EFFECTS OF BANKING TIME ON CHILD TALK OF PRESCHOOL LOW-RATE TALKERS

By

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Each individual child varies in their developmental progression. Developmental milestones can be used to determine if a child needs additional support to learn language. Previous studies have demonstrated the effectiveness of Banking Time (BT) as an approach to improve children's classroom behaviors and teacher-child relationships. However, no study has evaluated the effect of BT on language development. The rationale for examining the impact of BT on language is that adult-child relationships are the context in which children learn language. To address the gaps in the research, the impact of BT on child talk was examined on two target participants who were at risk for social or linguistic delay but had not been diagnosed with any disability nor in need of an assessment. An A-B-A-B withdrawal designed was used to examine impact of BT strategies on the rate of child talk. Findings show that despite mixed effects on child talk, BT resulted in positive teacher-child relationships as well as child excitement and confidence in play. Finally, BT strategies were seen as a socially valid way to increase talk according to early childhood teachers who had been in the field for at least two years.

INTRODUCTION

Language is the way we communicate in our environment (Levine & Munsch, 2014). It is how we get food to eat, get a jacket when we are cold, and ask for water when we are thirsty along with meeting many other day-to-day needs. According to the American Speech-Language-Hearing Association (ASHA; 1982), "Language is a complex and dynamic system of conventional symbols that is used in various modes of thought and communication." Language is described through four different characteristics including a system of symbols, a system that is conventional, a system that is dynamic, and a tool for human communication (Pence Turnbull & Justice, 2015). The ability to speak contributes to school readiness and later success (Hoff, 2013).

Typically, phonological development, which involves the sound structure of syllables and words, begins immediately after birth (Pence Turnbull & Justice, 2015). As they go through infancy, children begin to develop the use of sounds and cues. They respond to familiar voices by facial expressions and making sounds (U.S. Department of Health and Human Services [USDHHS], 2017). By the time children are 3-4 years old, phonological knowledge and production lead to speech. At this age, children answer "Wh-" questions (e.g., who, what, where, when, why) and use sentences with four or more words to talk about experiences (USDHHS, 2017). Each individual child varies in their developmental progression. However, these milestones can be used to determine if a child needs additional support to learn language skills. Without keeping track of this, an adult might unwittingly miss signs of a language delay, speech disorder, or a hearing loss (USDHHS, 2017). Missing signs of delays and disorders especially in critical periods

when the brain best absorbs language may cause difficulty in learning during the later years (USDHHS, 2017).

Several studies have evaluated interventions to help support language development. Enhanced Milieu Teaching (EMT) is a play-based intervention which has been shown to increase expressive language for young children (Hancock & Kaiser, 2006). A professional development framework (PD) such as behavior skills training (BST) has been found to be effective in delivering a behavior intervention plan for children with complex communication needs (Chazin et al., 2018). A peer-mediated intervention was designed to increase social and communication development through multiple and natural occurring opportunities in the classroom to create spontaneous interactions among children (Harris et al., 2009). These interventions are provided within the context of an adult-child relationship which shows the strength of the intervention used in this study. Thus, the purpose of this study is to investigate whether other interventions that target the adult-child relationship within a classroom, like Banking Time (BT; Pianta & Hamre, 2001), have an effect on children's language production.

Banking Time (BT) is an intervention designed to build or improve teacher-child relationships and interactions (Pianta & Hamre, 2001). BT happens one-on-one through child-led play for a short period of time (e.g., 10 minutes) at least twice per week. During BT, the teacher (a) observes the child's behaviors; (b) narrates what the child does; (c) labels the child's feelings and emotions; and (d) develops relational themes (LoCasale-Crouch et al., 2018). For instance, while observing, the teacher carefully watches the behavior and affect of the child. As teachers observe, they narrate what the child is doing as well as label the child's feelings and emotions to show that there is understanding

between them. Developing relational themes helps make sure that the teacher conveys that they are there to support the child, when needed (e.g., "*I can be your helper*"). In addition to promoting the use of these four critical strategies to strengthen teacher-child relationships, other practices are restricted or discouraged including teachers' use of asking questions, giving commands, teaching a concept or skill, commenting, and directing what the child is doing. These practices may shift the interaction to be more teacher-directed rather than child-directed.

Previous studies have demonstrated the effectiveness of BT as an approach to improve children's classroom behaviors. A 2017 study examined the use of BT to improve externalizing behaviors of children 3 to 4 years of age and reported a reduction in problematic behavior (Williford et al., 2017). Although there was a reduction in problem behavior, teachers using BT displayed fewer positive interactions compared to teachers using Child Time or who were in a business-as-usual condition. When engaging in Child Time, teachers were encouraged to spend time playing with the children without prescriptive instructions (Williford et al., 2017). It was hypothesized that the lower occurrence of positive interactions during BT may be the result of limitations on asking questions, using praise, and teaching skills (Williford et al., 2017). Additional research is needed to understand the effects of these limited strategies (Williford et al.,2017). Hatfield and Williford (2016) compared the effects of BT, Child Time (time-control comparison), and business-as-usual on children's activity via cortisol as a function of their participation. The results showed a decline in cortisol for both interventions, with a statistically significant difference in the group using BT, when compared to the business-as-usual group (Hatfield & Williford, 2016).

Current research provides evidence of the effectiveness of BT for improving teacher-child relationships. To date, no study has evaluated the effect of BT on language development, a gap the current study looks to fill. The rationale for examining the impact of BT on language is that adult-child relationships are a context in which children learn language. When children have trusting relationships, they may be more willing to use language (O'Connor & McCartney, 2007). To address the gaps in the research, we examined the impact of BT on the level of child talk. The following research questions were addressed:

Research Question 1: Does Banking Time increase levels of child talk for preschool children who are low-rate talkers?

Research Question 2: Do early childhood educators rate the BT strategies as socially valid for use with preschool children who are low-rate talkers?

Research Question 3: Do changes in rate of child talk generalize to BT implemented by a different adult?

METHODS

Participants

Target participants

After obtaining approval from the Institutional Review Board, two children between 2 and 5 years of age who were at risk for a social or linguistic delay were recruited for this study. The teacher was asked to nominate a child in their classroom who rarely talked. The inclusion criteria for target children were as follows: (a) chronological age of at least 24 months; (b) history of good attendance (i.e., five or fewer absences in the previous 30 days); and (c) social delays as identified through teacher nomination and confirmed through researcher observation. Three 10-min observations were conducted during free play for each nominated child to confirm their rate of talk. Participants demographics are presented in Table 1.

Table 1
Participants' Information

	Gender	Race	Age	Mullen Result	
				Receptive	Expressive
Participant 1	Female	Black	40 months	Very low	Very low
Participant 2	Male	Mixed Race	30 months	Below average	Very low

Participant 1, a 3-year-old Black female without a diagnosed disability, was nominated by her teacher as a child who rarely interacted with peers, and when she did, she interacted with the same peers. She usually engaged in solitary or parallel play without talking peers. Participant 2 was a 2-year-old mixed race male without a diagnosed disability who was observed to be soft-spoken in the classroom. His teacher and mother reported he was shy but would respond to initiations from others. He would also play with his peers but rarely talked.

Implementers

The primary implementer, first author, implemented all sessions across the first four conditions of the study. The researcher is an Asian, female graduate student in early childhood special education. She is also working towards her certification in behavior analysis at Vanderbilt University. Due to time constraints, the study was continued by a doctoral student who had been facilitating the generalization procedures and she served as the secondary implementor. She is a white female with 9 years of experience as an early childhood education teacher and administrator. She was trained in BT prior to this study and acted as the primary implementer for succeeding conditions.

Setting and Materials

The study was conducted in an inclusive university-affiliated preschool classroom in a large city in a southeastern state. All interviews, observations, and data collection sessions were conducted in the school. All sessions occurred in the participants' typical preschool classrooms. While typical classroom activities were occurring, the implementer conducted BT sessions in a part of the classroom was agreed upon with the teacher (e.g., a particular center, small group area). BT sessions were conducted through a one-on-one

play session for 10 min. The classroom staff, including the lead teacher and co-teacher, and peers were present during all sessions.

Pre-baseline sessions

Before starting intervention, the Mullen Scales of Early Learning, a standardized assessment to measure cognitive development (Mullen, 1995), was conducted with both participants. This was for the purpose of describing their current language abilities.

Intervention and generalization sessions

Intervention and generalization materials included sets of the participant's preferred toys as recommended by each participant's teacher. These were used by the implementer to interact with the participant in every session. From the first baseline through the second intervention condition, both participants had the same toy sets. These toy sets included sets of: (a) wooden blocks in different sizes; (b) kitchen toys consisting of various types of food and utensils; and (c) art materials including crayons, colored pens, stickers, and glitter. Since the duration of the study for the second participant was longer than the first participant, the researcher asked Participant 1's teacher to suggest additional toys to match his interests. Additional toy sets included: (a) Magnetiles, wild animals, and plastic people; (b) baby dolls, felt food, bottles, and utensils; and (c) Duplo blocks, monster trucks, hot wheel cars, and plastic dogs.

Data collection

The implementer used a Canon VIXIA digital recorder mounted on a tripod to record all sessions and uploaded the videos to Vanderbilt Box immediately after each session. The implementer, as the primary coder, used ProCoderDV, an electronic measurement system which allows the user to time stamp occurrences of behavior (Tapp & Walden, 1993). Data were graphed using Microsoft Excel.

Response Definitions and Measurement Systems

The primary dependent variable (DV) was rate of child talk, and these data were used to make all experimental decisions. The operational definitions used to code child talk are displayed in Table 2.

Table 2
Response Definitions

Response	Definition	Examples	Non-examples
Verbal communicative attempts	Greetings	"Hi", "Good morning!"	Waving to say hello
	Asking questions	What/when/who/why questions	Pointing to something/somewhere to express something
	Any statement that could express the child's thoughts	Sharing of ideas such as "The car is fast!" or "Mom made cookies."	Handing the toys over to the teacher
	Responding to questions	Open-ended statements, "yes" or "no" answers,	Nodding of head to express agreement or disagreement
	Making sounds or vocalizations related to play context	"Car says beep beep!", "moo….moo!"	Screaming, mumbling

Requesting statements	"Help please", "open please"	Pulling the teacher's hand towards something

A partial interval recording system with 5 s intervals was used to code the rate of child talk (Ledford & Gast, 2018). Coders watched the video once to record the participant's verbal communicative attempts with the teacher during the session.

Interobserver Agreement

The IOA coder was a white, female graduate student in Child Studies who was trained on BT. Interobserver agreement (IOA) data were collected in 33% of sessions across all participants and conditions, randomly selected using a random generator (Haahr, 2019). The primary data collector trained the IOA coder by discussing the operational definitions as well as examples and non-examples, a task analysis for the measurement system in which the IOA coder observes the primary data collector in action on coding, and practice coding videos together. Training included the use of ProCoderDV and answering questions from the secondary coder. After practicing coding together, the primary and secondary coders independently scored another video. If IOA fell below the criterion in any session, the primary and secondary coders discussed discrepancies and disagreements, and a consensus code was made. These steps were repeated until interobserver agreement reached greater than 80%. The researcher calculated IOA using a point-by-point agreement, dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100 (Ledford et al., 2018).

Experimental Design

An A-B-A-B withdrawal design (Ledford & Gast, 2018) was used to examine the rate of child talk when teachers use BT strategies. This design, as stated by Ledford and Gast (2018), "permits a clear and convincing demonstration of experimental control" as it requires repetition of introducing and withdrawing the intervention. In this case, the researcher wanted to see if the presence of the BT strategies increased the participants' rate of talking. An A-B-A-B design requires the DV to be a reversable behavior. While the acquisition of language may not be reversible, the purpose of this study was to determine whether the rate of child talk increased in the presence of BT. The use, or rate, of language was assumed to be a reversible behavior as it could be influenced by the addition or removal of supportive BT strategies. The A-B-A-B design also allows for three potential demonstrations of effect which are needed to determine the presence of a functional relation (Ledford & Gast, 2018). Researchers conducted the A-B-A-B design for each participant concurrently.

An A-B-A-B withdrawal design was chosen instead of a A-B-A design because an A-B-A design does not have an adequate number of replications and would have ended with participants in baseline condition (Ledford & Gast, 2018). It was chosen over a multiple baseline and multiple probe design to reduce the need for children to stay in baseline conditions for an extended period of time (Ledford & Gast, 2018). Maturation threats are easier to detect in the A-B-A-B design. To assess procedural infidelity, researchers conducted procedural fidelity checks for every session. Lastly, to control for possible attrition threats, an explicit description of withdrawal procedures was provided

during the consent process with the classroom teacher and parents (Ledford & Gast, 2018).

Visual analysis was used to make all decisions regarding formative and summative data. Level, trend, and variability of data were assessed within and across conditions for each participant (Ledford & Gast, 2018). Conditions continued until at least five sessions were completed and data were stable or showed a countertherapeutic or therapeutic trend in the baseline and intervention conditions, respectively. Consistency, overlap, and immediacy of change were examined across conditions (Ledford & Gast, 2018). Lastly, a functional relation was examined by determining whether three or more replications of behavior change occurred for each participant (Ledford & Gast, 2018). A behavior change is said to happen when there is a demonstration of effect between adjacent conditions.

Procedures

Pre-baseline sessions

The expressive and receptive subscales of the Mullen Scales of Early Learning Assessment were administered to provide a descriptive measure of each participant's language development prior to intervention (Mullen, 1989, 1995). This assessment was conducted by the primary implementer in a one-on-one setting with each participant. All sessions were completed in a space adjacent to the classroom where distractions could be limited.

Baseline sessions

For baseline sessions, non-BT strategies (see Table 3) were used during play with

the participant's toy sets. The toy set used for each session was determined by the

participant's interest at that time but was not limited to one choice for the session. Hence,

participants were allowed to choose a different toy set at any point during a session.

Baseline sessions included BT restricted practices: (a) giving instructions or commands,

(b) asking yes/no questions, and (c) giving praise statements. All baseline sessions were

conducted by the implementer for a duration of 10 min in an area of the classroom chosen

by the teacher (e.g., a particular center, small group area).

Table 3
Teacher Restricted Practices

Restricted Practice	Operational Definition	Examples	Non-Examples
Giving instructions or commands	The teacher gives a verbal direction, instruction, or command to the child	The teacher gives a directive (e.g., "Put the block on the tower) The teacher gives an instruction (e.g., "Turn the piece around so it fits")	The teacher gives a play suggestion (e.g., "You could add the block to your tower") The teacher asks a question (e.g., "Do you want to put the block on the tower?")
Asking Yes/No questions	The teacher askes yes or no, or closed-ended questions	Verbally asking a closed-ended choice question that can be answered in a 1-2 word answer (e.g., "Do you want the green marker?") Verbally stating a choice with limited answers (e.g., "Do you want the green car or the blue car?)	Verbally asking questions that encourage more than a 1-2 word answer (e.g. "How did you make the playdoh man?" or "Why should the doll wear their seatbelt?") Verbally making open-ended statements that encourage more than a 1-2 word answer (e.g., "Tell me about when

			you went to the zoo" or "I wonder what will happen if you..."
Praise Statements	The teacher utters a generic praise statement directed towards the child	Verbally giving generic praise statements (e.g., "Good Job", "Way to go", "Nicely done", "Awesome")	Verbally giving positive, descriptive praise (e.g., "I see you working hard to put the block on the tower")
			Verbally narrating child play actions (e.g., "I see you rolling the car" or "You put the fireman hat on")

Note. Adapted from Nuhring (2020)

Table 4
Study Procedures

	Baseline	BT	Generalization
Type of play	Adult directed & parallel play	Child-led play	In line with current condition
Materials	Child chooses from the 3 toy sets	Child chooses from the 3 toy sets	Child chooses from the 3 toy sets
Setting	Library or table during class free play	Library or table during class free play	Library or table during class free play
Implementer	Primary	Primary	Secondary
Strategies	Restricted practices	BT strategies	Depended on the condition currently being implemented

Intervention sessions

The setting and materials were held constant during baseline and intervention sessions (see Table 4). During intervention sessions, the implementer used BT strategies: (a) observed the child and followed their lead, (b) narrated child play actions, (c) labeled child emotions, (d) used phrases that related to relational themes (e.g., "*I can be your helper*" or *"I'm a safe person"*), and (e) asked open-ended questions (see Table 5). Intervention sessions were 10 min in length and conducted two to five times per week.

Table 5

Banking Time Operational Definitions of Teacher Behavior

Banking Time Strategy	Operational Definition	Examples	Non-Examples
Following the child's lead in play	Teachers will imitate or expand a child's verbal language, vocalizations, and/or play actions	Mimicking a child's actions (e.g., spinning a car on its top after the child spins a car) Imitating vocalizations (e.g., repeating "Beep Beep" after a child says "Beep Beep") Repeating the child's words from a story in the form of a question (e.g., child says, "Got cookies at the store" and then Teacher says, "At the store?") Expanding vocalizations (e.g., "Beep Beep said the car!") Recasting (e.g., child says, "The panda go-ed." Teacher says, "The panda did go!")	Verbally asking a closed-ended question about a story (e.g., "Did you get milk at the store?") Verbally giving a directive (e.g., "Feet on the floor") Verbally telling a personal story (e.g., "I saw a panda at the zoo one time") Physically and/or verbally leading play actions (e.g., "Let's play cars and roll them like this")
Ask open-ended questions	Teachers will ask questions that require more than one word to answer Teachers may use questioning statements like "I wonder if…" or "Tell me about…"	Verbally asking questions that encourage more than a 1-2 word answer (e.g., "How did you make the playdoh man?" or "Why should the doll wear their seatbelt?") Verbally making open-ended statements that encourage more than a 1-2 word answer (e.g., "Tell me about when you went to the zoo" or "I	Verbally asking a closed-ended choice question that can be answered in a 1-2 word answer (e.g., "Do you want the green marker?")

		wonder what will happen if you...")	
Narrating children's play actions	Teachers will verbally state actions the child does in play	Verbally narrating child play actions (e.g., "I see you rolling the car" or "You put the fireman hat on")	Verbally narrating own play actions (e.g., "I'm wearing the fireman hat")
			Verbally asking questions (e.g., "Do you like milk?" or "How can we keep it from falling?")
Label adult and child emotions	Teachers will label child emotions as well as their own	A verbal utterance labeling own emotion (e.g., "I am so happy to be playing with you. See my smile?")	Verbally describing how a situation may make someone feel (e.g., "How might you feel if your friend hit you? Sad?")
		A verbal utterance labeling child emotion (e.g., "I see that you are frustrated. Your tower fell down" or "You're feeling silly and giggling!")	Verbally labeling emotions of inanimate objects (e.g., "Your baby is feeling sad and hungry")
		Teacher states labels of accepted emotion words (see Appendix)	Verbally stating an emotion word as an adjective ("That's so surprising" or "What a sad baby doll")
			Verbally stating an emotion word in a way that tells the child that expressing the emotion is unacceptable (e.g., "We don't cry when we get sad" or "You're ok. Daddy is coming soon.")
			States labels for physical states, temperature words, or undefined emotional states (see Appendix)

Use helping statements or reminders	Teachers will provide one or more helping statements or reminders per session	Verbal utterance of a helping statement (e.g., "I'm here to help if you need me")	Physically assisting a child to accomplish a task without issuing a helping statement or reminder
		A verbal utterance of a helping reminder (e.g., "Remember I'm happy to help").	Verbally stating directives about help (e.g., "Here, let me help you.)
		Verbally asking if the child wants help (e.g., "Would you like help?")	Verbally prompting the child to ask for help (e.g., "Say, help please.")

Note. Adapted from Nuhring (2020)

Generalization sessions

Generalization across implementers was measured in this study. Generalization sessions were conducted once every 3-5 sessions and were planned to occur in all conditions but was not always feasible. Timing of generalization sessions were determined using a random number generator. During generalization sessions, the secondary implementer used the strategies matching the current condition. Therefore, if the generalization session was during a baseline condition, the implementer used the baseline strategies, and if the session was during intervention, they used the BT strategies.

During the second intervention condition, the generalization implementer became the primary implementer and no additional generalization data were collected. Prior to the change in implementers, the secondary implementer had an acclimation time where she spent time with each participant for at least 3 days before conducting study sessions. During the acclimation period, the secondary implementer would play with the

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participants during the classroom's free play time using their classroom toys and materials without intentionally using BT practices.

Relationship Measure - Descriptive Information

Because the primary objective of BT is to establish positive relationships between the teacher and the child (Pianta & Hamre, 2001), the primary implementer conducted the Student-Teacher Relationship Scale (STRS; Pianta, 2001). This is a 15-item assessment completed by the primary implementer and it yields scores on Conflict, Closeness, and Dependency. This was done to assess the relationship of the primary implementer with each participant before and after the intervention was introduced to measure changes in the relationship between the implementer and the participant throughout the study. The STRS was completed before and after the BT conditions in which the primary implementer conducted the sessions. This measure was not completed by the secondary implementer.

<center>Procedural Fidelity</center>

Procedural fidelity (PF) data were collected on the implementer's use of non-BT strategies during baseline conditions and the use of BT strategies during intervention sessions based on the operationalized definitions. Both sets of strategies were measured in all conditions. Strategies demonstrated in each session were tallied across all sessions. The direct systematic observation method (Barton et al., 2018) was used to measure PF using a researcher-created PF checklist (see Appendix A) while watching the videotape for each session simultaneously. In baseline, any combination of restricted practices could be used. During intervention, a minimum of 33 BT strategies had to be used for

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fidelity. Data were analyzed separately for each strategy for all conditions and

participants by counting the frequency of BT and restricted practices (see Table 6).

Table 6
Acceptable Practices Summary

Strategies	BT Strategies	BT Fidelity	Baseline Strategies	Baseline Fidelity
Following the child's lead in play	✓	1 or more		
Asking open-ended questions, narrating children's play actions, labeling adult and child emotions	✓	30 or more		
Using helping statements or reminders	✓	2 or more		
Giving instructions or commands			✓	Unlimited
Asking Yes/No questions			✓	Unlimited
Praise Statements			✓	Unlimited

PF data were collected for 100% of sessions in all conditions for all implementers.

The two data collectors completed IOA for 50% of all sessions for each implementer. PF

on BT and restricted practices were also assessed separately to ensure high fidelity on

each specific practice (see Table 7). If IOA fell below 80% accuracy, the primary and

secondary coders discussed discrepancies and disagreements, and a consensus was made.

Both coders coded all sessions again until fidelity reached greater than 80%.

Table 7

Diverged Practices PF IOA Data

Banking Time Practices		
	Participant 1 Mean (Range)	Participant 2 Mean (Range)
Baseline	87.5 (87-92)	96.2 (87-100)
BT	92.5 (85-97)	94 (83-98)
Generalization	92.17 (80-100)	93.98 (83-100)
Restricted Practices		
	Participant 1 Mean (Range)	Participant 2 Mean (Range)
Baseline	89.9 (86-93)	89.8 (82-97)
BT	87.7 (80-100)	95.7 (83-100)
Generalization	96 (90-100)	96.67 (90-100)

Social Validity

Two strategies were used to assess social validity: a) early childhood educators completed a survey about the use of BT strategies in relation to child talk; and b) the teachers of the two participants completed a survey to measure each participant's progress.

Seventeen early childhood teachers meeting the following inclusion criteria were recruited to assess social validity: (a) hold a professional degree in early childhood education or a similar field; (b) have 2 or more years of teaching experience; and (c) have not been trained to use BT. Social validity raters watched 1 compilation video containing BT sessions and non-BT sessions. The sample sessions used in the compilation video were not chosen using a random number generator but rather as an exemplar video

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demonstrating high fidelity to condition practices. Participants were not asked to rate or compare conditions. Upon watching the videos, participants completed a short survey (see Appendix B) using a 5-point Likert scale with five being "strongly agree" and one being "strongly disagree." The goal of this survey was to understand how teachers view BT strategies related to child talk. It talked about whether BT strategies were effective tools for increasing the rate of talk of preschool low-rate talkers. Included in this survey was a question asking teachers if they would try these strategies in their classroom.

Lastly, the researcher asked the teachers of the two participants to complete a survey about the participant's progress related to their talk in the classroom (see Appendix C). This survey also used a 5-point Likert scale with five being "strongly agree" and one being "strongly disagree."

RESULTS

Data Analysis

Data were graphed daily to make experimental decisions. The researcher only made changes in each condition when a minimum of five data points had been collected and the data were stable or showed a countertherapeutic or therapeutic trend in the baseline and intervention conditions, respectively (Gast et al., 2018).

The six characteristics of visual analysis (Barton et al., 2018) were used to analyze data for this study. Rate of talk (DV) was analyzed within each condition for each participant (e.g., level, trend, variability) (Barton et al., 2018). The DV was also analyzed across adjacent conditions (e.g., immediacy of change and overlap) and across similar conditions (e.g., A_1 and A_2, B_1 and B_2 for consistency) for each participant (Barton et al., 2018). Finally, the data were analyzed across participants to evaluate the patterns across similar conditions (Barton et al., 2018). After the characteristics of visual analysis were reviewed, the researcher assessed the presence of a functional relation.

Participant 1

Figure 1 shows child talk data and generalization results for Participant 1. During the first baseline condition, the data were variable and showed no trend. During the first intervention condition, there was an increasing trend toward a level higher than was observed during baseline. During the return to baseline, the rate of child talk showed a

decreasing trend. Upon the reintroduction of intervention, data showed an initial increase but returned to levels similar to the previous baseline condition. The change in interventionist did not appear to impact the data. Overlap in data is seen when comparing baseline to intervention, although baseline conditions showed a consistent decreasing trend while intervention conditions showed a consistent increasing trend in the percentage of child talk. Generalization data were only collected during the first intervention and second baseline conditions.

The results for participant 1 do not show a functional relation because there was considerable overlap between conditions and the trends were relatively flat in the final two conditions.

Participant 2

Intervention and generalization data for Participant 2 are shown in Figure 1. During the first baseline condition, data showed a decreasing trend. As BT was introduced in the first intervention condition, there was an immediate increase in the percentage of child talk with an increasing trend across the condition. During the second baseline condition, there was an immediate decrease in level and a decreasing trend. There was an immediate increasing trend following the introduction of the second intervention condition. In the fifth session of the second intervention condition, there was a change in implementer. While the data decreased immediately following the change, there was an increasing trend at the end of the second intervention condition. Because of the change in implementer, a third baseline and intervention condition were implemented. During the third baseline condition, there was a slightly decreasing trend. With the

introduction of the third intervention condition, there was an immediate increase in level. Percentage of child talk was moderately variable for three of the intervention conditions. However, data on the third intervention condition increased to the same levels of the first intervention condition. Overlap of data is seen when comparing baseline to intervention though baseline conditions had a decreasing trend while intervention conditions had an increasing trend.

The data for Participant 2 demonstrates a functional relation with a clear demonstration between the first baseline and the first intervention condition, the first intervention and the second baseline, and the final two conditions.

Generalization data were collected once per condition in three consecutive conditions. Generalization data were similar in level with the primary data for each condition. During the first generalization session in the first intervention condition, child talk was high and decreased during the return to baseline. Upon reintroduction of the intervention, generalization data were similar to the levels of talk during the intervention sessions in that condition. Generalization data are promising given the limited number of sessions conducted.

There were no changes in teacher rating on the STRS across conditions. Results show no indication of concern in terms of conflict and dependency for either participant. In terms of closeness, results indicate low level of relationship attribute. Data are displayed on table 8.
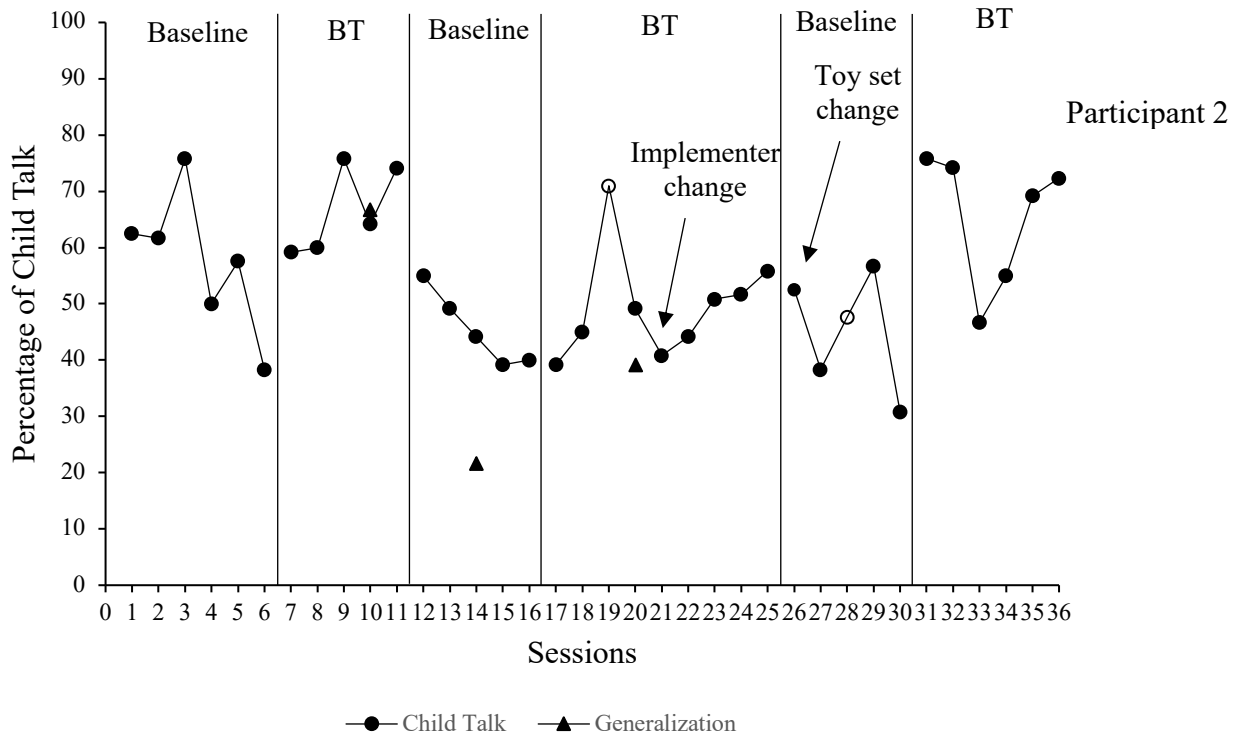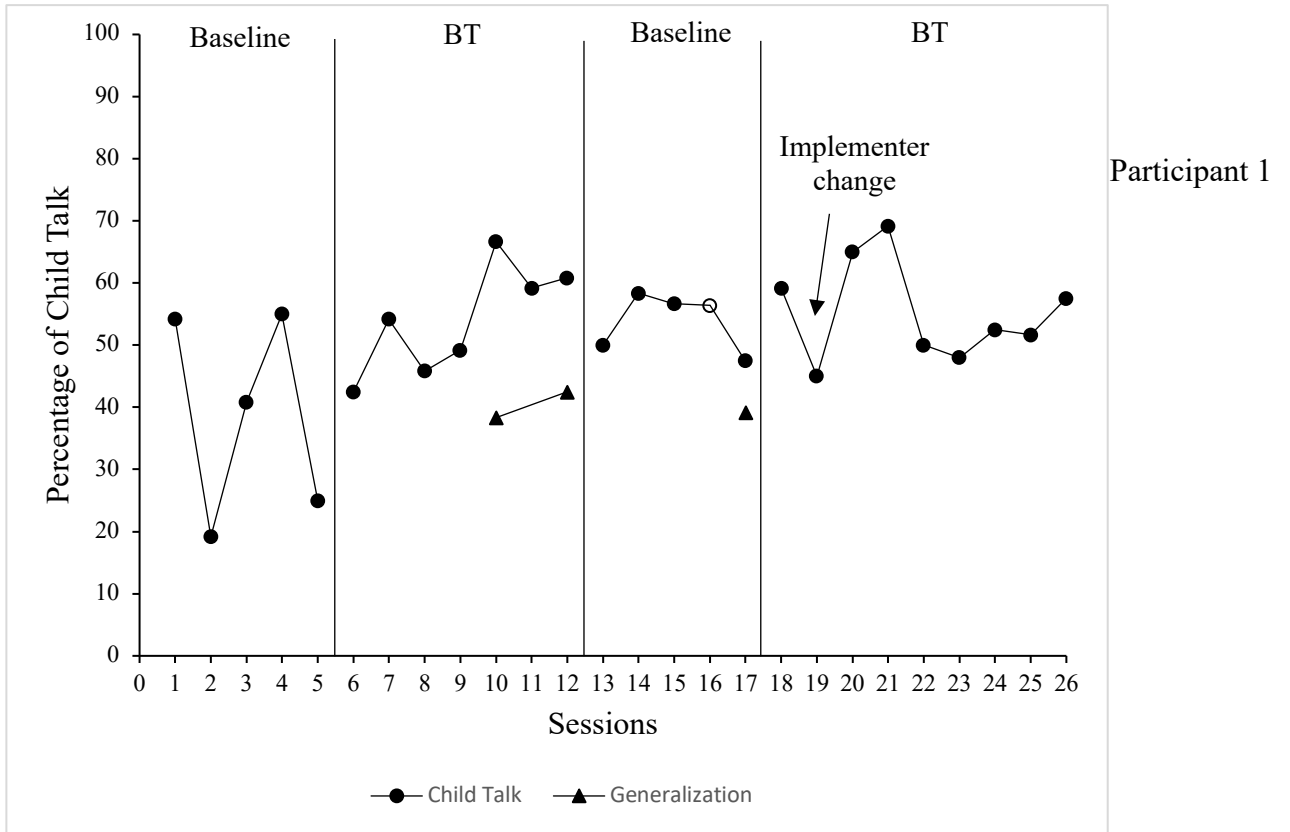
Figure 1. Percentage of child talk across conditions for Participant 1 (top) and Participant 2 (bottom). O=indicate sessions less than 10-min due to audio issues.

Table 8
STRS Data

	Pre-baseline 1	Post baseline 1	Post BT condition 1	Post baseline 2	Post BT condition 2
	CL	CL	CL	CL	CL
Participant 1	35%	22%	22%	22%	22%
Participant 2	36%	29%	24%	31%	31%

Note. CL=closeness

	Pre-baseline 1	Post baseline 1	Post BT condition 1	Post baseline 2	Post BT condition 2
	CON	CON	CON	CON	CON
Participant 1	25%	20%	20%	20%	20%
Participant 2	20%	20%	20%	20%	20%

Note. CON=conflict

	Pre-baseline 1	Post baseline 1	Post BT condition 1	Post baseline 2	Post BT condition 2
	DEP	DEP	DEP	DEP	DEP
Participant 1	32%	20%	20%	20%	20%
Participant 2	20%	20%	20%	20%	20%

Note. DEP=dependency

Social Validity

To examine social validity, recruited teachers completed one survey about the implementation of BT strategies in the classroom. See results in Table 9. Teachers reported that following the child's lead was most likely to increase child talk and using helping statements was rated as the least likely to increase child talk. These results indicated that teachers believe the intervention to have a high social significance and acceptance. Teachers indicated that they would use the strategies of BT in their classrooms and think that these strategies increase child talk.

A social validity survey was also completed by the teachers of the participants. Results are reported in Table 10. Both teachers rated the intervention as effective. All items were rated as a 4 or a 5 with the exception of participant 1's teacher assigning a rating of 3 on the item about initiating conversation.

Table 9
Social Validity Measures – BT Strategies

Questions	Average
Following the child's lead in play is an effective strategy to increase child talk.	4.89 (4-5)
Asking open-ended questions is an effective strategy for children to talk more.	4.77 (4-5)
Narrating children's play actions is an effective strategy to increase child talk.	4.81 (4-5)
Labeling yours and the child's emotions is an effective strategy to increase child talk.	4.59 (3-5)
Using help statements or reminders (e.g., "I'm here to help if you need it) is an effective strategy to increase child talk	4.06 (2-5)
Would you use these strategies in your classroom?	4.89 (4-5)

Note. Questions evaluated using a 5-point Likert scale with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree".

Table 10
Social Validity – Participants' progress

Questions	T1	T2
I have noticed an increased rate in my student's talking.	5	4
My student communicates more with me and peers compared to before.	4	4
My student engages in at least 2 conversation exchanges most of the time.	4	5
My student initiates conversation.	3	4
Banking Time is beneficial for this type of student who is a low-rate talker.	4	5

Note. T1=Teacher 1; T2=Teacher 2; Questions evaluated using a 5-point Likert scale with 1 indicating "Strongly Disagree" and 5 indicating "Strongly Agree".

IOA data were collected for at least 33% of sessions across participants and conditions (see Table 12). Overall IOA for Participant 1's child talk across conditions was 88.13% (range=86-89%). Overall IOA for Participant 2's sessions across conditions averaged 91.07% (range=90-91%). Analysis of IOA indicate no evidence of observer drift or bias. On average, IOA remained high throughout the study.

Table 11
IOA of PF Data

Condition	Data Mean (Range)
Baseline	90.7 (84-100)
BT	93.4 (83-100)
Generalization	96.3 (93-99)

Table 12
Child Responses IOA Data

Condition	Participant 1 Mean (Range)	Participant 2 Mean (Range)
Baseline	89.4 (84-95)	90.2 (80-97)
BT	86.9 (55-100)	91.9 (80-100)
Generalization	88.1 (79-94)	91.11 (89-93)

Procedural Fidelity

PF was collected on 100% of sessions in all conditions for each implementer. PF was 91.19% (range=81-99%) across all implementers and conditions (see Table 13). Low PF for generalization sessions was due to the misinterpretation of the secondary implementer on the minimum number of uses for each strategy. This was remedied by reviewing definitions and examples for each strategy. IOA on procedural fidelity was 93.47% (range=90-96%) on average (see Table 11).

Table 13

Overall PF Data

Condition	Implementer 1 Mean (Range)	Implementer 2 Mean (Range)
Baseline	83.4 (67-100)	94 (91-97)
BT	99.6 (97-100)	97.62 (84-100)
Generalization	N/A	81.33 (97-100)

DISCUSSION

The purpose of this study was to investigate whether BT, designed to improve student-teacher relationships, would have an impact on rate of talking in young children who were low-rate talkers.

The results were mixed with the demonstration of a functional relation with one child but not the other. The skills involved in BT which include narration of the child's play, verbal and play imitation, use of help statements, and open-ended questions were strategies that likely helped build rapport with the participant. These strategies established a connection between the implementor and the participant throughout the sessions. Since conducting BT meant forming a relationship with the participant, capable play partners even without the presence of BT strategies may have affected results.

Although the primary results were mixed, teachers reported positive impacts on the participants. As the sessions progressed, most especially in the intervention condition, participants were observed to be more excited to play. On the fifth session of participant 1's first intervention condition, the participant ran towards the implementer as she entered the room. Her teacher mentioned that the participant had been asking the whole day if the implementer was coming to play. Similarly, the same teacher stated in her survey that she noticed "a variety in types of play and playmates within our classroom." This demonstrates that establishing a positive relationship with each student can have a positive impact on social development (Rimm-Kaufman & Sandilos, 2015). Additionally,

maintaining positive relationships can contribute to the development of children's self-esteem (Harris, 2019). When children's ideas and choices are honored in BT by following their leading in play, it may help them feel more confident. Participant 1's teacher reported "an increase in confidence in play." She has seen her student be more willing to communicate her needs and wants during play as well as talk more about play. Similarly, as sessions progressed, both participants took the lead by directing what their play partner should do and how the play would look like.

The decreasing trend in child talk during baseline conditions shows that the child was not motivated to talk when the restrictive practices were used. The removal of a responsive play partner during the return to baseline conditions could be harm the adult-child relationship. This demonstrates the importance of engaging in quality interactions where responsive play interactions and child choice lead the play. These responsive play interactions give children the opportunity to "improve their capacity for thought, action, and communication" (Duffy, 2006, p. 6). In participant 2's third baseline condition, he indicated in two consecutive sessions that he was all done playing before the 10-min play session ended. It was observed that he lost interest in the session and would gravitate to a different play setting where he could have reciprocal and responsive interactions with peers and other adults. As BT was introduced after this baseline condition, an immediate increase in participant 2's percentage of talk was demonstrated. The immediate increase happened when more open-ended questions, narrations, and imitations were given such that there were potentially more opportunities to respond. On the second session of the third intervention condition, the implementer noticed the child's excitement as they were playing and stated, "you sound excited that we have more time to play today" while he

responded "yeah!" in excitement. These findings suggest that levels of child talk seem to increase when supported by a responsive play partner.

Another important factor to note in the study was the change in implementer during the second intervention condition. Because the primary implementer was not available, the decision was made to have the generalization implementer conduct the sessions as she was trained in BT and was familiar to the participants. As seen in the results, the change in implementer did not appear to negatively influence either participant's data.

Finally, the change in toy sets for Participant 2 is important to consider when analyzing the data. This was necessary when we decided to implement additional conditions. During the second intervention condition, Participant 2 was losing interest in the materials. Upon introducing new toy sets in the third baseline condition, rate of talk was variable until we observed an immediate increase upon moving to the intervention condition. Future studies might include more variety in toy sets throughout the study.

Limitations and Recommendations

One major limitation of this study was the lack of continuity in conducting sessions. School-wide as well as classroom-wide activities hindered the implementation of the study. The repetitive use of the same materials across a long period of time may have impacted the results of the study. Further the gaps between sessions may have affected the establishment of the relationship. For instance, when there were 3 or less days in between sessions, data seemed to be more stable. However, on sessions with longer gaps, data were more variable. More research is needed in the variety of the toy

sets as well as the appropriate duration of its usage. Future research can explore the child's behavior from the intervention being implemented consecutively without big gaps between sessions.

Another limitation was that generalization across implementers was limited due to the change in implementer. Since generalization happened once every 3-5 sessions, that made it happen once for each condition which and then was no longer an option when the implementer change occurred. More research is needed to determine if changes in child behavior occur when a different person implements the intervention, and further, it would be important to determine the quality of the relationship given less frequent sessions.

A final limitation was the research design chosen for this study. Withdrawing BT strategies, which means the interventionist is less responsive, may cause frustration for participants. Future studies may consider using different research designs when examining the effects of BT on child outcomes.

Finally, it is possible that BT is not adequate for changing child talk in all children. Combining BT strategies with language intervention strategies could be considered when exploring the impact on language outcomes.

Conclusion

The current study extends previous research by demonstrating the potential effectiveness of BT on children's rate of talk. While the effects on child talk were mixed, BT did result in positive adult-child relationships as well as child excitement and confidence in play. Additionally, BT strategies were seen as socially valid strategies to increase talk according to early childhood teachers who had been in the field for at least

two years. Further research is needed to determine whether BT could potentially work to increase child talk through the use of a different experimental design or BT combined with different research-based language interventions.

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APPENDIX A

PROCEDURAL FIDELITY SHEET

Teacher ID: _____   Child ID: _____ Primary ID: _____
Secondary ID: _____   Date: _____Reliability: Y   N

Condition: _____

Banking Time Strategies	Tally	Total
Following the child's lead in play (e.g., spinning a car on its top after the child spins a car)		
Ask open-ended questions (e.g., "How did you make the playdoh man?" or "Why should the doll wear their seatbelt?")		
Narrating children's play actions (e.g., "I see you rolling the car" or "You put the fireman hat on")		
Label adult and child emotions (e.g., "I am so happy to be playing with you. See my smile?")		
Use helping statements or reminders (e.g., "I'm here to help if you need me")		
OVERALL TOTAL		
Non-Banking Time Strategies		
Giving instructions or commands (e.g., "Put the block on the tower)		
Asking Yes/No questions (e.g., "Do you want the green marker?")		
Praise Statements (e.g., "Good Job", "Way to go", "Nicely done", "Awesome")		
OVERALL TOTAL		

APPENDIX B

SOCIAL VALIDITY SURVEY

Please circle one response that best reflects your opinion for each statement.

Following the child's lead in play is an effective strategy to increase child talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Asking open-ended questions is an effective strategy for children to talk more.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Narrating children's play actions is an effective strategy to increase child talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Labeling yours and the child's emotions is an effective strategy to increase child talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Using help statements or reminders (e.g., "I'm here to help if you need it) is an effective strategy to increase child talk.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Would you use these strategies in your classroom?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

APPENDIX C

SOCIAL VALIDITY TEACHER SURVEY

Please circle one response that best reflects your opinion for each statement.

I have noticed an increased rate in my student's talking.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

My student communicates more with me and peers compared to before.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

My student engages in at least 2 conversation exchanges most of the time.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

My student initiates conversation.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Banking Time is beneficial for this type of student who is a low-rate talker.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Are there other behaviors that you have noticed on the student after the implementation of the Banking Time intervention?

_____

_____

_____

_____

_____

_____