectively increase the rate of student-teacher interactions beyond what is already occurring in classrooms, especially classrooms with high levels of positive student-teacher interactions at baseline. CBC's effect on the rate of positive student-teacher interactions may be different in classrooms that has fewer positive interactions between students and teachers (e.g., more negative student-teacher interactions) at baseline. Additional research is needed to

determine if CBC effects positive student-teacher interactions in classrooms with fewer observed levels of positive student-teacher interactions at baseline than was observed in the present study.

The second research question investigated if the rate of negative student-teacher interactions decreases as a function of CBC. The Primary Investigator hypothesized that the rate of negative student-teacher interactions would decrease significantly from Time 1 to Time 2. This hypothesis was not confirmed. Results from the study indicate that there is no main effect of CBC on negative student-teacher interactions at Time 2.

The CBC group and the control group had a relatively low frequency of negative student-teacher interactions across time. It is possible that CBC, which is an intervention designed to focus on strengths and skill building (e.g., providing verbal praise for positive behaviors observed in the classroom; Sheridan & Kratochwill, 2008), may not effectively reduce the rate of negative student-teacher interactions in classrooms. Additional research is needed to determine if incorporating direct strategies (e.g., ignoring undesirable behaviors) into CBC's intervention plans may result in decreases in negative student-teacher interactions. Additionally, CBC's effect on the rate of negative student-teacher interactions may be different in classrooms that have more conflict between students and teachers (e.g., more negative student-teacher interactions) at baseline than was observed in this study. Additional research is needed to determine if CBC impacts negative student-teacher interactions in classrooms with greater levels of conflict at baseline than was observed herein.

The third research question investigated if the rate of unreciprocated student-teacher interactions changes as a function of CBC. The Principal Investigator hypothesized that the rate of unreciprocated student-interactions would decrease as a function of CBC, particularly if positive interactions increased (i.e., teachers and students both engaged in more positive

behaviors towards the other) and negative interactions decreased (i.e., teachers and students engaged fewer negative behaviors towards the other) over time. This hypothesis was not confirmed. Results from the study indicate that there is no main effect of CBC on unreciprocated student-teacher interactions at Time 2.

The CBC group and the control group had a relatively low frequency of unreciprocated student-teacher interactions across time. As such, CBC may not effectively change the rate of unreciprocated student-teacher interactions. Additional research is needed to determine how unreciprocated interactions function within the context of CBC. For example, an unreciprocated interaction may be desirable if a teacher responds to a negative student behavior in a positive way. Unreciprocated student-teacher interactions may be undesirable if teachers respond to positive student behaviors in negative ways. Additional research is also needed to determine if increasing or decreasing the rate of unreciprocated student-teacher interactions, or certain types of unreciprocated student teacher interactions (i.e., teacher positive to student negative), is associated with other student outcomes (e.g., increases in desirable behaviors) or relationship outcomes (e.g., stronger student-teacher relationships). Additionally, CBC's effect on the rate of unreciprocated student-teacher interactions may be different in classrooms with greater baseline levels of unreciprocated interactions between students and teachers. Additional research is needed to determine if CBC effects unreciprocated student-teacher interactions in classrooms with high levels of unreciprocated interactions at baseline.

Alternatively, the lack of significant main effects of CBC on positive, negative, and unreciprocated student-teacher interactions may also be due to the fact that CBC intervention strategies do not directly target student-teacher interaction quality. It is possible CBC may effectively enhance student-teacher interactions if direct strategies are incorporated into

intervention plans at school. Additionally, CBC was designed to promote student outcomes through family-school partnerships (Sheridan & Kratochwill) and may not be an effective intervention for addressing student-teacher interactions.

The lack of significant main effects of CBC on positive, negative, and unreciprocated student-teacher interactions may also be related to data collection sensitivity. The videos coded in this study were part of a larger study investigating CBC's effects on rural students' behavior. Video cameras were placed in unobtrusive areas of classrooms, and often far from the target student. The videos often included observations of entire classrooms and small groups. They were not originally designed to capture dyadic student-teacher interactions. As such, some student-teacher interactions were difficult to code and may have been missed (e.g., a teacher smiling or frowning at a student away from the camera). Future studies should aim to include more sensitive data collection procedures. For example, teachers and students could wear small video recording devices on their clothing, which might provide researchers with accurate data regarding how students and teachers interact with each other.

The STIM was developed to measure student-teacher interaction quality for the purposes of this study. It is possible that a different observation measure may be more sensitive to intervention effects than the STIM. Future studies should aim to determine if the STIM is superior to other observation measures (e.g., the CLASS or the T-POT). Future research should also aim to determine if teacher and student perceptions of interaction quality are more valid indicators of CBC's effectiveness on student-teacher interaction quality than observations of interaction quality.

The study's sample was a subset of the larger original study. The criteria for participation in the larger study did not include exclusion criteria related to student-teacher interaction quality.

As such, it is possible that some student-teacher dyads may not have needed an intervention aimed at improving interaction quality. Future studies examining CBC's effects on student-teacher interaction quality should define more specific inclusion criteria related to student-teacher interaction quality at baseline so that there is a greater number of student-teacher dyads whose baseline interactions are negative.

This study's sample was relatively small because it was a subset of the larger original study for whom there were video observations. Frequency data indicates that the data are trending in the desired direction for positive interactions and negative interactions, such that the frequency of positive interactions seems to be trending up and the rate of negative student-teacher interactions seems to be trending down for those in the CBC group. Additionally, the frequency of unreciprocated interactions may be trending down for those in the CBC group. As such, it is possible that there was not sufficient power to detect intervention effects. Future research should investigate CBC's effect on positive and negative student-teacher interactions with a larger sample size to determine if CBC's effect on positive and negative student-teacher interactions increases when there is more power to detect significant effects.

Secondary Findings

After conducting analyses necessary to address the primary research questions, the data generated using the STIM was further explored to provide a deeper understanding of how student-teacher interactions function in this sample. Child gender, target behavior, and teachers' years of teaching experience were explored as potential moderators to determine if they influence CBC's effects on positive and negative student-teacher interactions. Teachers' years of teaching experience was also explored as a moderator to determine if having more years of teaching experience influences the strength of CBC's effect on unreciprocated student-teacher

interactions. The subsequent paragraphs explore the significant results of the moderation analyses. The current study was not designed to examine variables moderating CBC's effects on student-teacher interactions, which may have influenced results.

Gender. Results of the moderation analyses indicate that gender is a significant moderator for CBC's effects on positive student-teacher interactions. Specifically, females in the CBC group demonstrated significantly lower rates of change in positive student-teacher interactions from Time 1 to Time 2, relative to females in the control group. This finding is surprising because CBC is expected to be associated with increases in positive student-teacher interactions. In this sample, being female did not increase the strength of CBC's effects on positive student teacher interactions. Data are trending in the desired direction for males in the CBC group, such that males in the CBC group seem to have greater increases in the rate of positive student-teacher interactions relative to males in the control group. Future research is needed to determine factors that might be influencing these findings. Future research should investigate if being male increases the strength of CBC's effects on positive student-teacher interactions with a larger sample. Additionally, research is needed to determine how participation in CBC and other teacher characteristics (e.g., teachers' beliefs about behavior management and student-teacher interactions) may influence interactions with students.

Target behavior. Target behavior did not significantly moderate CBC's effects on positive or negative student-teacher interactions. Findings did indicate, however, that target behavior significantly predicts positive student-teacher interactions at baseline. Target behavior did not significantly predict positive student-teacher interactions at Time 2. Students who had target behaviors that identified a desirable behavior to increase (e.g., compliance) rather than an undesirable behavior to decrease (e.g., noncompliance) had more positive student-teacher

interactions at Time 1 (i.e., baseline) than students who had negatively framed target behaviors at Time 1. Teachers whose students have positively framed target behaviors may view student behavior from a strengths-based perspective (Sutherland, Conroy, Abrams, & Vo, 2010). Teachers may be more likely to recognize positive behaviors and have more positive perceptions of students with positively framed target behaviors than students with negatively framed target behaviors (Sutherland, Conroy, Abrams, & Vo, 2010). Additionally, developing a positively framed target behavior may prime teachers to view student behavior from a strengths-based perspective and increase the likelihood that they will interact with students in positive ways. As such, the presence of a positively framed target behavior may positively influence how students and teachers interact with each other. Furthermore, recent CBC research has found that positively framed target behaviors moderate CBC's effects on children's internalizing and externalizing behaviors, and that children who received CBC and had negatively framed target behaviors had lower rates of compliance than children who did not participate in CBC (Bass et al., in submission). Educators should consider developing positively framed target behaviors for children because they are associated with positive student-teacher interactions and desirable intervention effects (Bass et al., in submission).

Years of teaching experience. Teachers' years of teaching experience did not significantly moderate CBC's effect on positive, negative, or unreciprocated student-teacher interactions. Although not a primary research question, the multilevel modeling data analyzed to address research questions 2 and 3 (i.e., CBC's effect on negative and unreciprocated student-teacher interactions) indicated that the rate of negative student-teacher interactions and the rate of unreciprocated student-teacher interactions significantly increased as teachers became more experienced. It is possible that teachers have less support in the classroom (e.g., fewer teacher

assistants) as they become more experienced. Teachers who have little support in the classroom may perceive their jobs as difficult, and may need additional support beyond the support they receive during CBC. Student-teacher interactions are associated with higher levels of conflict when teachers perceive their jobs as more difficult than when teachers do not view their jobs as difficult (Mantzicopoulos, 2005). Teachers who view their jobs as difficult also report having children with higher levels of risk in their classrooms (Mantzicopoulos, 2005). As such, teachers' jobs may become more difficult over time, particularly if they are assigned higher-risk students as they become more experienced. Teachers who have little support in the classroom, high-risk students, and/or the perception that their jobs are difficult may have higher rates of negative and unreciprocated interactions with students than teachers who do not. They may have greater rates of unreciprocated interactions with students if they respond to positive student behaviors negatively. Future research should examine ways to reduce the rate of negative and unreciprocated interactions students have with more experienced teachers.

Limitations and Directions for Future Research

Sample and setting limitations. The study's sample included a high percentage of White, rural child and teacher participants. It is possible that CBC's effects on student-teacher interactions may be greater in a more diverse group. For example, CBC's effects on student-teacher interactions may be greater in student-teacher dyads who have different races, ethnicities, and socioeconomic status'. Furthermore, student-teacher interaction quality may differ between rural and urban settings. CBC's may have stronger effects on student-teacher interaction quality in urban settings, which are often more demographically diverse than rural communities. Future studies should aim to examine CBC's effects on student-teacher interactions with heterogeneous student-teacher dyads and in urban settings.

Coding limitations. The STIM was developed to address limitations of other student-teacher interaction measures by objectively measuring the frequency of positive, negative, and unreciprocated student-teacher interactions. The measure was developed to measure observable student and teacher behaviors towards the other. Behaviors were only included in the STIM's coding scheme if they were observable via video observation. As such, the coding scheme does not capture every teacher and student behavior toward the other in the classroom setting. Some student-teacher interactions may not have been coded. For example, neutral teacher and student behaviors (e.g., looking at the other person without smiling or frowning) may influence perceptions of interaction quality and interaction quality over time. Additionally, discrete instances of teacher and student behavior that occurred quickly and far from the camera (e.g., smiles and frowns) were difficult to code. To increase coding effectiveness, coders were trained to slow and replay parts of videos when quick, discrete student-teacher interactions occurred. Although these quick, discrete behaviors may not always have been captured via video observation, they may influence interaction quality. Future research should seek to address the influence of neutral gestures, neutral facial expressions, and discrete behaviors on interactions.

In an effort to maintain a focus on interactions between teacher and student dyads, reduce the coding load, and improve inter-rater reliability, group level student-teacher interactions (e.g., a student participating in a choral response to a teacher's verbal prompt) were not coded. Group level interactions, however, may influence future interactions between teacher and student dyads. For example, student noncompliance to group level direct commands given by the teacher may negatively influence future student-teacher interactions, whereas compliance to group commands may have the opposite effect. Additionally, the teacher code "Ignoring a Question" proved difficult to code in large group settings. A decision was made to refrain from coding "Ignoring a

Question” when the student was participating in a group lesson during coder training. For example, if the teacher asked a question and multiple students rose their hand, ignoring was not coded if the teacher did not call on the target student. In this example, “Ignoring a Question” was not coded because the teacher may not have ignored the student when he/she called on the other student. It is possible, however, that the student interpreted the teacher’s behavior as ignoring, which could negatively impact future student-teacher interactions. Future studies should consider developing more stringent criteria for coding teacher ignoring, or eliminate the code altogether. Additionally, future studies should investigate the impact that ignoring in group settings might have on dyadic student-teacher interaction quality.

Consistent with a study conducted by Jack et al (1996), the STIM’s coding scheme identified interactions as teacher and student behaviors that occurred within 10 seconds of each other. Interactions that take more than 10 seconds were not coded as interactions in this coding scheme. As such, some dyadic teacher-student interactions may have been missed. For example, if a teacher asked a question and the student responded after 15 seconds, the interaction was not captured. This limitation may be especially important when considering the student-teacher interaction quality for students who have slower processing speeds. Approximately 25 percent of this study’s sample had a disability. Some students may have naturally needed more than 10 seconds to respond to teachers. Future research should consider how student-teacher interactions may vary across individuals with different processing speeds.

Additionally, teacher-initiated and student-initiated unreciprocated interactions were examined together (i.e., in one unreciprocated interactions category) in this study. The decision to combine teacher-initiated and student-initiated interactions was made during training to increase inter-rater reliability, as it proved difficult to determine which individual initiated some

interactions (e.g., high fives). It is possible that student-initiated unreciprocated interactions and teacher-initiated unreciprocated interactions function differently. As such, future studies should investigate if the individual initiating an unreciprocated interaction influences future student-teacher interaction and relationship quality.

Model fit and power limitations. The normal distribution method (i.e., conduct analyses assuming the data were normal) was used because other models were explored and did not fit the data well. Additionally, assuming the data were normal resulted in relatively valid outcomes (i.e., the estimates of the means were fairly accurate). It is possible that another model may fit the data better and result in more valid outcomes.

Power may have been a significant limitation to this study. This study's sample was comprised of two cohorts (71 children and 42 teachers) from the larger-randomized controlled trial for whom there are video observations. The results of this study indicate that there is no effect of CBC on positive, negative, and unreciprocated interactions. A power analysis was not conducted prior to this study because the STIM was a newly developed measure, and because its codes are derived from a combination of coding schemes (Eyberg, Nelson, Duke, & Boggs, 2009; Martin et al., 2010; Sheridan, n.d.). There may not have been enough power to detect significant intervention effects. Increased power may result in more accurate parameter estimates (Schmitt, 2011). It is possible that the study's results would be different with a larger sample size (e.g., the full sample from the randomized controlled trial). This was not possible due to the fact that observations of the first three cohorts in the larger study were conducted via live observation. Future research should examine CBC's effects on student-teacher interactions with a larger sample.

Instrument development and psychometrics. This study is the first study to use the STIM to measure student-teacher interactions. The student-teacher interactions measured using the STIM are theoretically derived based on existing student-teacher interaction measures (Eyberg, Nelson, Duke, & Boggs, 2009; Martin et al., 2010; Sheridan, n.d.). Future research on the STIM should include a Confirmatory Factor Analysis (CFA), which would inform the degree to which each teacher and student behavior contributes to the overall measure, and the degree to which all student and teacher behaviors measured by the STIM appropriately load onto the expected factor (i.e., positive, negative, or unreciprocated interactions; Schmitt, 2011). In other words, conducting a CFA would determine the accuracy of the factors hypothesized in the present study. A CFA would also determine if any student or teacher behavior codes should be eliminated from the STIM's coding scheme. A CFA was not performed because it was beyond the scope of the current study.

Inter-rater reliability was assessed during the study to ensure that coders were reliably capturing student and teacher behaviors, and interactions. Inter-rater reliability was calculated at Stage 1 using Cohen's Kappa. Although the average inter-rater reliability for Stage 1 was .90, the inter-rater reliability ranged from .45 to 1.0. The Principal Investigator's codes were used for the 3 videos that fell below .85. One reason for the unreliability between coders on three of the videos in Stage 1 may be due to the video quality. Several videos were difficult to code because teachers and students were far from the camera and/or due to poor sound quality. Future research should aim to improve video observation quality through more sensitive data collection techniques (e.g., participants wearing cameras on their clothing) to increase inter-rater reliability on videos at Stage 1. The range of inter-rater reliability at Stage 1 may also indicate that

additional coder training and/or modifications to the STIM's behavior codes may be necessary to increase the accuracy of data.

Inter-rater reliability was calculated at Stage 2 using percentage of agreement for all interactions (i.e., positive, negative, and unreciprocated interactions). The decision to calculate inter-rater reliability using percentage of agreement is consistent with other studies that include direct observations of interactions (Martin et al., 2010). Percentage of agreement for all interactions was used at Stage 2 to monitor video coding. A major limitation of this form of inter-rater reliability is that it does not account for agreement by chance (Jansen, Wiertz, Meyer, & Noldus, 2003). Although the mean percentage of agreement for all interactions was .92, the inter-rater reliability ranged from .48 to 1.0. The Principal Investigator's codes were used for the 4 videos that fell below .85. Additionally, the mean percentage of agreement for other interaction types was lower than the mean percentage of agreement for all of the interactions combined. Similar to Stage 1, one reason for the unreliability between coders on 4 of the videos in Stage 2 may be due to the video quality. Several videos were difficult to code because teachers and students were far from the camera and/or due to poor sound quality. Future research should aim to improve video observation quality through more sensitive data collection techniques (e.g., participants wearing cameras on their clothing) to increase inter-rater reliability at Stage 2. Additionally, although the overall percentage of agreement at Stage 2 is high, there may be underlying reliability issues that need to be addressed to increase the stability and overall reliability of the measure. Future research should aim to increase percentage of agreement for the each interaction type to increase the stability and reliability of all data generated using the STIM. Additionally, Cohen's Kappa was not calculated for Stage 2. Future research should include a

measure of Cohen's Kappa at Stage 2 to ensure that videos are reliable when accounting for agreement by chance.

Although procedures to establish convergent validity between the STIM and existing student-teacher interaction measures were originally proposed, the complexity of the current study and the focus on identifying treatment effects took precedence over scale development and validation. A decision was made under the advisement of two committee members to focus on testing the efficacy of CBC's effects on student teacher interactions over scale validation. Future research should aim to establish convergent validity between the STIM and existing student-teacher interaction measures. Convergent validity refers to the degree to which two measures capture the same construct (Carlson & Herdman, 2012). Future research may establish convergent validity by comparing the STIM's positive and negative behavioral codes to the select codes used in the original rural CBC study. The rural CBC codes could organize into composites similar to those of the STIM: positive teacher behaviors, negative teacher behaviors, positive student behaviors, and negative student behaviors. The positive teacher composite could include the following codes: providing tangible consequences, positive attention, and effective command codes (Sheridan, n.d.). The negative teacher behavior composite could include the use of reductive techniques and negative attention codes. The positive student behavior composite could include compliance and social behavior. The negative student behavior composite could include noncompliance and interference. Although there are other rural CBC codes, they are not student-teacher interaction specific (i.e., can occur without the teacher's presence). High correlations between each type of code (e.g., STIM positive teacher behaviors and CBC positive teacher behaviors) may establish convergent validity between the measures. Establishing

convergent validity with existing student-teacher interaction measures would support the rationale for using the STIM to capture student-teacher interactions in future studies.

Conclusion

This study examined CBC's effect on positive, negative, and unreciprocated student-teacher interactions with a sample of rural kindergarten through third grade students and their teachers. Student-teacher interactions were measured using a new observation tool, the Student-Teacher Interaction Measure (STIM). Results from the study indicated that there was no main effect of CBC on positive, negative, or unreciprocated student-teacher interactions over time. Results from secondary analyses indicate that target behavior is a significant predictor for positive interactions, and that the rate of negative student-teacher interactions and unreciprocated student-teacher interactions increase as teachers become more experienced. Results from secondary analyses also indicate that female students in the CBC group have significantly lower rates of change in positive student-teacher interactions over time, relative to female students in the control group. Future research should examine CBC's effect on positive, negative, and unreciprocated interactions with a larger sample to ensure there is sufficient power to identify intervention effects. Additional research is also needed identify why experienced teachers may interact with students differently than less experienced teachers. Future research should investigate why female students receiving CBC have lower rates of change with positive student-teacher interactions than those not receiving CBC. Finally, additional research is needed to refine the STIM's codes (e.g., eliminate behaviors that are difficult to observe), and examine its psychometric properties (e.g., reliability and validity).

References

- Aspland, H. & Gardner, F. (2003). Observational measures of parent-child interaction: An introductory review. *Child and Adolescent Mental Health, 8*, 136-143. doi:10.1111/1475-3588.00061
- Bakeman, R. & Dorval, B. (1989). The distinction between sampling independence and empirical independence in sequential analysis. *Behavioral Assessment, 11*, 31-37.
- Bass, H. P., Schumacher, R. E., Cheng, K. C., Wheeler, L. A., Sheridan, S. M., & Witte, A. L. (in submission). Enhancing the efficacy of conjoint behavioral consultation: What is the role of target behaviors.
- Bradshaw, C., Schaeffer, C., Petras, H., & Ialongo, N. (2010). Predicting negative life outcomes from early aggressive-disruptive behavior trajectories: Gender differences in maladaptation across life domains. *Journal of Youth and Adolescence, 39*, 953-966. doi:10.1007/s10964-009-9442-8
- Broidy, L. M., Tremblay, R. E., Brame, B., Fergusson, D., Horwood, J.L., Laird, R...Vitaro, F. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross national study. *Developmental Psychology, 39*, 222-245. doi:10.1037/0012-1649.39.2.222
- Cadima, J., Leal, T., & Burchinal, M. (2010). The quality of teacher-student interactions: Associations with first graders' academic and behavioral outcomes. *Journal of School Psychology, 48*, 457-482. doi:10.1016/j.jsp.2010.09.001
- Carlson, K. D., & Herdman, A. O. (2012). Understanding the impact of convergent validity on research results. *Organizational Research Methods, 15*, 17-32. doi:10.1177/1094428110392383

- Center for Advanced Study of Teaching and Learning. (2016). *The Individualized Classroom Assessment Scoring System Pre-K technical manual*. Retrieved from <http://www.inclassobservation.com/research/index.php>
- Chafouleas, S. M., Christ, T. J., Riley-Tillman, T. C., Briesch, A. M., & Chanese, J. A. (2007). Generalizability and dependability of direct behavior ratings to assess social behavior of preschoolers. *School Psychology Review, 36*, 63-79.
- Christenson, S. L., & Sheridan, S. M. (2001). *Schools and families: Creating essential connections for learning*. New York, NY: Guilford Press.
- Clarke, B. L., Sheridan, S. M., & Woods, K. E. (2014). Conjoint behavioral consultation: Implementing a tiered home-school partnership model to promote school readiness. *Journal of Prevention & Intervention in the Community, 42*, 300-314.
doi:10.1080/10852352.2014.943636
- Coplan, R. J., & Prakash, K. (2003). Spending time with teacher: Characteristics of preschoolers who frequently elicit versus initiate interactions with teachers. *Early Childhood Research Quarterly, 18*, 143-158. doi:10.1016/s0885-2006(03)00009-7
- Crosnoe, R., Johnson, M. K., & Elder, G. H. (2004). Intergenerational bonding in school: The behavioral and contextual correlates of student-teacher relationships. *School of Education, 17*, 60-81. doi:10.1177/003804070407700103
- Curby, T. W., Rimm-Kaufman, S. E., & Ponitz, C. C. (2009). Teacher-child interactions and children's achievement trajectories across kindergarten and first grade. *Journal of Educational Psychology, 4*, 912- 925. doi:10.1037/a0016647
- Dobbs, J. & Arnold, D. H. (2009). Relationship between preschool teachers' reports of children's behavior and their behavior towards those children. *School Psychology Quarterly, 24*, 95-

105. doi:10.1037/a0016157

- Dobbs, J., Arnold, D. H., & Doctoroff, G. L. (2004). Attention in the preschool classroom: The relationship among child gender, child misbehavior, and types of teacher attention. *Early Child Development and Care, 174*, 281-295. doi:10.1080/0300443032000153598
- Eyberg, S. M., Nelson, M. M., Duke, M. & Boggs, S. R. (2009). *Manual for the parent-child interaction coding system* (3rd ed). Retrieved from <https://www.researchgate.net>
- Frazier, P. A., Barron, K. E., & Tix, A. P. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology, 51*, 115-134. doi:10.1037/0022-0167.51.1.115
- Gallagher, K. C., Kainz, K., Vernon-Feagans, L., & White, K. M. (2013). Development of student-teacher relationships in rural early elementary classrooms. *Early Childhood Research Quarterly, 28*, 520-528. doi:10.1016/j.ecresq.2013.03.002
- Gebbie, D. H., Ceglowski, D., Taylor, L. K., & Miels, J. (2012). The role of teacher efficacy in strengthening classroom support for preschool children with disabilities who exhibit challenging behaviors. *Early Childhood Education Journal, 40*, 35-46. doi:10.1007/s10643-011-0486-5
- Graham, J. W., Taylor, B. J., Olchowski, A. E., & Cumsille, P. E. (2006). Planned missing data designs in psychological research. *Psychological Methods, 11*, 323-343. doi:10.1037/1082-989x.11.4.323
- Greenberg, M. T., Domitrovich, C., & Bumbarger, B. (2001). The prevention of mental disorders in school-aged children: Current state of the field. *Prevention & Treatment, 4*, 1-62. doi:10.1037/1522-3736.4.1.41a

- Hagekull, B., & Hammarberg, A. (2004). The role of teachers' perceived control and children's characteristics in interactions between 6-year-olds and their teachers. *Scandinavian Journal of Psychology, 45*, 301-312. doi:10.1111/j.1467-9450.2004.00409.x
- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*, 625-638. doi:10.1111/1467-8624.00301
- Hamre, B. K., & Pianta, R. C. (2004). Self-reported depression in nonfamiliar caregivers: Prevalence and associations with caregiver behavior in child-care settings. *Early Childhood Research Quarterly, 19*, 297-328. doi:10.1016/j.ecresq.2004.04.006
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk for school failure? *Child Development, 76*, 949-967. doi:10.1111/j.1467-8624.2005.00889.x
- Hamre, B. K., & Pianta, R. C. (2006). Student-teacher relationships. In G. G. Bear & K. M. Minke (Eds.), *Children's needs III: Development, prevention, and intervention* (pp. 59-71). Bethesda, MD: National Association of School Psychologists.
- Hamre, B. K., Pianta, R. C., Downer, J. T., & Mashburn, A. J. (2008). Teachers' perceptions of conflict with young students: Looking beyond problem behaviors. *Social Development, 17*, 116-136. doi: 10.1111/j.1467-9507.2007.00418.x
- Hamre, B., Pianta, R., Hatfield, B., & Jamil, F. (2014). Evidence for general and domain-specific elements of teacher-child interactions: Associations with preschool children's development. *Child Development, 85*, 1257-1274. doi: 10.1111/cdev.12184

- Henricsson, L., & Rydell, A. M. (2004). Elementary school children with behavior problems: Teacher-child relations and self-perception. A prospective study. *Merrill-Palmer Quarterly, 50*, 111-138. doi:10.1353/mpq.2004.0012
- Jack, S. L., Shores, R. E., Denny, R. K., Gunter, P. L., DeBriere, P., & DePaepe, P. (1996). An analysis of the relationship of teachers' reported use of classroom management strategies on types of classroom interactions. *Journal of Behavioral Education, 6*, 67-87. doi: [10.1007/bf02110478](https://doi.org/10.1007/bf02110478)
- Jansen, R. G., Wiertz, L. F., Meyer, E. S., & Noldus, L. P. (2003). Reliability analysis of observational data: Problems, solutions, and software implementation. *Behavior Research Methods, Instruments, & Computers, 35*, 391-399. doi: [doi:10.3758/bf03195516](https://doi.org/10.3758/bf03195516)
- Jerome, E. M., Hamre, B. K., & Pianta, R. C. (2008). Teacher-child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness. *Social Development, 18*, 915-945. doi:10.1111/j.1467-9507.2008.00508
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*, 741-756. doi: [10.1037/a0019237](https://doi.org/10.1037/a0019237)
- Lamar, S., & Gatfield, T. (2007). The early impact program: An early intervention and prevention program for children and families at-risk of conduct problems. *Journal of Early and Intensive Behavior Intervention, 4*, 703-713. doi:10.1037/h0100401
- Little, T. D., & Rhemtulla, M. (2013). Planned missing data designs for developmental researchers. *Child Development Perspectives, 7*, 199-204. doi:10.1111/cdep.12043

- Lunkenheimer, E. S., Kemp, C. J., & Albrecht, E. C. (2013). Contingencies in mother-child teaching interactions and behavioral regulation and dysregulation in early childhood. *Social Development, 22*, 319-339. doi: 10.1111/sode.12016
- Madill, R. A., Gest, S. D., & Rodkin, P. C. (2014). Students' perceptions of relatedness in the classroom: The roles of emotionally supportive teacher-child interactions, children's aggressive-disruptive behaviors, and peer social preference. *School Psychology Review, 43*, 86-105.
- Mantzicopoulos, P. (2005). Conflictual relationships between kindergarten children and their teachers: Associations with child and classroom context variables. *Journal of School Psychology, 43*, 425-442. doi: 10.1016/j.jsp.2005.09.004
- Martin-Forbes, P. (n.d.). *The teacher-pupil observation tool (T-POT): Coding manual*. Unpublished manuscript.
- Martin, P. A., Daley, D., Hutchings, J., Jones, K., Eames, C., & Whitaker, C. J. (2010). The teacher-pupil observation tool (T-POT): Development and testing of a new classroom observation measure. *School Psychology International, 31*, 229-249.
doi:10.1177/0143034310362040
- Mautone, J. A., Marshall, S. A., Sharman, J. Eiraldi, R. B., Jawad, A. F., & Power, T. J. (2012). Development of a family-school intervention for young children with attention deficit hyperactivity disorder. *School Psychology Review, 4*, 447-466.
- Merritt, E. G., Wanless, S. B., Rimm-Kaufman, S. E., Cameron, C., & Peugh, J. L. (2012). The contribution of teachers' emotional support to children's social behaviors and self-regulatory skills in first grade. *School Psychology Review, 2012*, 141-159.

- Monk, D. H. (2007). Recruiting and retaining high-quality teachers in rural areas. *The Future of Children, 17*, 155-174. doi: 10.1353/foc.2007.0009
- Murray, C. & Greenberg, M. T. (2006). Examining the importance of social relationships and social contexts in the lives of children with high-incidence disabilities. *The Journal of Special Education, 39*, 220-233. doi:10.1177/00224669060390040301
- Murray, C., & Murray, K. M. (2004). Child level correlates of teacher-student relationships: An examination of demographic characteristics, academic orientations, and behavioral orientations. *Psychology in the Schools, 41*, 751-762. doi:10.1002/pits.20015
- Nelson, J. R., & Roberts, M. L. (2000). Ongoing reciprocal teacher-student interactions involving disruptive behaviors in general education classrooms. *Journal of Emotional and Behavioral Disorders, 8*, 27-37. doi:10.1177/106342660000800104
- Nurmi, J. E. (2012). Student-characteristics and teacher-child relationships in instruction: A meta-analysis. *Educational Research Review, 7*, 177-197.
doi:10.1016/j.edurev.2012.03.001
- O'Connor, E. (2010). Teacher-child relationships as dynamic systems. *Journal of School Psychology, 48*, 187-218. doi:10.1016/j.jsp.2010.01.001
- Pianta, R. C. (n.d.). *Student-teacher relationship scale: Professional Manual*. Retrieved from https://curry.virginia.edu/uploads/resourceLibrary/STRS_Professional_Manual.pdf
- Pianta, R. C. (1999). *Enhancing relationships between children and teachers*. Washington, DC: American Psychological Association.
- Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom

- interactions. In S. Christenson, A. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 365-386). New York, NY: Springer.
- Pianta, R. C., Hamre, B., & Stuhlman, M. (2003). Relationships between teachers and children. In W. M. Reynolds, G. E. Miller, and I. B. Weiner (Eds.), *Handbook of educational psychology* (pp. 199-234). Hoboken, New Jersey: John Wiley & Sons.
- Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). *Classroom assessment scoring system manual Pre-K*. Baltimore, MD: Paul H. Brookes Publishing Company.
- Pianta, R. C., & Stuhlman, M. W. (2004). Teacher-child relationships and children's success in the first years of school. *School Psychology Review, 33*, 444-458.
- Reinke, W. M., Herman, K. C., Petras, H., & Ialongo, N. S. (2008). Empirically derived subtypes of child academic and behavior problems: Co-occurrence and distal outcomes. *Journal of Abnormal Child Psychology, 36*, 759-770. doi:10.1007/s10802-007-9208-2
- Rimm-Kaufman, S. E., Larsen, R. A., Baroody, A. E., Curby, T. W., & Abry, T. (2015). To what extent to teacher-student interaction quality and student gender contribute to fifth graders' engagement in mathematics learning? *Journal of Educational Psychology, 107*, 170-185. doi:10.1037/a0037252
- Rudasill, K. M. (2011). Child temperament, teacher-child interactions, and teacher-child relationships: A longitudinal investigation from first to third grade. *Early Childhood Research Quarterly, 26*, 147-156. doi:10.1016/j.ecresq.2010.07.002
- Rudasill, K. M., & Rimm-Kaufman, S. E. (2009). Teacher-child relationship quality: The roles of child temperament and teacher-child interactions. *Early Childhood Research Quarterly, 24*, 107-120. doi:10.1016/j.ecresq.2008.12.003

- Sheridan, S. M. (n.d.). *CBC in rural communities: Project codebook*. Unpublished manuscript, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln, Lincoln, NE.
- Schmitt, T. A. (2011). Current methodological considerations in exploratory and confirmatory factor analysis. *Journal of Psychoeducational Assessment, 29*, 304-321.
doi:10.1177/0734282911406653
- Sheridan, S. M., Bhatia, S. A., Angell, S. R., White, A. S., & Witte, A. L. (2016, April). Teachers and Parents and Partners: Essential relationships in early childhood. Paper presented at the 2016 CYFS Summit on Research in Early Childhood Education, Lincoln, NE.
- Sheridan, S. M., Bovaird, J. A., Glover, T. A., Garbacz, S. A., Witte, A., & Kwon, K. (2012). A randomized trial examining the effects of Conjoint Behavioral Consultation and the mediating role of the parent–teacher relationship. *School Psychology Review, 41*, 23–46.
- Sheridan, S. M., Clarke, B. L., & Christenson, S. L. (2014). Best practices in promoting family engagement in education. In P.L. Harrison & A. Thomas (Eds.), *Best Practices in school psychology: Systems-level services* (pp. 439-453). Bethesda, MD: National Association of School Psychologists.
- Sheridan, S. M., Clarke, B. L., Knoche, L. L., & Edwards, C. P. (2006a). The effects of conjoint behavioral consultation in early childhood settings. *Early Education and Development, 17*, 593–618. doi:10.1207/s15566935eed1704_5
- Sheridan, S. M., Eagle, J. W., Cowan, R. J., & Mickelson, W. (2001). The effects of conjoint behavioral consultation: Results of a four-year investigation. *Journal of School Psychology, 39*, 361–385. doi:10.1016/s0022-4405(01)00079-6

- Sheridan, S. M., Eagle, J. W., & Doll, B. (2006b). An examination of the efficacy of conjoint behavioral consultation with diverse clients. *School Psychology Quarterly, 21*, 396–417.
doi:10.1037/h0084130
- Sheridan, S. M., Koziol, N. A., Clarke, B. L., Rispoli, K. M., & Coutts, M. J. (2014). The influence of rurality and parental affect on kindergarten children's social and behavioral functioning. *Early Education & Development, 25*, 1057-1082.
doi:10.1080/10409289.2014.896682
- Sheridan, S. M. & Kratochwill, T. R. (2008). *Conjoint behavioral consultation: Promoting family-school connections and interventions*. New York, NY: Springer.
- Sheridan, S. M., Kratochwill, T. R., & Elliot, S. N. (1990). Behavioral consultation with parents and teachers: Delivering treatment for socially withdrawn children at home and school. *School Psychology Review, 19*, 33-52.
- Sheridan, S. M., Ryoo, J. H., Garbacz, S. A., Kunz, G. M., & Chumney, F. L. (2013). The efficacy of conjoint behavioral consultation on parents and children in the home setting: Results of a randomized controlled trial. *Journal of School Psychology, 51*, 717–733.
doi:10.1016/j.jsp.2013.09.003
- Sheridan, S. M., Witte, A. L., Holmes, S. R., Coutts, M. J., Dent, A. L., Kunz, G. M., & Wu, C. (2017). A randomized trial examining the effects of Conjoint Behavioral Consultation in rural schools: Student outcomes and the mediating role of teacher-parent relationships. *Journal of School Psychology, 61*, 33-53. doi:10.1016/j.jsp.2016.12.002
- Sheridan, S. M., Witte, A. L., Kunz, G. M., Wheeler, L. A., Angell, S. R., & Lester, H. F. (2018). Rural teacher practices and partnerships to address behavioral challenges: The efficacy

- and mechanisms of conjoint behavioral consultation. *Elementary School Journal*, *119*, 99-121. doi:10.1086/698694
- Skene, S. S., & Kenward, M. G. (2010). The analysis of very small samples of repeated measurements II: A modified box correction. *Statistics in Medicine*, *29*. Retrieved from <http://dx.doi.org.libproxy.unl.edu/10.1002/sim.4072>
- Stuhlman, M. W., & Pianta, R. C. (2001). Teachers' narratives about their relationships with children: Associations with behavior in classrooms. *School Psychology Review*, *31*, 148-163.
- Sutherland, K. S., Conroy, M., Abrams, L., & Vo, A. (2010). Improving interactions between teachers and young children with problem behavior: A strengths-based approach. *Exceptionality*, *18*, 70-81. doi:10.1080/09362831003673101
- Sutherland, K. S., & Oswald, D. P. (2005). The relationship between teacher and student behavior in classrooms for students with emotional and behavioral disorders: Transactional processes. *Journal of Child and Family Studies*, *14*, 1-14. doi:10.1007/s10826-005-1106-z
- Vogt, D. S., King, D. W., & King, L. A. (2004). Physiological assessment: Enhancing content validity by consulting members of the target population. *Psychological Assessment*, *16*, 231-243.
- Volpe, R. J., DiPerna, J. C., Hintze, J. M., & Shapiro, E. S. (2005). Observing students in classroom settings: A review of seven coding schemes. *School Psychology Review*, *34*, 454-474.
- Yoder, P. & Symons, F. (2010). *Observational measurement of behavior*. New York, NY: Springer Publishing Company.

Webster-Stratton, C., & Taylor, T. (2001). Nipping early risk factors in the bud: Preventing substance abuse, delinquency, and adolescence through interventions targeted at young children (0-8 years). *Prevention Science, 2*, 165-192.

Woltman, H., Feldstain, A., MacKay, C., & Rocchi, M. (2012). An introduction to hierarchical linear modeling. *Tutorials in Quantitative Methods for Psychology, 8*, 52-69.

Appendix A: STIM Coding Manual

Note: This manual has been adapted from the DPICS¹, CBC², and TPOT³ coding schemes.

STIM Teacher Behavior Codes and Definitions

	Code	Definition
Verbalizations	Negative Talk ^{1,2,3} (-)	A verbal expression of disapproval of the student's attributes, activities, products or choices. This code includes criticism, negative commands, reprimands, warnings/threats, comments of disapproval, and sassy, sarcastic, or rude speech. Negative talk must be aimed at the target student.
	Direct Command ^{1,2,3} (+)	A teacher delivers a specific order, demand, or instruction to the child. There should be no doubt regarding what the child is expected to do. A command that is easily understood by the child.
	Indirect Command ^{1,2,3} (-)	An order, direction, or demand for a particular behavioral response that is nonspecific, implied, or in a question form (except for when the teacher is asking for a verbal response in answer to a question). Indirect commands may be aimed at the target student.
	Specific Praise ^{1,3} (+)	The teacher verbally delivers positive evaluation of a student's specific behavior, activity, or product. Specific praise must be aimed at the target student.
	Unlabeled Praise ^{1,3} (+)	The teacher verbally delivers a non-specific positive evaluation to the student. The non-specific evaluation may be about a child's attribute(s), or a nonspecific activity, behavior, or product of the child. Unlabeled praise must be aimed at the target student.
	Question ^{1,3} (+)	A verbal inquiry from the teacher to the student. Also, code if the teacher asks a question to the group that a student is part of (e.g., whole class, small group) if the student answers/tries to respond to the question (even if the answer is incorrect).
	Teacher Acknowledgement ³ (+)	A brief verbal response to the target student about their behavior that ensures the student is aware that the teacher values their contribution. This code includes reflective statements as well as descriptive comments of the student's behavior. This code also includes statements

		made by the teacher that acknowledge the target student in a positive way but that are delivered to the group.
Physical Behaviors	Negative Touch ^{1,2,3} (-)	Any intentional touch that is intended to be directive, antagonistic, aversive, hurtful, or restrictive of the child's activity.
	Positive Touch ^{1,2,3} (+)	Any intentional neutral or positive physical contact between the teacher and the child.
Gestures	Negative Gesture ² (-)	Any negative, nonverbal gesture aimed at the target student. A negative gesture must be aimed at the target student.
	Positive Gesture ^{2,3} (+)	Any other positive, nonverbal gesture such as a thumbs up, a smile, or wink at the student. A positive gesture must be aimed at the target student.
Response Behaviors to Questions	Answering a Question ¹ (+)	The teacher verbally or nonverbally responds to a student's question within 5 seconds.
	Ignoring a Question ^{1,3} (-)	The teacher does not directly respond to a student's question within 5 seconds.
Consequence Response Behaviors	Use of a Reductive Technique ^{2,3} (-)	The teacher withdraws privileges, opportunities for social interaction or other types of reinforcement, points or tangible items/objects from the student or isolates the student from class.
	Use of a Positive Tangible Consequence ² (+)	The teacher provides the student with a tangible reward such as a sticker, candy, or special privilege.

Sources: (1) Eyberg, S. M., Nelson, M. M., Duke, M. & Boggs, S. R. (2004). *Manual for the parent-child interaction coding system* (3rd ed.). Retrieved from <https://www.researchgate.net>; (2) Sheridan, S. M. (n.d.). *CBC in rural communities: Project codebook*. Unpublished manuscript, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln, Lincoln, NE.; (3) Martin-Forbes, P. (n.d.). *The teacher-pupil observation tool (T-POT): Coding manual*. Unpublished manuscript.

Teacher Behavior Codes: Verbalizations

1. Negative Talk^{1,2,3}

Definition: A verbal expression of disapproval of the student's attributes, activities, products or choices. This code includes criticism, negative commands, reprimands, warnings/threats, comments of disapproval, and sassy, sarcastic, or rude speech. Negative talk must be aimed at the target student.

Examples:

- “No (except when in answer to a question).”
- “You’re just being silly.”
- “You’re awful today.”
- “You better not do that.”
- “That’s not the right way to do that.”
- “Well, thanks a LOT (sarcastically).”
- “Because I said so.”
- “Shh.” (code each "shh" as discrete occurrences if repeated)
- “That’s not very good.”
- “You’re a terrible listener.”
- "Stop that now."
- "Don't do that."
- "That's enough!"
- "You can't do X."
- "Leave that alone."
- "If you don't do X, you're going to lose Y."
- "Get back in your chair or I'm going to take X away."
- "Either do that now or stay after school to do it."
- Teacher using the student as an example of what not to do

2. Direct Command^{1,2,3}

Definition: A teacher delivers a specific order, demand, or instruction to the child. This code includes only neutral or positively framed statements or prompts that require the student to perform an observable behavior; is precise, specific and direct, with a clearly defined desired outcome; is given using a calm, neutral/firm tone; is within 3 feet or arm's length of the student and looking at the student. These should be easily understood by the child.

Examples:

- “Come here.”
- “Do that one (pointing).”
- “Look (with a point).”
- “Sit down.”

- “Let me help you.”
- “Give me the paper.”
- “Read that page.”
- “Tell me the answer.”
- "Quiet hands." (if understood by the child)
- "Try again."

*If teacher commands target student to "clip up" or "clip down" code as simultaneous teacher behavior for direct command (or indirect if it does not meet the criteria for direct) and use of reductive technique/positive tangible consequence ("clip down" = reductive and "clip up" = positive). Then code the target student behavior as either positive or negative academic behavior (whether or not they do it). If teacher clips the target student up or down themselves only code as use of reductive technique or positive tangible consequence.

*Code commands directed at the target student (both direct and indirect) separately when they occur in sequences.

*Codes that do not fit the criteria for direct commands should be coded as indirect commands, or if negatively framed, negative talk.

*If the teacher says something to the group like, “Raise your hand if you want to read X,” followed by additional prompts to read “e.g., paragraph 5,” code direct command if the child responds to the first command. If the child responds to the subsequent prompt instead (e.g., "paragraph 6") code indirect command instead.

*Code the command. If you cannot tell what the response is, do not code the child’s response. However, if the teacher repeats the command after 5 seconds, you can assume the child did not comply with the first request so code “negative academic behavior” after the first command.

3. Indirect Command^{1,2,3}

Definition: An order, direction, or demand for a particular, behavioral response that is nonspecific, implied (i.e., can be a nonverbal gesture to do something), or in question form (except for when the teacher is asking for a verbal response in answer to a question). Indirect commands must be aimed at the target student.

Examples:

- Teacher: “Come on.”
- Teacher: “Watch.”
- “Listen”- code for compliance if the child seems to listen (e.g., makes eye contact, turns head in desired direction, etc.)
- Teacher: “Will you please do what I ask?”
- Teacher: “Be careful.”
- Teacher: “Shouldn’t you be in your seat?”
- Teacher: “You will do what I say.”
- Teacher: “It’s time to go.”

- Teacher: observes a student's behavior and then say's his/her name to redirect (e.g., implying "stop")
- Teacher: "Check your seat before you go."
- Teacher: "If you feel like you're done, do X."
- "**If** you finish that problem, **then** you can go to the classroom library again."
- "**When** you put your coat away, **then** you can join the line."
- "As soon as you do X, you can do Y."
- "Be nice."
- "It's time to go."
- "How about you do one problem."

*Making a physical hand gesture implying the child should sit up (or doing something to cue attention) does not fit the “negative gesture” code- code it as an indirect command.

*Do not code teaching moments (e.g., explaining something to the class) that do not fit another code. Do not code:

- Action/ cue words such as "ready" and "go"
- Choral responding (blue; b-l-u-e)
- Teacher call and student response cues (e.g., clapping for attention, song for attention)

*If the teacher gives a sequence of commands to the target student and the child has no opportunity to respond between commands, code all of the teacher commands but do not code any child behaviors until the child has an opportunity to respond. Then, code positive or negative academic behavior once if he/she begins or fails to begin any of the instructions within 5 seconds of the sequence ending. Do not code positive academic or negative academic behavior multiple times in this case.

4. Specific Praise^{1,3}

Definition: The teacher verbally delivers positive evaluation of a student’s specific behavior, activity, or product. Specific praise must be aimed at the target student.

Examples:

- Teacher: “You did great job sitting quietly until I called on you!”
- Teacher: “You’re doing a nice job working cooperatively!”
- Teacher: “Great job following that direction!”
- Teacher: “I like the way you drew that.”
- Teacher: “That’s a great way to solve that problem.”
- Teacher: “Thank you for raising your hand.”
- Teacher: "Isn't that much better, Sophie?"- while looking at the student's work
- Teacher: "Thanks for putting that away."
- Teacher: "You're my little helper for cleaning up the table."

5. Unlabeled Praise^{1,3}

Definition: The teacher verbally delivers a non-specific positive evaluation to the student. The non-specific evaluation may be about a child's attribute(s), or a nonspecific activity, behavior, or product of the child. Unlabeled praise must be aimed at the target student.

Examples:

- Teacher: "Great!"
- Teacher: "Perfect!"
- Teacher: "That's better!"
- Teacher: "I'm proud of you."
- Teacher: "Correct."
- Teacher: "Thank you."
- Teacher: "Awesome!"

*Decision Rule for Praise Codes: If unsure if a statement is "Specific Praise" or "Unlabeled Praise," code "Unlabeled praise."

6. Question^{1,3}

Definition: A verbal inquiry from the teacher to the student. Code if the teacher asks a question to the group that a student is part of (e.g., whole class, small group) if the student answers/tries to respond to the question (even if the answer is incorrect).

Examples:

- Teacher: "What is the capital of Nebraska?"
- Teacher: "What did you draw?"
- Teacher: "What don't you understand?"
- Teacher: "How can I help?"
- Teacher: "Where is your book?"
- Teacher: "Will you read that again?"
- Teacher: "What did you say? What don't you understand?" - code as separate questions if both are directed at the target student BUT if the teacher asks, "What did you say? Followed by "Tell me what you don't understand," code question and then direct command if both are aimed at the target student.
- Teacher: "Ryan, are you seated?" - code as question not teacher acknowledgement or indirect command

*Do not code vague statements such as, "Okay?" and "Right?" as questions.

*Teacher saying something like, "This stands for ___" and expecting the target student to respond should be coded for the teacher as a question, and the student's behavior as prosocial talk if he/she responds appropriately.

* If the initial statement is framed as a question, code additional prompts as questions if the

target child responds to one. For example, “Who wants to read paragraph 5?” followed by paragraph 6, 7, etc., code as a "question" when the child responds.

7. Teacher Acknowledgement³

Definition: A brief verbal response to the target student about his/her behavior that ensures the student is aware that the teacher values his/her contribution. This code includes reflective statements as well as descriptive comments of the student’s behavior. Teacher acknowledgements that acknowledge the target student in a positive way but that are delivered to the group (e.g., “I like how Sarah is sitting quietly.”) should be coded as a teacher acknowledgment.

Brief acknowledgments are brief verbal responses to target student’s behavior.

Examples of brief acknowledgments:

- “Yes,” (e.g., when the student says, “Ms. ____?” And the teacher says, “Yes,” code as a teacher acknowledgment)
- “Yes,” when made in response to a student contribution (e.g., reading something)
- “Okay.”
- “Really?”
- “I see.”
- “Hmm?”
- “Uh-huh.”
- To the class- “I like how Sarah is sitting quietly.”
- To the class- “Like Sarah just answered...”
- To the class- “Jared is trying to read. You should be listening to him.”---shows his contribution is valuable; code each time Jared is acknowledged by the teacher
- Calling on the student when he/she raises her hand (most likely code as student positive gesture, teacher acknowledgment, and then student prosocial talk as long as no other codes take priority)

Reflective statements reflect all or part of a preceding statement made by the target student. It may exactly mirror the child’s statement or only contain some of the words, but the message is the same.

Examples of reflective statements:

- Student: “I can’t figure out this math problem!”
- Teacher: “You can’t figure out the problem?”
- Student: “I hate this project!”
- Teacher: “You really don’t like this project.”
- When the student answers a question and the teacher repeats their answer

Descriptive comments are comments in which the teacher verbally describes the target student’s actions.

Examples of descriptive comments:

- Teacher: “You’re solving that problem.”
- Teacher: “You’re working together.”
- Teacher: “You know your letters.”
- Teacher: “You are smiling.”
- Teacher: “You’re doing that fast.”

*If the teacher and the target student engage in a verbal interaction that you cannot hear, code the teacher behavior as teacher acknowledgment and the child behavior as child prosocial talk once if other codes (e.g., priority order codes) cannot be coded.

*Code neutral and positively framed corrections to a student's contribution as a teacher acknowledgement (I.e., use this code if the correction is not clearly negative).

Teacher Behavior Codes: Physical Behaviors

1. Negative Touch^{1,2,3}

Definition: Any physical touch that is intended to be directive, antagonistic, aversive, hurtful, or restrictive of the child’s activity.

Examples:

- Pushing the child
- Physically moving the child somewhere
- Physically restraining the student from moving somewhere
- Physically moving the child’s arm
- Moving the child's arm to the table (i.e., a directive movement)

2. Positive Touch^{1,2,3}

Definition: Any intentional neutral or positive physical contact between the teacher and the child.

Examples:

- Putting arm around child
- Patting child’s arm
- Giving the child a high five
- Patting the child’s head/ shoulder/ hand
- Ruffling the child's hair

Teacher Behavior Codes: Gestures

1. Negative Gesture²

Definition: Any negative, nonverbal gesture aimed at the target student. This code includes physical gestures that are threatening or abusive. This code includes all negative,

noncontact communication, including physical damage on an object by hitting, throwing, etc. when directed at the student (i.e., using an object as a weapon directed at the student). It also includes negative nonphysical contact (i.e., they do not physically touch each other). Don't code gestures made toward the group.

Examples:

- Frowning at the student
- Glaring at the student
- Moving the child's desk or chair while he/she is in it (but still expected to be in the group)
- Fingers to lips and saying "shh" to the target student- code as negative gesture (even if no frown/glare because it's still an expression of disapproval) and negative talk (code simultaneous behavior if they occur at exactly the same time)

*Making a physical hand gesture implying the child should sit up (or do something) does not fit this "negative gesture" code- code this as an indirect command.

2. Positive Gesture^{2,3}

Definition: Any warm, positive nonverbal gesture aimed at the target student. Don't code gestures made toward the group.

Examples:

- An encouraging nod directed at the student
- Smiling at the student
- Giving the thumbs up sign to the student
- If the teacher/student hands something to the other, code positive gesture for both in the order that the item was passed if they both touch it.
- Do not code modeling (e.g., letter writing) as a gesture.
- Handing the student something he/she needs (e.g., an eraser). – positive gesture for both if the student accepts it
 - If the teacher puts something on the student's desk instead of handing it to him/her; only code the teacher's behavior as a positive gesture (or vice versa)

*Neutral instructional gestures should not be coded as positive or negative.

Examples:

- Pointing in book to where target student is reading
- Pointing to the child's seat
- Neutral gestures accompanying commands (code the command though)

Teacher Behavior Codes: Response Behaviors to Questions

1. Answering a question¹

Definition: The teacher verbally or nonverbally responds to a student's question within 5 seconds.

Examples:

- Student: "Where is my book?"
- Teacher: "Your book is in your desk."
- Student: "How do I solve that problem?"
- Teacher: "You solve it by..." (shows the student or explains it)

2. Ignoring a question^{1,3}

Definition: The teacher does not directly respond to a student's question within 5 seconds.

Examples:

- Student: "How do I do that?"
- Teacher: No response

- Student: "Where is my book?"
- Teacher: No response directed at the student

- Student: "Ms. King?" (to get her attention)
- Teacher: Ms. King ignores verbal statement and moves on (e.g., says something to the class)

*If the student raises his/her hand and is not called on within 5 seconds, do not code teacher behavior as ignoring a question (but code the student behavior).

Teacher Behavior Codes: Response Behaviors to Questions

1. Use of a Reductive Technique^{2,3}

Definition: The teacher withdraws privileges, opportunities for social interaction or other types of reinforcement, points or tangible items/objects from the student or isolates the student from class.

Examples:

- Time out when the child is first sent to time out
- Safe seat when the child is first sent to the safe seat
- Send the child to the office
- Telling the child to move to a different seat (reductive technique)
- Telling the child to go to leave an activity/group (reductive technique)
- The teacher removes something the child was holding

- The teacher takes a token (e.g., ticket, coin, sticker) away from the child

2. Provides a Positive Tangible Consequence²

Definition: The teacher provides the student with a tangible reward or special privileges.

Examples:

- Stickers
- Points
- Toys
- Computer time
- Line leader

*If teacher commands target student to "clip up" or "clip down" code as simultaneous teacher behavior for direct command and use of reductive technique/positive tangible consequence ("clip down" = reductive and "clip up" = positive). Then code the target student behavior as either positive or negative academic behavior (whether or not they do it). If teacher clips the target student up or down themselves only code as use of reductive technique or positive tangible consequence.

STIM Student Behavior Codes and Definitions

	Code	Definition
Verbalizations	Prosocial Talk ^{1,3} (+)	All statements that positively evaluate an attribute, product, or behavior of the teacher (especially or generally); describe the teacher's behavior, provide neutral information; reflect the teacher's verbalization; and acknowledge the teacher. Positive statements made towards the teacher are coded as prosocial talk. Neutral and positive questions are also coded as prosocial talk. Answering a teacher's question should be coded as prosocial talk.
	Negative Talk ^{1,2,3} (-)	A verbal expression of disapproval of the teacher's attributes, activities, products, or choices. Negative talk can include sassy, sarcastic, and rude statements. Negative/sarcastic questions are coded as negative talk.
Physical Behaviors	Negative Touch ^{1,2,3} (-)	Any physical touch that is intended to be directive, aversive, hurtful, or restrictive to the teacher's activity.

	Positive Touch ^{1,3} (+)	Any intentional neutral or positive physical contact between the teacher and the child.
Gestures	Negative Gesture ² (-)	Any negative, nonverbal gesture directed at the teacher. This code includes physical gestures that are threatening or abusive and directed at the teacher. This code includes all negative, noncontact communication, including physical damage to an object by hitting, throwing, etc. when aimed at the teacher (i.e., using an object as a weapon directed at the teacher).
	Positive Gesture ^{2,3} (+)	Any neutral or positive nonverbal gesture aimed at the teacher.
Response Behaviors	Positive Academic Behavior ^{1,2,3} (+)	Compliance. Positive academic behavior should not be coded if the student continues an activity in an effort to ignore the teacher. Code positive academic behavior if the child begins to comply with a teacher command within 5 seconds.
	Negative Academic Behavior ^{1,2,3} (-)	Noncompliance and/or ignoring the teacher. Code negative academic behavior if the child does not start to comply to a teacher command within 5 seconds.

Sources: (1) Eyberg, S. M., Nelson, M. M., Duke, M. & Boggs, S. R. (2009). *Manual for the parent-child interaction coding system* (3rd ed.). Retrieved from <https://www.researchgate.net>; (2) Sheridan, S. M. (n.d.). *CBC in rural communities: Project codebook*. Unpublished manuscript, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln, Lincoln, NE.; (3) Martin-Forbes, P. (n.d.). *The teacher-pupil observation tool (T-POT): Coding manual*. Unpublished manuscript.

Student Behavior Codes: Verbalizations

1. Negative Talk^{1,2,3}

Definition: A verbal expression of disapproval of the teacher's attributes, activities, products, or choices. Negative talk can include sassy, sarcastic, and rude statements. Negative/sarcastic questions are coded as negative talk. Interrupting the teacher should be coded as negative talk.

Examples:

- Student: "You're mean."
- Student: "Why don't you leave me alone?"
- Student: "Stop, stop, stop!"
- Student: "You suck."
- Student: "You're not fair!"
- Making an excuse
- Counter-commanding
- Arguing
- Blurting something to the teacher while the teacher is talking

2. Prosocial Talk^{1,3}

Definition: All statements that positively evaluate an attribute, product, or behavior of the teacher (especially or generally); describe the teacher's behavior, provide neutral information; reflect the teacher's verbalization; and acknowledge the teacher. Positive statements made towards the teacher are coded as prosocial talk. Neutral and positive questions are also coded as prosocial talk. Answering a teacher's question (verbally or nonverbally like nodding/shaking head) should be coded as prosocial talk.

Examples:

- Student: "Hi!"
- Student: "Okay."
- Student: "I need my book."
- Student: "Where should I write that?"
- Student: "We made that look good."
- Student: "You're nice."
- Teacher: "Are there any more pieces to clean up?"
- Student: "6 pieces."

Decision Rules for Student Verbalization Codes¹:

- If unsure if a statement is "Negative Talk" or "Prosocial Talk," code "Prosocial talk."

*If teacher asks a question and student responds = prosocial talk. If teacher makes a command and student follows direction = positive academic behavior. Do not code simultaneous behavior.

Student Behavior Codes: Physical Behaviors

1. Negative Touch^{1,2,3}

Definition: Any physical touch that is intended to be directive, aversive, hurtful, or restrictive to the teacher's activity.

Examples:

- Hitting the teacher
- Pulling the teacher's arm towards the door
- Knocking the teacher's hand and making something fall
- Snatching something out of the teacher's hand

2. Positive Touch^{1,3}

Definition: Any intentional neutral or positive physical contact between the teacher and the child.

Examples:

- Putting an arm around the teacher (code only for student if teacher does not reciprocate)
- High fiving the teacher (code positive touch for both)
- Gently touching the teacher (e.g., while playing Legos)
- Affectionate touches

Decision Rules for Student Physical Behavior Codes¹:

- If unsure if physical contact has occurred, do not code "Negative Touch" or "Positive Touch."
- When uncertain if the contact has been positive or negative, code "Positive Touch."

Student Behavior Codes: Gestures

1. Negative Gesture²

Definition: Any negative, nonverbal gesture directed at the teacher. This code includes physical gestures that are threatening or abusive and directed at the teacher. This code includes all negative, noncontact communication, including physical damage to an object by hitting, throwing, etc. when directed at the teacher (i.e., using an object as a weapon directed at the teacher).

Examples:

- Throwing a Lego at a teacher
- Throwing a pencil at a teacher
- Animal noises/grunts directed at the teacher
- Frowning at the teacher
- Glaring at the teacher

*Do not code arm crossing as we do not know if it is directed at the teacher.

2. Positive Gesture^{2,3}

Definition: Any warm, positive nonverbal gesture directed at the teacher.

Examples:

- Smiling at the teacher
- Giving a thumbs up sign to the teacher
- Raising hand (student-initiated)
- Student hands teacher paper, teacher takes paper- code positive gesture for student (student-initiated behavior) and positive gesture for the teacher (teacher response to gesture)

*If the child says “yes” and does a celebratory gesture to himself/herself, do not code.

*If the child raises his/her hand in response to a teacher question, code positive gesture immediately even if the teacher does not respond right away.

*Hand raising should be coded multiple times as a child behavior if it happens in response to a codable teacher behavior:

Hand raising scenario 1: Child thinks up a question and raises his/her hand. Wait to code until the teacher responds. Do not code as teacher ignoring if the teacher does not respond within 5 seconds.

Hand raising scenario 2: Teacher asks a question, child has hand up. Teacher calls on someone else and then asks a new question. Student still has hand up. Code teacher question and then student positive gesture. Then teacher question, and student positive gesture.

Student Behavior Codes: Response Behaviors

1. Positive Academic Behavior^{1,2,3}

Definition: Compliance. Positive academic behavior should not be coded if the student continues an activity in an effort to ignore the teacher. Code positive academic behavior if the child begins to comply with a direct or indirect teacher command within 5 seconds.

Examples:

- Taking out a book within 5 seconds of being told to do so (if the command is said directly to the target child)

*When a teacher says, “Raise your hand if X” (i.e., directly or indirectly *commanding the child’s response gesture*,” code positive academic behavior if the child raises their hand *not* positive gesture.

*If the teacher repeats a command but the student has already complied with the instruction, code the command and the child's response.

*If the teacher gives a sequence of commands and the child has no opportunity to respond between commands, do not code any child behaviors until the child has an opportunity to respond. Then, code positive or negative academic behavior once if he/she begins or fails to begin any of the instructions within 5 seconds of the sequence ending. Do not code positive academic or negative academic behavior multiple times in this case.

*If teacher asks a question and student responds = prosocial talk. If teacher makes a command and student follows direction = positive academic behavior. Do not code simultaneous behavior.

*Do not code the following responses to group cues from the teacher:

- Response to a classroom-wide teacher attention cue (e.g., teacher clap, student clap back)
- Teacher call, student response (e.g., teacher "bababa," student "bababa")

*Code responses to negatively framed commands (i.e., commands coded as "negative talk") as positive or negative academic behavior depending on the student's response within 5 seconds to that command.

2. Negative Academic Behavior^{1,2,3}

Definition: Noncompliance and/or ignoring the teacher. Code negative academic behavior if the child does not start to comply to a teacher command within 5 seconds.

Examples:

- Ignoring the teacher's command
- Refusing to obey
- Not beginning to do what the teacher instructed the child to do within 5 seconds
- Ignoring the teacher when directly asked a question (i.e., noncompliance to a direct question)

*Code responses to negatively framed commands (i.e., commands coded as "negative talk") as positive or negative academic behavior depending on the student's response within 5 seconds to that command.

STIM Coding Rules

STIM Coding Process

1. Code all teacher and student behaviors in CBC videos (i.e., step 1) as soon as they occur. Check reliability for those codes.
2. Then, code student-teacher interactions. Check reliability for interactions.

Step 1 Instructions for Coding Teacher and Student Behaviors

The Four Classes of Behavior

- Verbalizations
 - a. Teacher- negative talk, direct command, indirect command, specific praise, unlabeled praise, question, teacher acknowledgement
 - b. Student-prosocial talk, negative talk
- Physical Behaviors
 - a. Teacher- negative touch, positive touch
 - b. Student- positive touch, negative touch
- Gestures
 - a. Teacher- negative gesture, positive gesture
 - b. Student- positive gesture, negative gesture
- Response Behaviors
 - a. Teacher-
 - i. Type 1- answering a question, ignoring a question
 - ii. Type 2- use of a reductive technique, positive tangible consequence
 - b. Student- positive academic behavior, negative academic behavior

The Priority Order

- When a teacher or student engages in behaviors from different categories simultaneously, the coder will use the code “simultaneous positive teacher behavior,” “simultaneous negative teacher behavior,” “simultaneous unmatched teacher behavior,” “simultaneous positive student behavior,” “simultaneous negative student behavior,” or “simultaneous unmatched student behavior” and add a comment about which behaviors were simultaneously occurring. Behaviors that co-occur often will be added to the coding scheme later.
 - Examples of each type of code:
 - Simultaneous positive teacher behavior: positive touch and specific praise
 - Simultaneous negative teacher behavior: negative touch and negative talk
 - Simultaneous unmatched (i.e., tone of bx does not match) teacher behavior: question with negative touch
 - Simultaneous positive student behavior: prosocial talk and positive touch
 - Simultaneous negative student behavior: negative talk and negative touch

- Simultaneous unmatched (i.e., tone of bx does not match) student behavior: prosocial talk with a negative gesture
- When a behavior contains elements of more than one category within a class of behavior, only one category will be coded. For example, “Aren’t you working hard on that problem!” has elements of two categories in the verbalization class (*labeled praise* and a *question*). A priority order has been established that lists the categories for each class in the order of their importance (adapted using DPIC parent-child interaction priority). Thus, in this example, the priority order indicates that praise takes precedence over the question code.

The Complete Thought Rule

- One unit of behavior is defined by a complete thought, which is often expressed as a sentence, and is considered one behavior. In conversation, however, people do not speak in complete, grammatically correct sentences. Rather, they may name a series of objects or say short phrases. Sentence fragments that do not contain independent meaning are not considered complete thoughts and, consequently, are not coded as separate verbalizations. However if an initial sentence fragment (e.g., This is a...) is completed (that is, the thought is finished) after a pause of any length, the entire sentence is coded as one verbalization as long as there has been no intervening verbalization during the pause.

Talking to Oneself

- Verbalizations must be directed to the other person in the teacher-child dyad to be coded. If the speaker is clearly speaking to him or herself, the verbalization is not coded.

Coding Yes and No

- The words “yes” and “no” are coded independently (as teacher acknowledgment, response to question, or negative talk) whether they occur alone or at the beginning of a sentence. The remainder of the sentence, if any, is then coded in its appropriate category.

Co-occurring Teacher and Student Behaviors

- If it is unclear who initiated the interaction, code the teacher behavior before coding the student behavior. This rule was created to increase sequential inter-rater reliability between coders.
 - Example: Code the teacher behavior first if it is unclear who initiated a high five between the teacher and the target student.

Priority Order for Teacher Behaviors

Classes of Behavior	Priority Order
Verbalizations	Negative Talk Direct Command Indirect Command Specific Praise Unlabeled Praise Question Teacher Acknowledgement
Physical Behaviors	Negative touch Positive touch
Gestures (not in DPICS)	Negative gesture Positive gesture

Note. The categories in the classes “Response Behaviors to Questions” and “Consequence Response Behaviors” cannot occur simultaneously.

Table 4

Priority Order for Student Behaviors

Classes of Behavior	Priority Order
Verbalizations	Prosocial Talk Negative Talk
Physical Behaviors	Negative touch Positive touch
Gestures (not in DPICS)	Negative gesture Positive gesture

Note. The categories in the class “Response behaviors” cannot occur simultaneously

Step 2 Instructions for Coding Student-Teacher Interactions:

Code any student-teacher and teacher-student behaviors that occur within 10 seconds of each other as positive, negative, or unreciprocated.

- Positive interactions- the teacher and the student engage in positive behaviors within 10-seconds
- Negative interactions- the teacher and the student engage in negative behaviors within 10-seconds
- Unreciprocated interactions- the tone of student-teacher and teacher-student behaviors occurring within 10-seconds does not match (e.g., teacher positive to student negative; teacher negative to student positive)

Note: The STIM’s step 1 coding rules have been adapted from the Dyadic Parent-Child Interaction Coding System (DPICS) coding rules.

Source: Eyeberg, S. M., Nelson, M. M., Duke, M. & Boggs, S. R. (2009). *Manual for the parent-child interaction coding system* (3rd ed). Retrieved from <https://www.researchgate.net>