Program and Teacher Characteristics Predicting the Implementation of Banking Time with Preschoolers Who Display Disruptive Behaviors

**Amanda P. Williford · Catherine Sanger Wolcott ·
Jessica Vick Whittaker · Jennifer Locasale-Crouch**

Abstract This study examined the relationship among baseline program and teacher characteristics and subsequent implementation of *Banking Time*. Banking Time is a dyadic intervention intended to improve a teacher's interaction quality with a specific child. Banking Time implementation was examined in the current study using a sample of 59 teachers and preschool children displaying disruptive behaviors in the classroom (~three children per classroom). Predictors included preschool program type, teacher demographic characteristics (personal and professional), and teacher beliefs (self-efficacy, authoritarian beliefs, and negative attributions about child disruptive behavior). Multiple measures and methods (i.e., teacher report, consultant report, independent observations) were used to assess implementation. We created three implementation composite measures (dosage, quality, and generalized practice) that had high internal consistencies within each composite but were only modestly associated with one another, suggesting unique constructs of implementation. We found that type of preschool program was associated with dosage and quality. Aspects of teacher demographics related to all three implementation composites. Teacher beliefs predicted dosage and generalized practice. Results suggest that the factors that predict the implementation of Banking Time vary as a function of the type of implementation being assessed.

Keywords Implementation · Early childhood · Teacher-child relationships · Teacher beliefs

A. P. Williford (✉) · C. S. Wolcott · J. V. Whittaker ·
J. Locasale-Crouch
Center for Advanced Study of Teaching and Learning, University of
Virginia, Charlottesville, VA 22908-0784, USA
e-mail: apw2c@virginia.edu

Children who display early disruptive behaviors (e.g., hyperactivity, impulsivity, low frustration tolerance, noncompliance, anger) are at risk for both short- and long-term negative outcomes. Preschool children with these types of behavior problems are expelled from classrooms three times more often than K-12 students exhibiting similar behavioral problems (Gilliam 2005). Children who display high levels of disruptive behaviors exhibit less close and often conflictual relationships with teachers (Buyse et al. 2008), more negative interactions with their peers (Ramani et al. 2010), and less engagement with learning tasks and activities (Bulotsky-Shearer et al. 2011). This lack of positive engagement in the classroom context is linked with an escalation of behavior problems, less social competence, and greater academic difficulty as children enter into elementary and secondary grades (e.g., Ladd et al. 1999).

Developmental theory and prevention science indicate that early treatments for emerging problems, compared with later interventions, are more likely to interrupt the stabilization of behavioral, emotional, and social problems, thereby increasing children's likelihood of positive school success (Kazdin and Weisz 2003). And yet, even though well-validated approaches to support children's social-emotional competence are available, teachers continue to indicate that addressing challenging behaviors is the area in which they most need additional training (Hemmeter et al. 2006). Thus, the fields of early education and prevention science need additional focus and research to address factors that are supports or barriers to implementing effective preschool/childcare-based intervention and prevention programs. In the current study, we examined whether a set of classroom and teacher factors predicted the implementation of a teacher-child, relationship-based intervention designed to improve young children's emotional and behavioral outcomes.

Interventions Focused on Teacher-Student Relationship Quality

The quality of relationships that students form with their teachers has been repeatedly linked with students' academic and social-emotional outcomes (Sabol and Pianta 2012). High-quality teacher-student relationships are most often characterized by high levels of warmth, sensitivity, and responsiveness and low levels of dependency, negativity, and conflict (Sabol and Pianta 2012). The teacher-student relationship is protective for children who display behavior problems (Baker et al. 2008). Because children who display behavior problems often engage in conflictual interactions with their teachers, a positive relationship with a teacher can help prevent coercive cycles, thereby decreasing children's negative behavior and increasing prosocial behavior and achievement (Doumen et al. 2008).

Banking Time is a dyadic intervention intended to improve a teacher's relationship with a specific child. Banking Time is directly adapted from parent training interventions that focus extensively on increasing parents' sensitivity and responsiveness (e.g., Brinkmeyer and Eyberg 2003). The intervention is called Banking Time because when a teacher invests in a relationship with a child, that relationship can become a resource in the classroom for both the child and the teacher during times of challenge (e.g., when the child is struggling within a learning or social activity). The links between teachers' implementation of Banking Time and children's outcomes have been examined in two studies of preschool teachers serving low-income preschool children. First, in the context of a larger intervention study, all participating preschool teachers (N=252) within a diverse sample of state-funded preschool programs in an eastern state were provided information to implement Banking Time with children selected for the study (N=1064 children; ~4 per classroom; Driscoll et al. 2011). Results indicated that voluntary implementation of Banking Time (24 % of teachers chose to implement) was linked with higher teacher-child closeness. And, teachers implemented Banking Time more frequently with children who displayed disruptive behavior or who were from poor backgrounds. In a subsequent study, 29 Head Start teachers were randomly assigned to Banking Time or a business as usual condition. The sample included 116 children (4 per classroom). Teachers assigned to the Banking Time condition reported increased relationship closeness, child frustration tolerance, task orientation, and competence and decreased conduct problems (Driscoll and Pianta 2010).

Banking Time is well-suited to be used in classrooms at scale as it is delivered by the teacher and designed to take place in short increments of time during the school day. Teachers spend 10–15 min of individual time with a student, two to three times a week. Integral to the Banking Time intervention is a consultation model providing implementation support to the teacher, which can be filled through a variety of personnel including school psychologists, guidance counselors, and supervisory or mentoring teachers. Understanding the factors that are linked with teachers' implementation of Banking Time can help determine how and why some teachers are ready to uptake and benefit from interventions. This knowledge can help determine how and when to provide support to improve implementation.

Intervention Implementation

The field of prevention science has called for a better understanding of both the factors that influence intervention implementation and how implementation affects program outcomes (e.g., Damschroder et al. 2009; Domitrovich and Greenberg 2000). Without information about implementation, it is impossible to understand the mechanisms by which interventions may impact outcomes, thereby preventing the advancement of knowledge for program replication and diffusion (Knoche et al. 2010). Although some progress has been made in understanding program implementation, more work that focuses on how to monitor and measure implementation is needed. For instance, implementation studies have most often only examined one aspect of implementation (Durlak and Dupre 2008). We examined several dimensions of teachers' implementation of Banking Time.

Implementation quality has been defined in a variety of ways, and currently, there is a lack of consensus regarding which dimensions are most important. Recent conceptual models describe implementation as the processes that need to occur for an intervention to be used within an organization (Damschroder et al. 2009; Durlak and Dupre 2008). Frequently examined aspects of implementation include *dosage*, which refers to how much of an intervention is delivered, and *quality of delivery*, which refers to how well different intervention components are implemented (Durlak and Dupre 2008). A less often examined but critical aspect of implementation (sometimes included as an aspect of implementation quality) is *generalization of practice*, which is defined as the extent to which the intervention components are extended into interactions or activities that are not part of the formal intervention delivery (Domitrovich et al. 2010). For many classroom-based interventions, improved child outcomes are expected to occur through the teacher's ability to generalize strategies outside of the training situation (e.g., Blair et al. 2010). We know very little about the factors that are related to early childhood teachers' generalization of intervention practice (Sheridan et al. 2009).

Previous work examining implementation of Banking Time indicated that with respect to dosage, teachers were able to conduct sessions at the requested frequency (i.e., two to three times a week). Prior work has not examined the quality

of teacher's Banking Time implementation but did explore generalized practice. Driscoll and Pianta (2010) found that Banking Time teachers generalized Banking Time techniques (e.g., following a child's lead) to structured interactions outside of Banking Time sessions. In order to extend this prior work, we examined multiple indicators of implementation that assessed dosage, quality of delivery, and generalized practice using a multi-method approach that included teacher and consultant report as well as independent observation. We expected that these aspects of implementation would be moderately associated with one another. As an example, even though we expected dosage to be positively related to quality, we anticipated that some teachers may have provided high dosage of Banking Time but with lower quality and little generalization. We then examined teacher and school factors that predicted these different aspects of implementation.

Factors Linked with Implementation

Several comprehensive reviews provide useful frameworks for understanding and organizing the factors that may be linked with intervention implementation (Aarons et al. 2011; Damschroder et al. 2009; Durlak and Dupre 2008). These models underscore the myriad of factors that occur at multiple levels (e.g., school, teacher) and interact to impact implementation. We selected a limited number of teacher and program factors that we hypothesized would be relevant in understanding the implementation of this intervention. In this study, we focused on the type of preschool program within which the teacher taught, key teacher demographics, and multiple aspects of teacher beliefs. Below, we describe our rationale for choosing these variables to predict teachers' implementation of Banking Time.

Type of Preschool Program Variability in intervention participation has been attributed to the type of center (i.e., Head Start or private child care; Baker et al. 2010). In a study that examined implementation of a social-emotional and academic program targeting school readiness, Baker et al. (2010) found that Head Start teachers were less likely than teachers in community centers to implement the intervention. Researchers speculated that this may have been because teachers in Head Start must fulfill multiple federal requirements, and therefore, implementing a new program may have been especially difficult given teachers' competing demands. In addition, center characteristics have been tied to quality (Blau 2000), which may be related to implementation via shared factors that are important for both implementation and classroom quality. For example, policies (e.g., regulations, state laws) have been shown to relate to implementation (Domitrovich et al. 2010), and these factors have also been associated with preschool classroom quality (Mashburn et al. 2008). In an investigation

of the relation between center characteristics and program quality, Blau (2000) found that centers that received public subsidies for maintaining certain standards of care displayed higher quality than for profit, privately run, or non-profit preschools. We implemented Banking Time in classrooms that were part of Head Start, state-funded pre-K, and private programs. Given previous research on classroom quality and implementation, we predicted that teachers working in state-funded preschools would evidence better implementation compared to teachers working in Head Start or privately run preschool programs.

Teacher Demographics Teacher socio-demographics, such as years of experience, specialization in early childhood, and race/ethnicity, were hypothesized to possibly relate to uptake of the Banking Time intervention. Existing research examining the association between teacher experience and implementation has shown inconsistent findings (e.g., Baker et al. 2010 vs. Morris et al. 2013). However, we hypothesized that less experienced teachers may be more willing to uptake a new strategy in their classroom (Morris et al. 2013). Because Banking Time is a child-centered intervention, we expected teachers whose education did not include a focus on early childhood might be less likely to uptake the intervention. We found little research examining the extent to which teacher race/ethnicity was linked with intervention implementation in early childhood. However, because Banking Time is directly adapted from parent training interventions where research has indicated that parents of minority ethnicity show lower levels of engagement in parent training (Lau 2006), we wanted to examine whether teacher ethnicity was related to implementation of Banking Time.

Teacher Beliefs Teachers' perceptions of teacher-child relationships are influenced by their own personal characteristics (e.g., Mashburn et al. 2006; Spilt et al. 2012). Given the explicit focus on Banking Time to improve child disruptive behavior through strengthening the teacher-child relationship, we expected that teachers' existing belief systems (i.e., authoritarian beliefs, efficacy, attributions) might be associated with their implementation of Banking Time. We expected that teachers who were more child-centered in their beliefs would be more responsive to Banking Time, which is consistent with other research examining interventions focused on improving teacher-child interactions (Downer et al. 2009). With regard to teaching self-efficacy, research suggests that higher teaching self-efficacy is related to more positive perceptions of the teacher-child relationship (Spilt et al. 2012) and high-quality program implementation (Kallestad and Olweus 2003). Thus, we hypothesized that teachers with higher levels of teaching efficacy would be more open to implementing an intervention focused on improving the teacher-child relationship. Finally, recent research found that teacher-reported negative

attributions were linked with less supportive teacher interactions, lower perceptions of teacher-child relationship closeness, and more negative discipline practices (Carter et al. 2014). Given this, we hypothesized that teachers who endorsed more negative attributions might be less likely to implement an intervention that was focused on improving the teacher-child relationship, emphasized that the child lead the session, and did not encourage traditional behavior management strategies.

In sum, the current study examined the relations among multiple program and teacher characteristics collected at baseline and subsequent implementation of Banking Time. We investigated multiple predictors of implementation including the organizational setting of type of preschool program, teacher demographics and educational background, and teacher beliefs.

Method

Participants

Data were collected as part of a larger randomized control trial examining the impact of Banking Time to improve children's social-emotional outcomes. Teachers (N=173) were randomly assigned to one of three treatment conditions (Intervention— Banking Time, time-control comparison, business-as-usual). The current sample included the 59 teachers who were assigned to the Banking Time condition and who were active participants at the time when the intervention work started (about 6 weeks into the school year). Six teachers who were randomly assigned to the Banking Time condition were excluded because they attrited from the study before starting the intervention. Teachers were mostly female (94.7 %) and averaged 40.38 years of age (SD=11.91). Most teachers (67.8 %) reported having a bachelor's degree or higher (M education years=15.51, SD=1.56) and had on average 8.54 years of experience teaching prekindergarten (SD=7.15). Teachers' racial/ethnic composition was 49 % White, 42 % Black, 3.5 % Hispanic, and 5.5 % multi-racial or another ethnicity.

Procedures

Recruitment of preschool programs (Head Start, state-funded public, and private [for- and not-for-profit]) occurred in three urban or semi-urban southeast regions. Programs were contacted by email, phone, and/or in person. If a director agreed to allow teachers to participate, research staff met with teachers, described the project, and asked them to participate. Programs varied in size (range=1–6 preschool classrooms/ building). Teachers who agreed to participate signed an informed consent form and were randomized into conditions.

Teachers allowed data collectors access to their classrooms for observations, completed surveys, and assisted in obtaining parental consent. All parents or guardians of children in each participating classroom (M=15 students, SD=3.2) were given a letter explaining the study, an informed consent form, and a short family demographic survey, which they completed and returned to their child's teacher (76 % of parents agreed to participate). Teachers rated all children in their classroom on two disruptive behavior rating scales (ADHD Rating Scale-IV, DuPaul et al. 1998; oppositional defiant disorder (ODD) Rating Scale, Hommersen et al. 2006). The two boys and one girl who had the highest teacher ratings of disruptive behavior (ADHD and ODD combined) and who also had caregiver consent participated in the remainder of the study (88 % of selected children were rated by their teachers as the two boys or one girl evidencing the most disruptive behavior). Children were then randomly assigned to receive the treatment during one of three, 7-week treatment windows. Data were collected at four points during the year: (a) before window 1/baseline, (b) after window 1/before window 2, (c) after window 2/before window 3, and (d) after window 3/end of year. Before any intervention began at baseline, classroom and teacher characteristics were collected via teacher report. Teacher implementation data was collected during or immediately after each treatment window via teacher report, consultant report, or observation.

Intervention Banking Time sessions are a set of time-limited (10–15 min), one-on-one meetings between a teacher and a child that take place within the school setting and occur two to three times per week. For the current study, teachers implemented Banking Time with one child at a time for seven consecutive weeks during his/her selected window (~three children total). Teachers were instructed to find time that they could work with the child privately (e.g., have another staff member substitute for the teacher so the teacher could have an individual Banking Time session in a library or break room). During each Banking Time session, a teacher and child participated in an activity that was supposed to be chosen and led by the child. Teachers were instructed to implement critical skills designed to improve the quality of teacher-child interactions: (a) observing the child's behaviors and expressed emotions, (b) narrating the child's actions and allowing the child to lead the activity, (c) accurately labeling the child's feelings and emotions to understand the child's perspective, and (d) developing relational themes to focus on important aspects of the teacher-child relationship. Teachers were also instructed to limit questioning and refrain from teaching skills during the session.

Implementation Support Teachers were provided with a site-specific consultant to increase the likelihood that the teacher fully implemented Banking Time. Immediately after baseline

data collection, consultants met individually with each teacher for about 1.5 h, at which time they provided teachers with a Banking Time teacher manual and briefly described the intervention. Following this interaction, teachers and consultants had a face-to-face meeting once every 2 weeks and a brief phone meeting on the alternate weeks. The focus of in-person and phone meetings was to ensure that teachers fully implemented the Banking Time intervention. Initially, consultants supported teachers' implementation by helping them problem-solve how to fit Banking Time into their daily teaching routine so that teachers implemented at full dosage levels (three times per week). Throughout the year, teachers videotaped an individual Banking Time session once a week and sent this footage to their consultant. The consultant reviewed and rated this footage (see "Measures" section for details) and used short clips from this footage in the face-to-face meetings in order to improve the teacher's implementation and address any questions or concerns. The phone meetings were check-ins used to make sure that teachers were on track with implementation and provided teachers with an opportunity to problem-solve with the consultant.
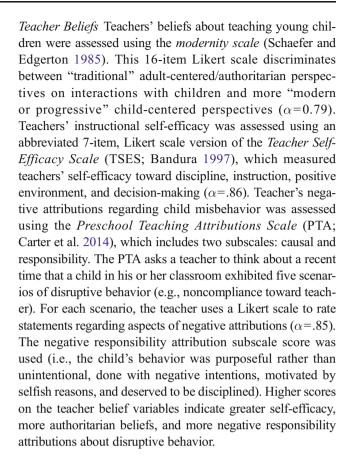
This study employed four Banking Time consultants across three sites, with one site using two consultants. All consultants had a master's degree in education or psychology and had early childhood experience. Consultants received intensive training before starting their work with teachers that consisted of 1 week of onsite training and additional offsite training. In addition, consultants participated in weekly group and individual supervision throughout the year led by a supervisor who had extensive early childhood experience and prior training in Banking Time to ensure that consultants were providing accurate information in their support of teachers. The supervisor regularly selected teachers' tapes of Banking Time sessions at random from each consultant. The supervisor then independently reviewed and rated the tape using the same coding scheme as the consultant to ensure consultant accuracy. Disagreements occurred infrequently but were discussed when they arose.

Measures

Predictors of Implementation

Program Type The type of preschool program within which each teacher worked (Head Start, state-funded, private) was collected at the time of recruitment.

Teacher Professional Characteristics In the fall, teachers completed a survey asking them to report personal and professional demographics including their race, years of experience teaching pre-K, and whether they had a degree in early childhood education.

Teacher Beliefs Teachers' beliefs about teaching young children were assessed using the *modernity scale* (Schaefer and Edgerton 1985). This 16-item Likert scale discriminates between "traditional" adult-centered/authoritarian perspectives on interactions with children and more "modern or progressive" child-centered perspectives ($\alpha=0.79$). Teachers' instructional self-efficacy was assessed using an abbreviated 7-item, Likert scale version of the *Teacher Self-Efficacy Scale* (TSES; Bandura 1997), which measured teachers' self-efficacy toward discipline, instruction, positive environment, and decision-making ($\alpha=.86$). Teacher's negative attributions regarding child misbehavior was assessed using the *Preschool Teaching Attributions Scale* (PTA; Carter et al. 2014), which includes two subscales: causal and responsibility. The PTA asks a teacher to think about a recent time that a child in his or her classroom exhibited five scenarios of disruptive behavior (e.g., noncompliance toward teacher). For each scenario, the teacher uses a Likert scale to rate statements regarding aspects of negative attributions ($\alpha=.85$). The negative responsibility attribution subscale score was used (i.e., the child's behavior was purposeful rather than unintentional, done with negative intentions, motivated by selfish reasons, and deserved to be disciplined). Higher scores on the teacher belief variables indicate greater self-efficacy, more authoritarian beliefs, and more negative responsibility attributions about disruptive behavior.

Implementation Outcomes

Implementation was assessed at the end of each window. Table 1 provides the descriptive statistics for each of the implementation variables.

Table 1 Descriptives of implementation variables, and outcome composites

Implementation variables	Minimum	Maximum	Mean	SD
Dosage				
Phone attendance	0.00	5.00	2.33	1.29
# Videos submitted	0.00	8.00	4.67	2.37
# Session notes submitted	0.00	26.00	13.30	6.76
Frequency of BT sessions	1.00	5.00	3.23	1.54
Quality				
Session quality	1.00	4.00	3.12	0.65
Engagement	1.42	5.00	3.84	1.01
Banking Time fidelity during a structured free play				
Observation	1.00	5.00	2.99	0.90
Narration	1.00	5.00	2.23	0.71
Imitation	1.00	5.00	2.37	0.76
Language to control (rev.)	1.00	5.00	3.20	1.19
Child-led	1.00	5.00	2.98	1.15

Dosage Four variables (α=.80) were aggregated to assess the amount of total dosage each teacher received in Banking Time: Three variables assessed how often teachers implemented Banking Time: (a) number of videos submitted (ideal number of videos=7). Once a week, teachers were asked to submit a video of a Banking Time session to consultants. (b) Number of session notes submitted (ideal=3×7 or 21). After each Banking Time session, teachers were asked to complete session notes that included information about the date and duration of intervention sessions. (c) Consultant ratings of the frequency that teachers implemented Banking Time. Consultants rated the frequency with which they thought each teacher engaged in Banking Time during each window on a 5-point scale ranging from 1, "never or rarely," to 4, "very frequently—three times a week for most weeks". (d) Dosage was also measured by how often teachers participated in the consultancy. Consultants kept a detailed log of all teacher contacts including the number of phone meetings during each window (ideal=3 or 4). We did not use the number of face-to-face meetings in the dosage composite for two reasons. First, almost all teachers met with their consultant at least three or four times (which was ideal) during each window (M=3.91). Second, some consultants chose to meet with teachers face to face more frequently if they felt that teachers were less engaged, and so, higher face-to-face meetings indicated lower implementation for some teachers.

Quality Two variables (r=.52) were aggregated to assess the quality of teachers' implementation of Banking Time. (a) Consultants reviewed each of their teachers' video-recorded teacher-child Banking Time sessions and rated the teacher's overall quality of implementation of Banking Time on a 4-point, Likert scale ranging from "very poor" to "good" (see "Procedures" section for more details). Quality of the teacher-child session was evaluated by consultants in terms of using the Banking Time techniques effectively (observation, narration, labeling, and relational themes), integrating techniques, and maintaining a session that was child-led by limiting questioning, teaching, and other directive language. (b) Consultants also reported on their impressions of the quality of teachers' engagement in Banking Time after each window. Consultants rated the extent to which they disagreed or agreed with statements about teachers' openness to the intervention (e.g., "This teacher is open to trying new or different strategies") and teachers' involvement during consultation sessions (e.g., "This teacher takes an active role in consultancy sessions") using 12 items rated on a 5-point, Likert scale that ranged from "definitely agree" to "definitely disagree" (α=.95).

Generalized Practice Teachers' generalized practice of Banking Time was assessed during a 3-min cleanup portion of a standardized, teacher-child interaction task. Immediately following the treatment/assessment window, trained data collectors scheduled a time to administer and video-record this task with all teachers across conditions. This standardized task was different from a Banking Time session in several ways. The task included a 7-min play session during which the teacher and child were instructed to play with a specially selected set of toys that the data collector emptied from a bin and spread out on the floor. This was followed by a 3-min cleanup session that began when the data collector stated that the child should clean up and sort the toys. This task was adapted from the mother-child interaction task developed by Egeland and Hiester (1993) and similar tasks that have been used frequently in developmental research to examine the quality of mother-child interactions (e.g., Carlson et al. 2009; Kochanska and Askan 1995). We adapted the task to examine the quality of interactions across teacher-child dyads in a standardized setting. The cleanup portion was selected because it was a situation that was outside of a Banking Time session that was designed to induce stress upon the dyad similar to situations in classrooms where teacher-child conflict may occur (e.g., child given a directive with which he/she may not want to comply). Coders blind to condition evaluated the frequency with which teachers used Banking Time strategies during this structured play task. For the current study, the following items were coded on a 5-point Likert scale ranging from very poor to good: (a) use of observation, (b) use of imitation, (c) use of overall narration, (d) use of language to control child's behavior (reverse scored), and (e) session was child-led. Correlations among the individual Banking Time techniques were positive, although there was variability in teachers' use of the individual Banking Time techniques with positive correlations among the individual indictors ranging from low to high. We used a total score across all items which evidenced adequate reliability (α=.71). Thirty-five percent of tapes were double coded, and the intraclass correlation for the composite score was .73. Validity of the measure was supported by the total score's inverse relation to independently observed teacher-child conflict in the classroom (r=−.22; p<.05) as measured by the Individualized Classroom Assessment Scoring System (inCLASS; Downer et al. 2011).

Data Analytic Plan

Data were analyzed using Mplus Version 6.1 (Muthén and Muthén 1998–2010). Missing data for any one variable ranged between 0 and 27 %. Analyses were run using maximum likelihood estimation with robust standard errors so that data analyses used all available data (i.e., 59 teachers and 160 cycles). The hierarchical/organizational structure of the data where windows (level 1) were nested within teachers (level 2) was taken into account by conducting two-level, hierarchical regressions (using type=two-level). This approach adjusts the standard errors to take into account that

windows were clustered within teachers. Each implementation outcome variable was examined in a separate model. Full models were fit and included window, site variables, teacher demographic variables, and teacher beliefs to determine the unique explanatory variance of each between-level variable. In order to determine if implementation varied across windows, we created two dummy variables where window 1 served as the reference group. All other predictors were between-level. Categorical variables were dummy coded as follows: for program type, Head Start=1 and private=1 so that state-funded preschool served as the reference group; for teacher ethnicity, minority ethnicity=1 so that White, non-Hispanic served as the reference group; for teacher major, early childhood=1 so that teachers without this major served as the reference group. Consultants were accounted for by including a series of three dummy codes.

Results

Table 2 provides the bivariate correlations of predictor and outcome variables. The implementation measures were modestly associated with one another, and the associations between the predictor variables and implementation outcome variables ranged from small to medium. Table 3 provides the results of the hierarchical models of program and teacher factors predicting aspects of Banking Time implementation. There was one effect of window/time such that teachers tended to display lower dosage during the last window compared to the first window ($B=-.26$, $SE=.11$, $p<.05$).

Dosage

Compared to teachers in state-funded preschool programs, teachers in Head Start preschool programs ($B=-.62$, $SE=.32$, $p=.05$) and teachers in private preschool programs

($B=-.44$, $SE=.18$, $p=.016$) exhibited lower Banking Time dosage, as did teachers of minority ethnicity compared to teachers of White, non-Hispanic ethnicity ($B=-.45$, $SE=.15$, $p=.003$). Teachers with an early childhood major demonstrated greater Banking Time dosage ($B=.29$, $SE=.11$, $p=.007$). Finally, teachers reporting more authoritarian beliefs exhibited higher Banking Time dosage ($B=.33$, $SE=.15$, $p=.022$).

Quality

Teachers in Head Start or private preschool programs tended to evidence lower Banking Time quality ($B=-1.18$, $SE=.38$, $p=.001$; $B=-.47$, $SE=.23$, $p=.028$, respectively) as compared to teachers in state-funded preschool programs. Teachers who were of minority ethnicity compared to teachers of White, non-Hispanic ethnicity tended to evidence lower quality ($B=-.68$, $SE=.22$, $p=.001$).

Generalized Practice

Teachers' report of negative attributions was positively associated with generalized practice ($B=.16$, $SE=.07$, $p=.023$), such that teachers who reported more negative responsibility attributions about children's disruptive behavior tended to display higher generalized practice.

Discussion

The purpose of the current study was to examine classroom and teacher characteristics that predicted teachers' implementation of Banking Time—a social-emotional intervention aimed at improving the quality of the teacher-child relationship—in a sample of early childhood teachers and preschool children. There are multiple aspects of implementation that can be measured in a variety of ways. A clear strength of this

Table 2 Bivariate correlations among predictor and outcome variables

	Minority	Yrs. exp. PK	ECmajor	Author. beliefs	Self-efficacy	Attributions	Dosage	Quality	Gen. practice
Minority	–	.04	.16	.24	.15	−.13	−.37**	−.26	−.17
Years Exp. PK		–	.11	−.09	.02	.22	−.03	.01	−.23
EC Major			–	−.04	.03	−.21	.06	.07	.12
Author. beliefs				–	−.06	.26	.06	−.08	−.05
Self-efficacy					–	.14	.10	−.14	−.14
Attributions						–	.05	−.10	.21
Dosage							–	.36**	.23
Quality								–	.39**
Gen. practice									–

Author. beliefs authoritarian beliefs, *EC major* early childhood major, *Gen. practice* generalized practice

*$p<.05$, **$p<.01$

Table 3 Predictors of implementation and their association with dosage, quality, and generalized practice

	Dosage		Quality		Generalized practice	
	B (β)	SE	B (β)	SE	B (β)	SE
Within						
Window 2	−0.14 (−0.14)	0.09	0.02 (0.02)	0.08	−0.03 (−0.02)	0.13
Window 3	−0.26* (−0.24)	0.11	0.23 (0.22)	0.13	−0.14 (−0.11)	0.15
Between						
Classroom context						
Head Start	−0.62* (−0.39)	0.32	−1.18** (−0.66)	0.38	0.04 (0.08)	0.20
Private	−0.44* (−0.32)	0.18	−0.47* (−0.30)	0.23	0.22 (0.47)	0.16
Teacher demographics						
Minority ethnicity	−0.45** (−0.32)	0.15	−0.68** (−0.44)	0.22	0.08 (0.17)	0.19
Years experience pre-K	0.00 (0.02)	0.01	−0.02 (−0.19)	0.02	−0.02 (−0.49)	0.01
Early childhood major	0.29** (0.36)	0.11	−0.07 (−0.08)	0.12	0.13 (0.48)	0.10
Teacher beliefs						
Authoritarian beliefs	0.33* (0.32)	0.15	0.04 (0.04)	0.15	−0.08 (−0.24)	0.09
Self-efficacy	0.08 (0.10)	0.10	−0.02 (−0.03)	0.11	0.03 (0.11)	0.09
Attributions	−0.01 (−0.01)	0.11	−0.21 (−0.22)	0.13	0.16* (0.57)	0.07

Dosage, Quality, and Generalized practice were run in separate two-level models with window controlled for at the within level using a series of dummy codes, where window 1 is the reference groups. Reference group for classroom context variables is the state-funded preschools. Consultants were controlled for using a series of dummy codes.*$p < .05$, **$p < .01$

work was our examination of implementation in terms of dosage (how *often* teachers engaged in the Banking Time intervention), quality (how *well* teachers engaged), and generalized practice (did teachers extend what they learned). In addition, we used a multi-method approach to assessing these implementation aspects, including teacher report, consultant report, and independent observations.

An interesting descriptive result was that the implementation components were modestly or not significantly associated with one another. Dosage was positively linked with quality, and quality was positively linked with generalized practice. However, dosage was not significantly related to generalized practice. In addition, we found differential prediction of these implementation outcomes. Together, these results underscore the multi-dimensional nature of intervention implementation and emphasize that multiple aspects of implementation need to be examined in order to determine how to best support teachers to take up and use interventions. Below, we discuss the implications associated with the differential pattern of results for predictors of dosage, quality, and generalized practice.

Our study tested an intervention within a range of preschool program types rather than within a single program type, which is more typical. This heterogeneity allowed us to examine how teachers working within different program types vary in their implementation of Banking Time. Teachers working with children in classrooms that were part of Head Start or private preschool programs were less likely to

implement Banking Time than state-funded preschool programs in terms of dosage and quality. This result may be because state-funded classrooms reside within a larger elementary school setting. As such, teachers may have been more likely to have access to a private space for teacher-child and consultation sessions, and principals and resource teachers may have been more supportive of teachers' implementation of this intervention. Alternatively, the quality of higher order contextual characteristics (e.g., administrative leadership and organization) have been found to be important for good implementation (Durlak and Dupre 2008), and these factors may have overlapped with program type in the current study. However, we did not collect data on these higher level administrative and leadership characteristics in our study. At the end of the year, we asked teachers to report whether implementing Banking Time was feasible and/or stressful and whether they had adequate support at their school/center to support their implementation. As a post hoc analysis, we looked to see if teachers' responses differed based on program type and we found no evidence of differences. Thus, more research is needed to understand why teachers in state-funded preschool programs may be better able to implement interventions such as Banking Time at greater frequency and with higher quality.

In terms of teacher demographics, we found that teachers who were of minority ethnicity tended to engage in Banking Time less often and with lower quality compared to White, not Hispanic teachers. Minority and White teachers did not differ in the extent to which they transferred Banking Time

techniques into a new setting. Researchers have expressed concern about the generalizability of interventions to diverse consumer populations (e.g., Lau 2006). These results suggest that minority teachers were less receptive to the intervention as indicated by a lower degree of dosage, perhaps indicating a lack of social validity with these teachers. Future exploration is needed to determine how to overcome barriers to engagement, including whether intervention adaptations may be needed (e.g., ethnic match with consultant; Lau 2006) to promote better uptake and implementation of the intervention. Teachers with specialization in early childhood tended to engage in Banking Time more often compared to teachers without this specialization. This is consistent with research that has shown that early childhood training is linked to quality (Pianta et al. 2005) and productivity (Blau 2000).

Our results with respect to teacher beliefs were not consistent with our hypotheses. Teachers holding more authoritarian/adult-centered beliefs tended to implement Banking Time with higher dosage, and teachers who had beliefs that a child's behavior is purposeful, motivated by selfish reasons, and deserves to be disciplined were more likely to extend Banking Time techniques outside of their sessions. Previous research has found that teachers who are most in need of an intervention may benefit the most from engagement in that intervention (Raver et al. 2008). Along these lines, perhaps for teachers who initially held more adult-centered beliefs or negative attributions about the children with whom they were working, implementation of Banking Time provided opportunities to engage in teacher-child interactions that were set up to be very different from their typical day-to-day interactions with children. The interactions during Banking Time may have provided these teachers with a view of a child that diverged from their current personal beliefs, and this juxtaposition may have been influential for these teachers and had a greater impact on their implementation. Teacher beliefs need to be examined in future implementation research to determine if our unexpected effects will hold in other studies that assess similar belief constructs.

Our study is limited by the fact that this was an observational study that explored the associations between baseline predictors and subsequent teacher implementation within a group of teachers receiving Banking Time, and thus, results cannot be interpreted causally. In addition, the sample size for this study was relatively small ($N=59$), which limited the number of factors that we could use to predict teacher's implementation of Banking Time. The small sample size also limited our power, allowing us to detect only modest associations between baseline characteristics and implementation.

In conclusion, we examined program type, teacher demographics, and teacher beliefs collected at baseline that predicted implementation of Banking Time. This dyadic intervention was designed to improve a teacher's relationship with a specific child and was implemented by early childhood education teachers with children displaying disruptive behavior. Research focused on implementation can advance our understanding of the mechanisms by which interventions impact outcomes and our knowledge of effective program replication and scalability (Domitrovich and Greenberg 2000; Knoche et al. 2010). We found that the factors that predicted Banking Time implementation varied depending upon type of implementation. This implies that teachers may need distinct types of scaffolding and support for various implementation components. This type of individualization may be the key to the successful implementation of many SEL interventions. For young children who display disruptive behavior problems, improving the teacher-child relationship can increase their early school success, as teachers may be less likely to remove them from the early childhood classroom—a reality that the research indicates happens all too frequently (Gilliam 2005). Perhaps, by individualizing supports during implementation, teachers may, in turn, be more likely to individualize their interactions to meet children's needs.

References

Aarons, G. A., Hurlburt, M., & Horwitz, S. M. (2011). Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Administration and Policy in Mental Health and Mental Health Services Research, 38,* 4–23.

Baker, J. A., Grant, S., & Morlock, L. (2008). The teacher-student relationship as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly, 23,* 3–15.

Baker, C. N., Kupersmidt, J. B., Voegler-Lee, M. E., Arnold, D. H., & Willoughby, M. T. (2010). Predicting teacher participation in a classroom-based, integrated preventive intervention for preschoolers. *Early Childhood Research Quarterly, 25,* 270–283.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Blair, K. S. C., Fox, L., & Lentini, R. (2010). Use of positive behavior support to address the challenging behavior of young children within a community early childhood program. *Topics in Early Childhood Special Education.*

Blau, D. M. (2000). The production of quality in child-care centers: Another look. *Applied Developmental Science, 4,* 136–148.

Brinkmeyer, M. Y., & Eyberg, S. M. (2003). Parent-child interaction therapy for oppositional children. In A. E. Kazdin & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 204–223). New York: Guilford Press.

Bulotsky-Shearer, R. J., Fernandez, V., Dominguez, X., & Rouse, H. L. (2011). Behavior problems in learning activities and social interactions in Head Start classrooms and early reading, mathematics, and approaches to learning. *School Psychology Review, 40*, 39–56.

Buyse, E., Verschueren, K., Doumen, S., Van Damme, J., & Maes, F. (2008). Classroom problem behavior and teacher-child relationships in kindergarten: The moderating role of classroom climate. *Journal of School Psychology, 46*, 367–391.

Carlson, E. A., Egeland, B., & Sroufe, L. A. (2009). A prospective investigation of the development of borderline personality symptoms. *Development and Psychopathology, 21*, 1311–1334.

Carter, L., Williford, A., & Locasale-Crouch, J. (2014). Reliability and validity of a measure of preschool teachers' attributions for disruptive behavior. *Early Education and Development.* Advance online publication.

Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R., Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science, 4*, 50.

Domitrovich, C. E., & Greenberg, M. T. (2000). The study of implementation: Current findings from effective programs that prevent mental disorders in school-aged children. *Journal of Educational and Psychological Consultation, 11*, 193–221.

Domitrovich, C. E., Gest, S. D., Jones, D., Gill, S., & DeRousie, R. M. S. (2010). Implementation quality: Lessons learned in the context of the Head Start REDI trial. *Early Childhood Research Quarterly, 25*, 284–298.

Doumen, S., Verschueren, K., Buyse, E., Germeijs, V., Luyckx, K., & Soenens, B. (2008). Reciprocal relations between teacher–child conflict and aggressive behavior in kindergarten: A three-wave longitudinal study. *Journal of Clinical Child & Adolescent Psychology, 37*, 588–599.

Downer, J. T., Locasale-Crouch, J., Hamre, B., & Pianta, R. (2009). Teacher characteristics associated with responsiveness and exposure to consultation and online professional development resources. *Early Education & Development, 20*, 431–455.

Downer, J. T., Booren, L. M., Hamre, B., Pianta, R. C., & Williford, A. (2011). *The Individualized Classroom Assessment Scoring (inCLASS).* Unpublished technical manual, Curry School of Education, University of Virginia, Charlottesville, VA.

Driscoll, K. C., & Pianta, R. C. (2010). *Banking Time* in Head Start: Early efficacy of an intervention designed to promote supportive teacher–child relationships. *Early Education & Development, 21*, 38–64.

Driscoll, K. C., Wang, L., Mashburn, A. J., & Pianta, R. C. (2011). Fostering supportive teacher–child relationships: Intervention implementation in a state-funded preschool program. *Early Education & Development, 22*, 593–619.

DuPaul, G. J., Power, T. J., Anastopoulos, A. D., & Reid, R. (1998). *ADHD Rating Scale—IV: Checklists, norms, and clinical interpretation.* New York: Guilford Press.

Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology, 41*, 327–350.

Egeland, B., & Hiester, M. (1993). Teaching task rating scales. Institute of Child Development, University of Minnesota.

Gilliam, W. S. (2005). *Prekindergarteners left behind: Expulsion rates in state prekindergarten systems.* New Haven: Yale University Child Study Center.

Hemmeter, M. L., Corso, R., & Cheatham, G. (2006). Issues in addressing challenging behaviors in young children: A national survey of early childhood educators. In *Conference on Research Innovations in Early Intervention, San Diego, CA.*

Hommersen, P., Murray, C., Ohan, J. L., & Johnston, C. (2006). Oppositional defiant disorder rating scale preliminary evidence of reliability and validity. *Journal of Emotional and Behavioral Disorders, 14*, 118–125.

Kallestad, J. H., & Olweus, D. (2003). Predicting teachers' and schools' implementation of the Olweus Bullying Prevention Program: A multilevel study. *Prevention & Treatment, 6.*

Kazdin, A. E., & Weisz, J. R. (2003). Introduction: Context and background of evidence-based psychotherapies for children and adolescents. In *Evidence-based psychotherapies for children and adolescents* (pp. 3–20). New York: Guilford.

Knoche, L. L., Sheridan, S. M., Edwards, C. P., & Osborn, A. Q. (2010). Implementation of a relationship-based school readiness intervention: A multidimensional approach to fidelity measurement for early childhood. *Early Childhood Research Quarterly, 25*, 299–313.

Kochanska, G., & Aksan, N. (1995). Mother-child mutually positive affect, the quality of child compliance to requests and prohibitions, and maternal control as correlates of early internalization. *Child Development, 66*, 236–254.

Ladd, G. W., Birch, S. H., & Buhs, E. S. (1999). Children's social and scholastic lives in kindergarten: Related spheres of influence? *Child Development, 70*, 1373–1400.

Lau, A. S. (2006). Making the case for selective and directed cultural adaptations of evidence-based treatments: Examples from parent training. *Clinical Psychology: Science and Practice, 13*, 295–310.

Mashburn, A. J., Hamre, B. K., Downer, J. T., & Pianta, R. C. (2006). Teacher and classroom characteristics associated with teachers' ratings of prekindergartners' relationships and behaviors. *Journal of Psychoeducational Assessment, 24*(4), 367–380.

Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., Howes, C., Burchinal, M., & Early, D. M. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development, 79*, 732–749.

Morris, P., Lloyd, C. M., Millenky, M., Leacock, N., Raver, C. C., & Bangser, M. (2013). Using classroom management to improve preschoolers' social and emotional skills. *MDRC.*

Muthén, L. K., & Muthén, B. O. (1998–2010). *Mplus user's guide sixth edition.* Los Angeles: Muthén & Muthén.

Pianta, R., Howes, C., Burchinal, M., Bryant, D., Clifford, R., Early, D., & Barbarin, O. (2005). Features of pre-kindergarten programs, classrooms, and teachers: Do they predict observed classroom quality and child-teacher interactions? *Applied Developmental Science, 9*, 144–159.

Ramani, G. B., Brownell, C. A., & Campbell, S. B. (2010). Positive and negative peer interaction in 3- and 4-year-olds in relation to regulation and dysregulation. *The Journal of Genetic Psychology, 171*, 218–250.

Raver, C. C., Jones, S. M., Li-Grining, C. P., Metzger, M., Champion, K. M., & Sardin, L. (2008). Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in Head Start settings. *Early Childhood Research Quarterly, 23*, 10–26.

Sabol, T. J., & Pianta, R. C. (2012). Recent trends in research on teacher–child relationships. *Attachment & Human Development, 14*, 213–231.

Schaefer, E. S., & Edgerton, M. (1985). Parent and child correlates of parental modernity. In I. E. Sigel (Ed.), *Parental belief systems: the psychological consequences for children* (pp. 287–318). Hillsdale, NJ: Erlbaum.

Sheridan, S. M., Edwards, C. P., Marvin, C. A., & Knoche, L. L. (2009). Professional development in early childhood programs: Process issues and research needs. *Early Education & Development, 20*, 377–401.

Spilt, J. L., Koomen, H. M., Thijs, J. T., & van der Leij, A. (2012). Supporting teachers' relationships with disruptive children: The potential of relationship-focused reflection. *Attachment and Human Development, 14*(3), 305–318.