Masters Theses, 2020-current   The Graduate School

5-12-2022

An Analysis of Behavior Management Strategies Used Within Parent-Child Interaction Therapy to Facilitate Verbalizations by Children with Developmental Disabilities

Megan Barnes

An Analysis of Behavior Management Strategies Used Within Parent-Child Interaction Therapy to Facilitate Verbalizations by Children with Developmental Disabilities

Megan Barnes

A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of Requirements

for the degree of

Master of Arts

Psychological Sciences, Applied Behavior Analysis Concentration

May 2022

FACULTY COMMITTEE

Committee Chair: Trevor Stokes, Ph.D., BCBA-D

Ben Riden, Ph.D., BCBA-D

Lora Henderson., Ph.D.

Acknowledgments

I would like to thank Dr. Trevor Stokes for believing in me as an undergraduate student and shaping me into the clinician I am today. In addition, I would like to acknowledge the continued support and guidance that Dr. Stokes has provided me both professionally and personally over the last few years. I would like to thank Dr. Ben Riden for the immense knowledge that he has contributed about single-case research design. I would also like to thank Dr. Lora Henderson for her willingness to be a part of my thesis committee. Thank you Angelina Clark and Brooklin Davis for all of the effort that you put into coaching me during the study and collecting data. I appreciate the passion that you both brought to each session and all of the support that you both provided me.

Table of Contents

List of Tables

List of Figures

Abstract

We examined the effects of the procedures recommended for interventions using the
Parent-Child Interaction Therapy (PCIT) protocols on child verbalizations. The effects of
the procedures of Child Directed Interaction (CDI) were examined in a non-concurrent
multiple baseline across participants design. Two seven-year-old participants with
developmental disabilities and language delay experienced a baseline condition followed
by two experimental conditions during a free play environment. A range of child toys
were rotated systematically throughout the study. The total number of therapist-child
interactions remained consistent across all experimental conditions. The experimenter
received bug-in-the-ear feedback about her use of the therapy components in order to
maintain similar interaction frequencies across the study. Only the topography of the
interactions varied across conditions. During the first experimental condition the therapist
used descriptive-labeled praise, behavior descriptions, and motor imitation of appropriate
play. During the second experimental condition the therapist systematically added the use
of reflections of child vocalizations. Within the non-concurrent design, total
verbalizations, total different verbalizations, and mean length of utterance increased
following the introduction of the first intervention condition. Total verbalizations and
total different verbalizations increased further following the systematic introduction of
reflections of child verbalizations.

Introduction/Literature Review

Autism Spectrum Disorder (ASD) is a developmental disability present at an early age in children and is characterized by stereotypic behavior, communication deficits, social skills deficits, and sensitivity to environmental stimuli (Vietze and Lax, 2020). Current research suggests that 25% to 30% of people diagnosed with ASD are non-verbal or minimally verbal (Rose et al., 2016). In B.F. Skinner's seminal book *Verbal Behavior* (1957), he defines verbal behavior as ''behavior reinforced through the mediation of other persons [who] must be responding in ways which have been conditioned precisely in order to reinforce the behavior of the speaker'' (p. 225). In other words, verbal behavior is maintained by interactions that result in reinforcement of the verbalization that an individual emits. Skinner's definition puts emphasis on the concept that verbal behavior is a socially mediated behavior.

Early language interventions are important for several reasons. Verbal language allows individuals to communicate their wants and needs to those around them. In addition, researchers have noted that children who exhibit language delays are at a higher risk of externalizing behavior problems. Early language interventions are important because children with language delays are at a higher risk of engaging in maladaptive behaviors such as aggression and self-injurious behavior (Carr & Durrand, 1985). As a result of the behaviors that are attributed to language delays, there is a significant need to identify effective interventions that increase language development in children with ASD.

Early Intervention

The trend over time has been that identification of ASD has occurred in earlier years of child development, due to the advancements in research of characteristics and time course of ASD and greater recognition of ASD by health professionals and parents. Currently ASD may be diagnosed before the age of 2. In a study conducted by Itzchak and Zachor (2010), it was found that a significant predictor in the success of behavioral interventions was the child's age. They determined that the younger the child is when they receive an intervention, the more effective the intervention tends to be. The researchers noted that the success of early intervention was due to the fact that at a young age, brain plasticity allows for changes in the central nervous system. Children with ASD who begin Applied Behavior Analysis (ABA) services prior to the age of 48 months make greater progress than those who begin ABA services after 48 months (Vietze & Lax, 2020). The common elements of studies that document positive effects of early interventions are that the interventions are provided by highly trained staff, they actively involve parents, and children begin intervention by at least 48 months. Improvement in early diagnosis of ASD allow for interventions to be implemented in earlier years which leads to greater success (McGee et al., 1999).

Vocal Imitation

Vocal imitation is a term that is frequently used in the ABA literature and is defined as echoing what someone says without adding additional words or content. Imitation and expansion/extension of a child's verbalizations can significantly improve the child's functional communication skills (Starry et al., 2021).

In a study conducted by Field et al. (2010), researchers sought to examine the effects of therapists imitative behavior on child behavior. The results showed that when adults engage in vocal and non-vocal imitation of child behavior, children with ASD imitated the adult vocal and non-vocal imitation. These data suggest that the imitative behavior of the therapist will evoke imitative behavior of the child.

Paleaz et al. (2011) conducted a study that analyzed the reinforcing effects of vocal imitation on child verbal behavior. The researchers sought to determine whether the increases in child verbal behavior were due to operant conditioning or due to the fact that mother vocalizations evoked child verbal behavior. Operant conditioning proposed that when a stimulus is added and the behavior increases in frequency, then positive reinforcement has occurred. They found that vocal imitation increased child verbal behavior, and served as a reinforcing stimulus for children. The reinforcing effect of vocal imitation on early infant vocalization further increases child language development, consistent with the principles of operant conditioning. Vocal imitation can serve as a functional positive reinforcer for child verbal behavior.

Parent Mediated Interventions

Parent training interventions are important because parents have greater amounts of time spent with the child and exert the greatest amount of control over the child's environment. Researchers indicated that even if a child learns a skill in a clinic setting, that skill will most likely regress without parental support in the home environment. As stated in Stokes and Baer's (1977) seminal research on generalization, for a therapeutic behavior change to be effective behaviors must occur over time, across settings, and across people. They noted that when behavior changes occur, the change is seen typically

where and when the experimental contingencies are operating. Generalization will not occur simply because a behavior change has occurred which indicates the need for researchers to actively program for generalization (Stokes et al., 1977). Coaching parents on how to implement behavioral interventions provides parents with the skill set to further develop and maintain learned behaviors through teaching the manipulation of environmental contingencies. Furthermore, coaching parents on how to interact positively with their child fosters the development of the parent-child relationship.

Hanf sought to develop an intervention rooted in promoting the use of parents in behavioral therapy treatments. Her seminal contributions were noted throughout an article by Reitman and McMahon (2013), who outlined and described Hanf's child's game and parent's game. Stage one of Hanf's parent training intervention was the child's game. The child's game was conducted in a free play environment where parents were coached to use differential attention of appropriate behavior by providing descriptive-labeled praise and rewards for behaviors they wanted to increase and selectively ignore behaviors they wanted to decrease. Stage two of the intervention was the parent's game. During the parent's game, parents had children complete various tasks and parents were coached in the use of time-out contingent on child non-compliance. Hanf's child's game and parent's game were adapted in many parent training interventions.

Parent Child Interaction Therapy

PCIT is a common intervention package used with child disruptive behavior challenges. These procedures emerged from the foundations of the Hanf parenting model, social learning, and attachment theory. PCIT is an evidence based parent training program designed by Eyberg (1988) to address young children who engage in

challenging oppositional and defiant behavior. PCIT consists of two phases, child-directed interaction (CDI) and parent-directed interaction (PDI). The first phase, CDI, is used to enhance the parent-child relationship. The main focus of CDI is to create an enjoyable and inviting atmosphere for the child and the parent to engage with one another to enhance attachment. In addition, CDI increases the functional value of interactions between the child and the parent due to the differential positive consequences delivered by the parent following child behavior. Throughout the CDI phase, parents or caregivers follow the lead of the child by engaging in playtime while delivering positive consequences. During this playtime, parents are coached to utilize core "do" skills as consequences of child appropriate behavior. The core "do" skills consist of labeled (specific) Praise, Reflecting appropriate vocalizations, Imitating appropriate play, Describing child behavior, and encouraging Enjoyment (PRIDE). By utilizing the core "do" skills caregivers create a friendly, fun, engaging, and uplifting play interaction with their child. Parents are also coached to refrain from using "don't" skills. Don't skills consist of giving commands, asking questions, and using negative talk such as criticizing the child. Using the "don't" skills can result in negative reactions from the child such as maladaptive behaviors. By increasing the use of "do" skills and eliminating or decreasing the use of "don't" skills, parents maximize the probability of positive interactions (Eyberg, 1988). Upon the mastery of skills in the CDI phase, parents then transition to the second phase of PCIT, the PDI phase. Throughout the PDI phase, parents are coached on how to continue to utilize the "do" skills taught in the first phase, while also implementing effective clear commands and consequence sequences to develop the child's compliance (Masse et al., 2016).

PCIT and Language Development

Many of the studies that have investigated the effects of using PCIT with children who have been diagnosed with ASD have focused on behavioral problems. In addition to a strong focus on how PCIT affects child oppositional and disruptive behavior, there is an emerging base of literature documenting increases in child verbalizations. Previous research has noted that anecdotal evidence suggests that the use of PRIDE skills led to increased acquisition of language among English learners at school (Fawley et al., 2020).

Hansen and Shillingsburg (2016) conducted a study that assessed whether children who were diagnosed with ASD exhibited an increase in vocalizations after participating in a modified PCIT program. In addition to the manualized PCIT skills, the modified PCIT program consisted of a coaching phase where caregivers were instructed to increase vocal imitations and requests by using stimulus-stimulus pairings (SSP). The goal of SSP is to establish vocal sounds as a conditioned reinforcer through repeated pairing of a vocal stimulus with a highly preferred item or event (Shillingsburg et al., 2015). During the coaching phase, researchers emphasized reinforcing and imitating the child's vocalizations. The results indicated that both participants demonstrated a significant increase in total vocalizations from pre- to post- test. Evidence suggested that skills taught in PCIT paired with SSP in combination with reinforcement of child vocalizations can be effective in increasing child vocalizations in children with ASD.

Garcia et al. (2015) conducted a study to examine the effects of PCIT on child verbal behavior. They found that when parents used more PRIDE skills there was an increase in the amount of word types that the child used. In their study word types were defined as the number of different words. The results of their study suggested that the use

of child-directed skills play an important role in growing and improving child language for children with developmental delays. Garcia et al. (2015) provided evidence in support of targeting both the child's behavior and language through the use of PCIT.

Bagner et al. (2016) examined the effects of an adapted home-based PCIT model on infant language production. The results of their study showed that when caregivers were coached in using CDI skills, with a focus of repeating infant vocalizations, the infants produced a significantly higher number of different and total utterances than that of the infants in the control group. In addition to improvements in infant language production, the researchers found that there was a decrease in infant externalizing behavior problems. The researchers state that one mechanism that may have played a role in the improvement of child language is the fact that through PCIT parents are taught to reflect infant vocalizations; however components of PCIT were not examined separately. The study's anecdotal support for the use of reflections provides evidence for the need of future research on the reflection component of PCIT.

Reflections

A reflection is defined as "a declarative phrase or statement that has the same meaning as the child's verbalization. The reflection may paraphrase or elaborate upon the child's verbalization but may not change the meaning of the child's statement or interpret unstated ideas" (Eyberg, et al., 2005, p. 69). When parents reflect what their child says, they are showing that they are interested in what their child has to say. Reflections are an effective strategy of communication to use as a tactic to increase child vocalizations, build vocabulary, and improve grammar and pronunciation (Eyberg, 1988).

Reflections contain many components that are similar to intervention techniques that are used by speech and language pathologists (SLPs) to facilitate language development. One technique that SLPs use to teach child verbal language is using a concept called build-ups and break-downs. When using the build-up and break-down language intervention techniques, SLPs are breaking apart and then rebuilding child utterances using correct grammatical structures (Tempel et al., 2009). Likewise, SLPs use expansion/extension and imitation of utterances, which is defined as repeating what the child has said using correct grammatical structure of the sentence and/or adding words to provide additional meaning to the sentence (Starry et al., 2021). Furthermore, the techniques described above are very similar to the reflection component of the PCIT intervention and serve the same purpose of increasing child vocalizations.

Purpose of the Current Study

The purpose of the current study was to isolate and examine the effects of reflections on child verbalizations. Despite promising emerging literature on the effects of PCIT on verbal language development in children, the components of the treatment package have yet to be systematically evaluated at this time. The current study hypothesized that, relative to baseline levels of PCIT components without reflections, data would show that the additional use of reflections would increase the number of total and different utterances that children emit. Furthermore, it was hypothesized that the use of reflections would increase the mean length of utterances in words (MLUw) that children emit when compared to baseline levels and CDI skills without reflections. It is important to note that the researcher hypothesized that it is not the number of therapeutic

interactions that increase child verbal behavior, it is the contingency of the therapeutic interaction.

Method

Participants

Two participants were recruited from a university ABA clinic. The current study included two children, age 7, who exhibited language delays with emerging vocalizations. Both participant's had a diagnosis of ASD and had received prior ABA, speech, occupational therapy services. Names of each participant have been changed to protect to ensure confidentiality. Each participant's language ability was assessed using the Pearson Peabody Vocabulary Test-Fifth Edition (PPVT-5) combined with the Expressive Vocabulary Test-Third Edition (EVT-3). Both participant's scores fell between the range of well below expected and below expected for receptive and expressive language ability. Assent/consent was obtained for each participant prior to beginning the study according to a protocol approved by the James Madison University Institutional Review Board.

Setting

Two-clinic rooms connected by a one-way mirror were used for the duration of the study. The room that allowed the researchers to look through the mirror and observe child-therapist interactions was referred to as the observation room. The observation room was approximately 2.75 meters wide and 2.75 meters long and was the space in which researchers observed and took data on the child and the therapist. The room that shows a mirror was referred to as the treatment room. The treatment room was approximately 2.75 meters wide and 2.75 meters long and included a couch against the

wall as well as a table with three chairs. The treatment room was the space in which the child and the therapist interacted.

Independent Variables

PRIDE Skills Used

The PRIDE skills that were used changed throughout each condition of the study. Throughout baseline, none of the intervention components of PCIT were implemented. In the first intervention, condition the therapist engaged in labeled praise, motor imitation of appropriate behavior, described appropriate behavior, and encouraged enjoyment during the interaction using non-contingent neutral talk and positive touch (e.g., fist bumps, high-fives, or hand squeezes). In the subsequent intervention condition, the therapist engaged in the same skills from the previous condition and systematically added the use of reflections of child verbalizations.

PRIDE Skills. The following skills were defined by Eyberg (2005) in the DPICS third edition manual.

1. Labeled Praise (P): A contingent positive evaluation of child behavior that specifies the behavior, activity, or product of the child that you are praising. An example of labeled praise is when the child is stacking blocks and the therapist says "I love how you are stacking the blocks." Another example is when the child is playing with a calm body and the therapist says "Great job playing with a calm body."

2. Reflection (R): A statement contingent upon child vocalizations that may paraphrase or elaborate the child's verbalization but does not change the meaning of the statement or add unstated ideas. For example, the child

says "car go fast" and the therapist reflects "the red car goes fast."

Another example is if the child says "cow moo" and the therapist reflects

"the cow goes moo!"

3. <u>Motor Imitation (I):</u> Motor imitation is not defined by Eyberg further than

imitating appropriate play. Some examples are when the child is clapping

and the therapist claps or when the child is jumping and the therapist

jumps.

4. <u>Behavior Description (D):</u> A non-evaluative sentence or phrase that

describes observable verbal or non-verbal behavior that the child is

currently engaging in or has immediately completed. For example, if the

child is rolling a car the therapist may say "you are rolling the car fast," or

if the child is building a tower the therapist could say "you are building a

tall tower!"

5. <u>Positive Touch (PTO):</u> Any intentional positive physical contact between

a parent or therapist and the child. Some examples of positive touch

include instances of high fives, fist bumps, hugs, or back rubs.

Dependent Variables

Language Production

The dependent variables of this study were the frequency of verbalizations, the

frequency of different verbalizations, and the MLUw that the participants emitted.

Frequency of verbalizations was defined as the total number of words spoken by the child

per observation. Verbalizations included mands (requests), tacts (labeling), echoics

(imitation), and intraverbals (responses) (Starry et al., 2021). Frequency of different

verbalizations was defined as any instance in which a verbalization differentiated in form or function from previous verbalizations per observation. The MLUw referred to the average length of utterances that the child used and was calculated by dividing the total number of words by the number of phrases emitted by the child (Parker & Brorson, 2005). Verbalizations that occurred as delayed echolalia or while the child was engaging in repetitive statements were not coded (Starry et al., 2021).

Design

The current study assessed the influence of the independent variables using a non-concurrent multiple baseline across participants design. Due to the fact that we hypothesized that praise, imitation, behavior descriptions, and enjoyment would cause a moderate increase in verbalizations and that reflections would cause a further increase in verbalizations, the conditions were arranged to allow the variable that was hypothesized to have the strongest effect follow the introduction of the other variables. Once language is developed you cannot remove that repertoire from an individual. Therefore, we would not anticipate for the new language skills to disappear after an effective intervention had been in place. By utilizing a non-concurrent multiple baseline design we demonstrated experimental control by exhibiting that responding changed when there was a change in conditions.

Throughout the analysis of the graphs, the primary research examined the changes in level, trend, variability, and stability. If the data were highly variable or are trending in a therapeutic direction during baseline the researcher continued to collect baseline data (Parsonon, 2002). Each intervention was not implemented until a steady state of responding had been reached. A steady state of responding was defined by a pattern of

responding that shows consistent variation and stable trends in the dependent variables over time. When there was relatively stable data within a phase it suggested that extraneous variable influences were minimal. In addition, stable responding indicated that any of the effects that occurred from the transition from one condition to the other had reached its more enduring effects (Johnston et al., 2020).

Data Collection

Throughout each condition, a data collector recorded each instance of verbal behavior that the child emitted, word for word. During each session data sheets were provided to the data collectors. One data sheet was used for child verbal behavior (Appendix A). Another data sheet was used to assess therapists use of CDI skills (Appendix B). At the end of each session the data collectors scored the frequency of verbalizations, the frequency of different verbalizations, and the MLUw that the participant emitted. Data were graphically displayed and analyzed using Microsoft Excel.

Two research assistants underwent training from the primary researcher on how to code data. The primary researcher provided a definition and a model of each PRIDE skill used in PCIT. As a means to know that the research assistants were trained to criteria, each assistant was required to watch a film of the primary researcher engaging in CDI and was required to score the mock data. Mastery criteria was met when each of the research assistants met 90% IOA with the primary researcher using the total count method.

Each session was recorded by Video Audio Learning Tool (VALT). The VALT computer software is downloaded onto a secure computer that does not allow access to the internet. The computer, VALT software, and videos were encrypted and protected by

a password. In the treatment room there were two cameras and microphones that transmitted the feeds to a computer that contains the VALT software. The recordings were used as a reference for the primary researcher and the research assistants.

Pre-Experimental Procedures

During an intake appointment, the therapist conducted a parent interview to assess each child's preferred items and activities. In addition, the therapist conducted a free operant preference assessment at intake (Appendix C). During the preference assessment the therapist set up an environment enriched with different types of toys (noise makers, puzzles, squish balls, cars, etc.) and observed the child interacting with each toy or activity. The items that the learner engaged with for the longest durations were used in the play environment. Additionally, the therapist used the parent indicated child preferred toys and activities to create an environment that was conducive to child free play. This free play environment was intended to encourage child engagement with toys and activities.

In addition, the PPVT-5 and EVT-3 were administered to the participant during the intake appointment. The PPVT-5 and EVT-3 are norm referenced assessments that measured the receptive vocabulary acquisition of individuals, the ability for individuals to retrieve words, and the expressive-vocabulary of the participant. Each assessment took approximately 10-15 minutes to conduct and was presented in an easel format. The therapist determined the entry item by using the child's age and the child's understanding of example items. The therapist discontinued testing when the child demonstrated a ceiling by missing 5 consecutive items.

Overall reliability of the normative sample was reported for the PPVT-5 at .97 and the EVT-3 at .97 indicating an excellent correlation. Test-retest reliability was reported for the PPVT-5 at .88 and the EVT-3 at .90. Clinical validity for both tests were reported for special populations. For individuals diagnosed with language delays, clinical validity was reported at 1.93 for the PPVT-5 and 1.92 for the EVT-3. The clinical validity for individuals diagnosed with autism were reported at .81 for the PPVT-5 and .63 for the EVT-3. All of the validity measures indicate that both assessments have average to excellent correlation. As stated previously, children with scores that range from well below expected to below expected were included in the current study.

Materials

The materials used throughout the study were based on the parent indicated preference of toys and activities as well as the results from the free operant preference assessment at intake. The primary researcher arranged the treatment room to ensure that there was a variety of play items spread amongst the play area for the child to engage with. The same materials used throughout each condition of the current study and were shifted in and out on a slow changing rotation to ensure that the child did not get satiated with the toys in their environment. There were approximately 5 different types of toys (i.e., cars, coloring materials, balls, musical toys, and instruments) and one type of toy was switched out for something different each session. If the participant requested for an item that was not currently available in the play room, the item was retrieved and switched with another item.

Baseline

Baseline sessions were conducted in a play environment that included free access to toys and preferred activities. Each data collection period lasted twenty minutes. During the twenty minute unstructured play session the child was completely free to lead the activity and to make choices and decisions about the game or activity. Throughout the baseline condition, the therapist used non-contingent neutral talk and positive touch while interacting with the child to control for the number of therapeutic interactions per condition. Non-contingent speech occurred in the form of neutral talk that was not contingent upon child verbalizations. Neutral talk statements occurred when the statements contained no praise or criticism, described the therapists own behavior, or used state of being verbs such as thoughts feelings and emotions. Examples of neutral talk statements were "you are feeling very happy," "I am stacking the blue block," or "the doll has brown hair."

During baseline the therapist aimed to engage in 120 to 160 instances of non-contingent neutral talk and/or positive touch. This range of interactions was selected based on the mastery criteria for CDI defined by Eyberg (2005) as 10 behavior descriptions, 10 labeled praises, 10 reflections and fewer than 3 questions, commands, and negative talk statements during a 5 minute observation. As a means to understand each participant's verbal repertoire, the therapist refrained from using any CDI skills during baseline. Data was collected on child verbal behavior to serve as a control condition for each of the experimental conditions.

Interventions

Each of the experimental phases looked similar to the baseline phase. The primary researcher set up an environment that was enriched with the child's preferred toys and activities, as determined by the parent interview and free operant preference assessment at intake. In the first intervention phase, the therapist interacted with the child during free play. As a means to maintain a similar frequency of interaction that occurred in baseline, the therapist aimed to utilize 40-54 behavior descriptions, 40-54 instances of labeled praise of appropriate child behavior, and encourage enjoyment during the play interaction using 40-54 instances of non-contingent speech and positive touch. The therapist engaged in motor imitation during play; however, consistent with PCIT these interactions were not tracked in data collection.

In the second intervention phase, the therapist continued to interact with the child during free play; however, the therapist systematically added the use of reflections, while maintaining the same total number of therapeutic interactions. In attempt to maintain a similar frequency of interaction that occurred in both of the previous conditions, therapist aimed to engage in 30-40 reflections of child verbal behavior, 30-40 behavior descriptions, 30-40 instances of labeled praise of appropriate child behavior, and encourage enjoyment using 30-40 instances of non-contingent speech and positive touch. As in the previous condition, the therapist engaged in motor imitation during play.

Interobserver Reliability

IOA was assessed for child's verbal behavior using the total agreement method for each of the variables. Total agreement IOA was calculated by taking the smaller number and dividing it by the larger number and then multiplying that number by 100

(Johnston et al., 2020). Observations that obtained 80% IOA or higher were considered acceptable for this study (Cooper et al., 2020). IOA was taken on child data, for 100% of the observations in baseline, 92% of the observations in intervention one, and 82% of the observations in intervention two.

For Jax, percentage of agreement for the frequency of verbalizations was 92% during the baseline condition, 94% during the first intervention condition, and 92% during the second intervention condition. Percentage of agreement for the frequency of different verbalizations was 86% in the baseline condition, 95% during the first intervention condition, and 94% during the second intervention condition. Percentage of agreement for the MLUw was 94% during the baseline condition, 98% during the first intervention condition, and 96% during the second intervention condition.

For Callie, percentage of agreement for the frequency of verbalizations was 81% during the baseline condition, 90% during the first intervention condition, and 94% during the second intervention condition. Percentage of agreement for the frequency of different verbalizations was 92% in the baseline condition, 91% during the first intervention condition, and 95% during the second intervention condition. Percentage of agreement for the MLUw was 90% during the baseline condition, 91% during the first intervention condition, and 93% during the second intervention condition.

Procedural Fidelity

Procedural fidelity data were taken throughout the duration of this study. The Dyadic Parent-Child Interaction Coding System (DPICS) -Third Edition (Eyberg et al., 2005) is a valid and reliable means to measure interactions. An adapted version of the DPICS data sheet was used to collect data on the interactions between the therapist and

the child. Data were collected to evaluate the use of non-contingent neutral talk, positive touch, behavior descriptions, labeled praises, reflections, questions, commands, and negative talk statements. Procedure fidelity was determined by dividing the number of correctly delivered steps by the total number of steps and multiplying that number by 100 (Johnston et al., 2020). Procedure fidelity was analyzed across 100% of the observations in baseline, 100% of the observations in intervention one, and 100% of the observations in intervention two.

For Jax, the therapist implemented the skills in baseline with 97% fidelity, the skills in intervention 1 with 96% fidelity, and the skills in intervention 2 with 90% fidelity. For Callie, the therapist implemented the skills in baseline with 94% fidelity, the skills in intervention 1 with 97% fidelity, and the skills in intervention 2 with 88% fidelity.

Results

Child Behavior

The study hypothesized that relative to baseline levels of PCIT components without reflections, data would show that the additional use of reflections would increase the number of total and different utterances that children emit. Further, it was hypothesized that the use of reflections would increase the MLUw that the children emit. The results indicate that when you systematically add the use of reflections there is an increase in the number of total and different verbalizations that children emit.

Figure 1 shows the total frequency of verbalizations that each participant emitted per session. Jax engaged in an average of 12.75 verbalizations during the baseline period. The frequency of verbalizations that Jax emitted during baseline remained at a low level

with no trend and showed little variability. When the first intervention was implemented, the frequency of verbalizations that Jax emitted increased in level to an average of 57.50 verbalizations. The number of verbalizations that Jax emitted during the first intervention remained relatively stable with little variability in responding. Following the implementation of the second intervention condition, the verbalizations that Jax emitted increased in level to an average of 87.42 verbalizations. The frequency of verbalizations that Jax emitted during the second intervention continued to trend in a therapeutic direction throughout the second intervention condition. During baseline, Callie engaged in an average of 7.75 verbalizations. The frequency of verbalizations that Callie emitted during baseline remained at a low level. There was no trend and little variability across number of verbalizations Callie emitted during the baseline condition. When the first intervention was implemented, the frequency of verbalizations that Callie emitted increased in level to an average of 38.55 verbalizations. The verbalizations that Callie emitted demonstrated no trend and moderate variability throughout the first intervention condition. Following the implementation of the second intervention condition, the frequency of verbalizations that Callie emitted increased in level to an average of 76.5 verbalizations. The data show that when the experimental conditions are sequentially implemented at different times for each participant the pattern of change is consistent among each participant.

Figure 2 displays the total number of different verbalizations each participant engaged in. Jax engaged in an average of 7.38 different verbalizations during baseline. Throughout baseline, the total number of different verbalizations that Jax emitted remained at a low level with little variability and no trend. After the implementation of

the first intervention condition, the frequency of different verbalizations demonstrated an increase in level with an average 30.88 verbalizations. When the second intervention condition was implemented, the frequency of different verbalizations that Jax emitted increased in level to an average of 46.83 verbalizations. Data in the second intervention continued on an increasing trend in the therapeutic direction throughout the condition. For Callie, the number of different verbalizations was stable throughout baseline with an average of 5.75 different verbalizations. Once the first intervention condition was implemented, the frequency of different verbalizations that Callie emitted increased in level to an average of 21.75 different verbalizations. The number of different verbalizations that Callie emitted during intervention one demonstrated a relatively stable state of responding across the entire condition as evidenced by a pattern of responding that showed consistent variation and no trend. When the second intervention condition was implemented, the number of different verbalizations that Callie emitted increased in level to an average of 49.5 verbalizations.

Figure 3 shows MLUw. Jax emitted a MLUw that averaged 1.18 words during baseline. During the first intervention Jax's MLUw increased in level to an average of 1.39 words. Jax's MLUw remained relatively stable with little variability throughout the first intervention condition. Following the implementation of the second intervention condition, Jax's MLUw increased in level to an average of 1.71 words. During baseline Callie emitted a MLUw that averaged 1.28 words. During the first intervention Callie's MLUw increased in level to an average of 1.93 words. Throughout the first intervention condition, Callies MLUw was variable. During the second intervention condition Callie's MLUw was an average of 2.09 words.
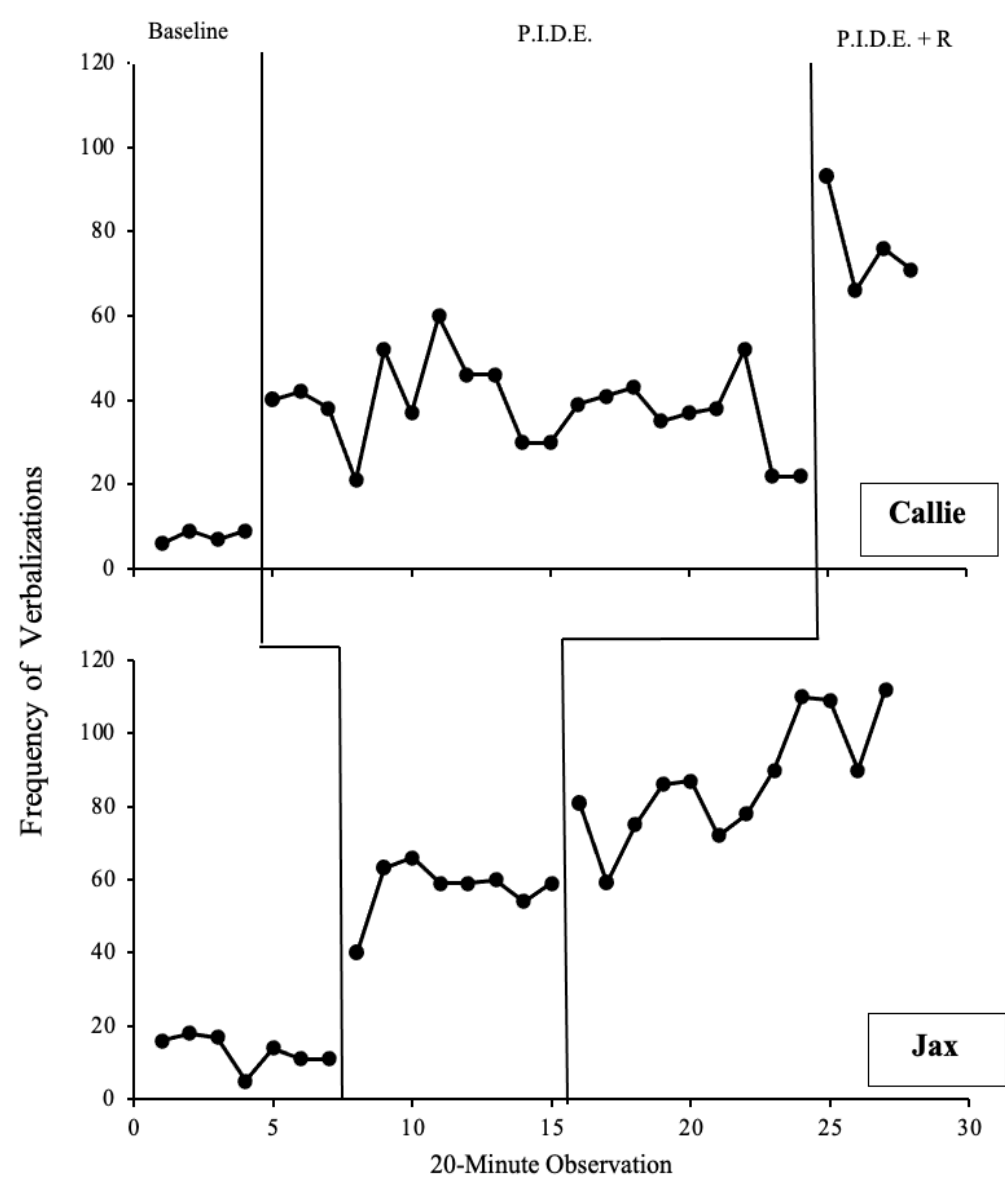
Figure 1.

Frequency of Verbalizations

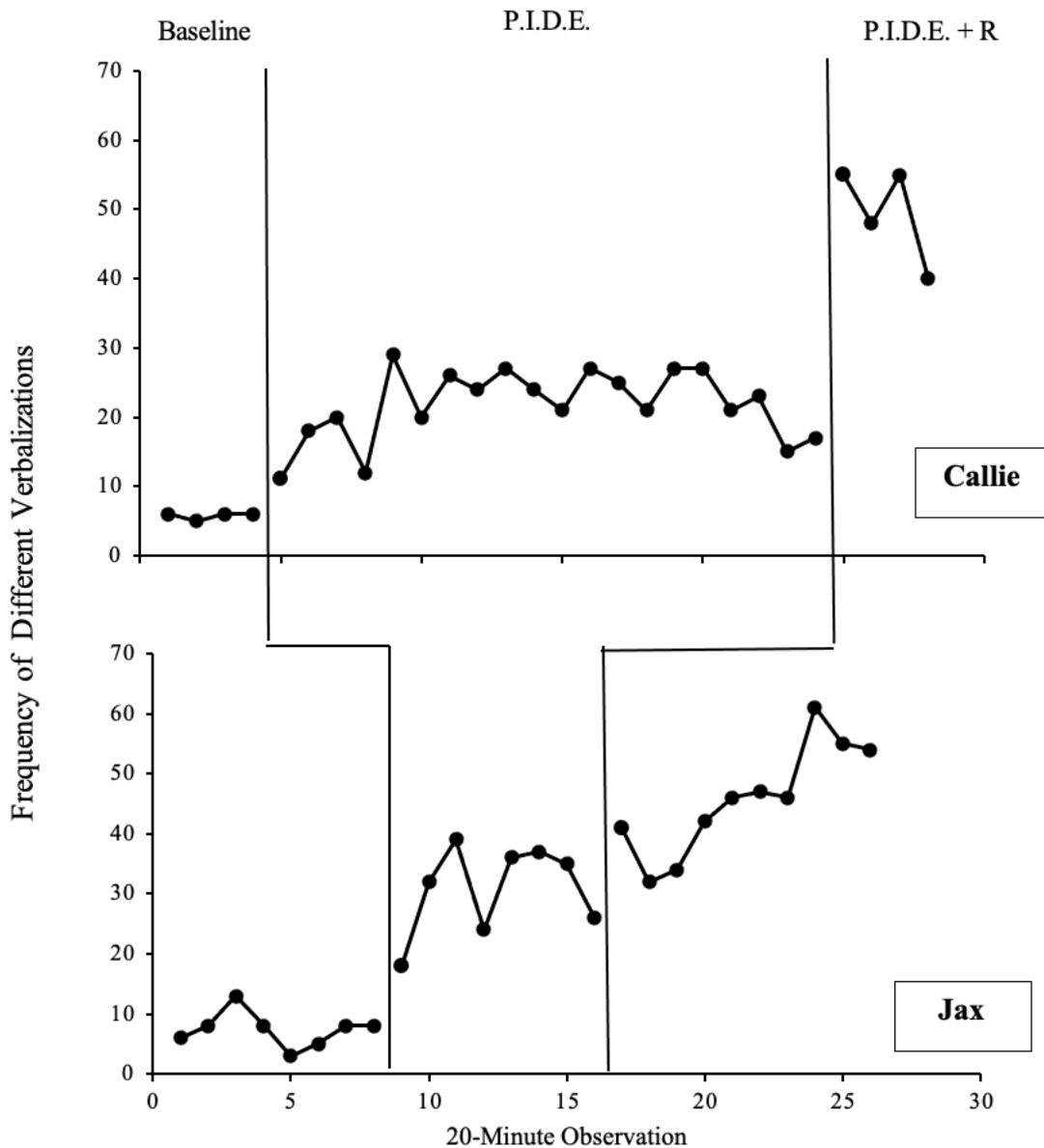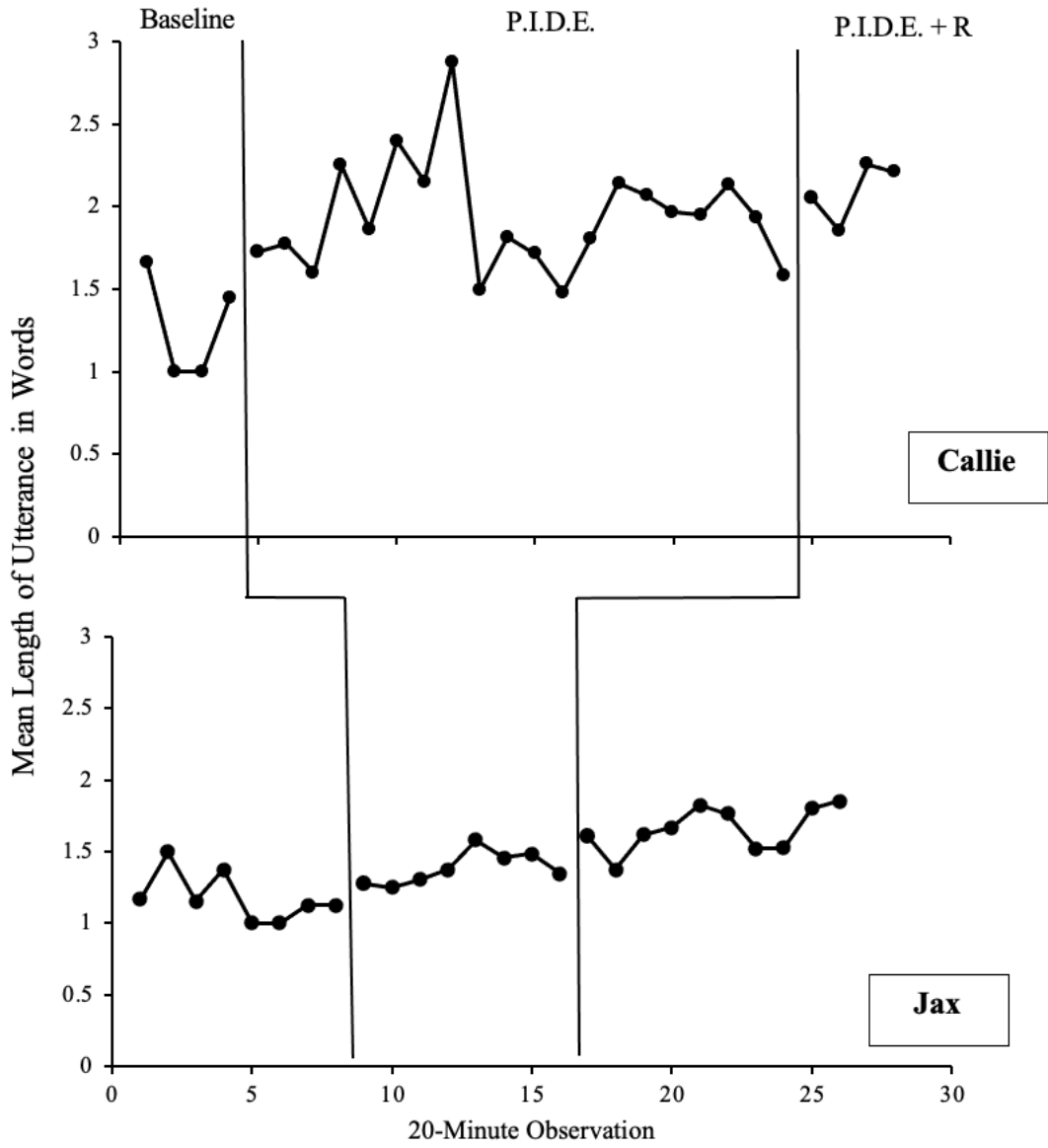Figure 2.

Frequency of Different Verbalizations

Figure 3.

Mean Length of Utterance in Words

Therapist Behavior

As displayed in Table 1., the therapist engaged in an average of 146 total

therapeutic interactions during baseline with Jax. Further analysis of the therapeutic

interactions in baseline indicate that the therapist engaged in an average of 144 instances

of non-contingent neutral talk and 2 instances of positive touch. During baseline, the

therapist engaged in 1 don't skill in the form of a question and 1 instance of a PRIDE

skill, in the form of a behavior description. During the first intervention condition, the

therapist engaged in an average of 144 total therapeutic interactions. The therapist

engaged in an average of 48 behavior descriptions, 44 instances of labeled praise, 47

instances of non-contingent neutral talk, and 5 instances of positive touch. The therapist

did not engage in any don't skills and engaged in 1 instance of reflection throughout the

first intervention phase. During the second intervention condition, the therapist

systematically added the use of reflections. The therapist engaged in an average of 148

total therapeutic interactions throughout the second intervention condition. Further

analysis indicated that the therapist engaged in an average of 38 reflections of child

verbal behavior, 36 behavior descriptions, 36 instances of labeled praise, 34 instances of

neutral talk, and 4 instances of positive touch. The therapist did not engage in any don't

skills during the second intervention condition.

Table 1.

Mean Frequency of Interactions Across Conditions for Jax

	Non-Contingent Talk	Positive Touch	Labeled Praise	Behavior Descriptions	Reflections	Total Therapeutic Interactions
Baseline	144	2	0	0.13	0	146
Intervention One	47	4	44	48	0.13	144
Intervention Two	34	5	36	36	38	148

As presented in Table 2., the therapist engaged in an average of 141 therapeutic interactions during baseline with Callie. Further, baseline data collected indicated that the therapist engaged in an average of 133 instances of non-contingent neutral talk and 8 instances of positive touch. The therapist did not engage in any don't skills throughout baseline and engaged in 1 instance of a PRIDE skill in the form of a reflection. During the first intervention condition, the therapist engaged in an average of 137 total therapeutic interactions. The therapist engaged in an average of 45 behavior descriptions, 44 instances of labeled praise, 39 instances of non-contingent neutral talk, and 9 instances of positive touch. The therapist did not engage in any don't skills and engaged 1 instance of reflection throughout the first intervention phase. During the second intervention condition the therapist systematically added the use of reflections. The therapist engaged in an average of 149 total therapeutic interactions throughout the second intervention condition. The therapist engaged in an average of 40 reflections of child verbal behavior, 34 behavior descriptions, 31 instances of labeled praise, 35 instances of neutral talk, and

9 instances of positive touch. The therapist refrained from engaging in any don't skills during the second intervention condition.

Table 2.

Mean Frequency of Interactions Across Conditions for Callie

	Non-Contingent Talk	Positive Touch	Labeled Praise	Behavior Descriptions	Reflections	Total Therapeutic Interactions
Baseline	133	8	0	.25	0	141
Intervention One	39	9	44	45	.05	137
Intervention Two	35	9	31	34	40	149

Discussion

This study sought to isolate and examine the effects of reflections on child verbalizations, for children diagnosed with developmental disabilities that exhibit language delays. The results demonstrated an increase in the frequency of total verbalizations and different verbalizations that both participant's emitted. Jax demonstrated a minimal increase in his MLUw as each subsequent intervention condition was implemented. We are unable to draw conclusions about the impact that reflections have on Callie's MLUw due to the variability of responding that she demonstrated within each condition.

The design of this study was founded on the principle of baseline logic. Throughout the study each participant experienced a baseline condition and two subsequent intervention conditions. Each participant's performance was compared across each condition. As each intervention condition was implemented we saw an increase in

the dependent variables which served as a demonstration of the effect of the intervention (Ledford et al., 2018). By utilizing a non-concurrent multiple baseline design we exhibited experimental control while removing the need for researchers to remove an effective treatment (Johnston et al., 2020).

The findings of this study serve as evidence indicating the effectiveness of the use of PRIDE skills in increasing child verbalizations. Specifically, the results showed that child verbalizations increased moderately when the therapist used behavior descriptions and labeled praise; however, when the therapist systematically added the use of reflections there was a further increase in child verbalizations. The results of this study demonstrate the importance of reflecting child verbalizations to reach full therapeutic potential in increasing child verbalizations. The study findings supported previous research demonstrating that when more PRIDE skills were used there was in increase in the number of different words that children emitted (Garcia et al., 2015).

As shown in Table 1 and Table 2, the total number of therapeutic interactions that occurred in each condition of the study remained stable for each participant. Because the total number of therapeutic interactions remained stable across intervention conditions, we can determine that the increase in the frequency of total and different verbalizations was due to the contingency of the interaction rather than the frequency of interactions.

Limitations

Although the findings of this study are encouraging, it is important to consider the limitations of the current study when interpretating the results. The first limitation of the study is the threat of a sequence effect. Due to the fact that each participant experienced every treatment condition, there is a chance that prior experience to a previous treatment

condition influenced responding in subsequent conditions. As an attempt to minimize the threat of sequence effects, the researcher attempted to gradually shift participants to each subsequent condition which helped to separate sequence effects across conditions (Johnston et al., 2020).

A second limitation of this study is the weakness of the non-concurrent multiple baseline design and its limited ability to assess the threat of extraneous events (Johnston et al. 2020). Due to the fact that the treatment conditions were not occurring simultaneously we are unable to draw conclusions across baselines. A non-concurrent multiple baseline relies on the comparisons between conditions within each participant. It is important to note that throughout the study there was a large amount of overlap and simultaneous implementation of intervention conditions. The overlap of implementation of intervention conditions reduces the threat of extraneous events influencing the results of the study (Harvey et al., 2004).

Additionally, there is a limitation because the data collectors for this study were not blind to each treatment condition. Due to the fact the data collectors were providing the primary researcher bug-in-the-ear coaching during each treatment condition, the observers were aware of the criteria for each topography of interaction. This may have led to biased data collection. Although feasible, it is important to note the high percentage of agreement across all conditions in the study which reduces the threat of bias in the current study.

A final limitation of the study is that the therapist had an established therapeutic relationship with both participant's due to prior experience working with the participants in a clinic setting. For Callie, a previous therapeutic goal in the clinic setting was to

request to go for a walk to a highly preferred clinic space. There were instances in which Callie appropriately requested to go to the highly preferred clinic space; however, the therapist denied these requests in order to maintain procedure fidelity. Denying the requests to go to a different clinic space was often an antecedent to challenging behavior that may have interfered with the study.

Clinical Implications

The current study demonstrates that the child-directed skills outlined in PCIT interventions can significantly increase the total and different verbalizations that children emit. Reflections are a critical component of the PCIT intervention and are unique in that they serve as a potential reinforcer for verbalizations as well as a model for future verbalizations. Verbal language interventions may benefit from a focus on reflecting child verbalizations.

Further, PCIT's child-led approach may alleviate potential barriers in therapeutic relationships and enhance the rapport between the client and the therapist. Engaging in the child-directed skills outlined in PCIT provides clinicians with the skill set to pair with a client while targeting functional communication skills using a naturalistic approach. Due to the fact that the CDI skills are typically implemented by client caregivers, it is important to assess whether similar treatment outcomes are achieved when parents are coached to utilize the PRIDE skills outlined in PCIT. Including multiple people and environmental contexts in a child's behavior change program follows the generalization framework outlined by Stokes and Bear (1997).

Targeting language development, through a child-led approach, may serve to prevent externalizing behaviors that are often present in children with language delays.

Behaviors serve as a way to access something or escape something (Cooper et al., 2020). Often children with limited verbal repertoires engage in challenging behavior as a means to communicate to the people in their environment. By increasing a child's verbal repertoire using a child-led approach we are teaching the child the skills they need to access the world around them while minimizing interactions that may be perceived as aversive.

Appendix A

Condition:_____   Date:_____

Participant:_____   Observer: _____

Child Vocalization:	Type of Verbalization (Circle)				Tally number of occurrences:
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	
	M	T	IV	E	

Appendix B

Condition:_____   Date:_____

Participant:_____   Observer: _____

Skills:	Count:	Total:
Labeled Praise		
Unlabeled Praise		
Behavior Description		
Neutral Talk		
Positive Touch		
Reflection		
Negative Talk		
Command		
Question		

Appendix C

Free Operant Observation Log

Date:	Location:		Teacher:	Child:
Item/Activity	**Approached**	**Did not approach**	**Engaged with**	**Duration of engagement**
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s
				_____ min, _____ s

Highest preferred items (approached frequently, engaged with for longest durations):

Moderately preferred items (approached, engaged with for shortest durations):

Low preferred items (did not approach):

References

Bagner, D. M., Garcia, D., & Hill, R. (2016). Direct and indirect effects of behavioral

    parent training on infant language production. *Behavior Therapy*, *47(2),* 184–197.

    https://doi.org/10.1016/j.beth.2015.11.001

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through

    functional communication training. *Journal of Applied Behavior Analysis, 18(2),*

    111–126. https://doi.org/10.1901/jaba.1985.18-111

Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied Behavior Analysis* (3rd

Edition). Hoboken, NJ: Pearson Education.

Eyberg, S. (1988). Parent-Child Interaction Therapy: Integration of traditional and

    behavioral concerns. *Child and Family Behavior Therapy, 10(1),* 33–46.

    https://doi.org/10.1300/J019v10n01_04

Eyberg, S. M., Nelson, M. M., & Boggs, S. R. (2008). Evidence-based psychosocial

    treatments for children and adolescents with disruptive behavior. *Journal of*

    Clinical Child and Adolescent Psychology, 37, 215-237.

    doi:10.1080/15374410701820117

Eyberg, S. M., Nelson, M. M., Duke, M., & Boggs, S. R. (2005). *Manual for the Dyadic*

    Parent Child Interaction Coding System (3rd ed.). Gainesville, PL: University of

    Florida. Retrieved from http://www.PCIT.org

Fawley, K.D., Stokes, T.F., Rainear, C.A. Rossi, J.L. & Budd, K.S. (2020). Universal

    TCIT improves teacher–child interactions and management of child

    behavior. *Journal Behavioral Education*, *29*, 635–656.

Field, T., Nadel, J., Diego, M., Hernandez-Reif, M., Russo, K., Vchulek, D., Lendi, K., & Siddalingappa, V. (2010). Children with autism are more imitative with an imitative adult than with their parents. *Early Child Development and Care*, *180(4),* 513–518. https://doi.org/10.1080/03004430802090570

Garcia, D., Bagner, D. M., Pruden, S. M., & Nichols-Lopez, K. (2015). Language production in children with and at risk for delay: Mediating role of parenting skills. *Journal of Clinical Child and Adolescent Psychology, 44(5)*, 814–825. https://doi.org/10.1080/15374416.2014.900718

Hansen, B., & Shillingsburg, M. A. (2016). Using a modified parent-child interaction therapy to increase vocalizations in children with autism. *Child and Family Behavior Therapy*, 38(4), 318–330. https://doi.org/10.1080/07317107.2016.1238692

Harvey, M.T., May, M.E. & Kennedy, C.H. Nonconcurrent Multiple Baseline Designs and the Evaluation of Educational Systems. *Journal of Behavioral Education* 13, 267–276 (2004). https://doi.org/10.1023/B:JOBE.0000044735.51022.5d

Itzchak, E. B., & Zachor, D. A. (2011). Who benefits from early intervention in autism spectrum disorders? *Research in Autism Spectrum Disorders*, 5(1), 345–350. https://doi.org/10.1016/j.rasd.2010.04.018

Johnston, J. M., Pennypacker, H. S., & Green, G. (2020). *Strategies and Tactics of Behavioral Research and Practice*. https://doi.org/10.4324/9781315537085

Ledford, J., Lane, J., & Severini, K. (2018). Systematic Use of Visual Analysis for Assessing Outcomes in Single Case Design Studies. *Brain Impairment*, 19(1), 4-17. doi:10.1017/BrImp.2017.16

Masse, J. J., McNeil, C. B., Wagner, S., & Quetsch, L. B. (2016). Examining the efficacy of parent–child interaction therapy with children on the autism spectrum. *Journal of Child and Family Studies*, *25(8),* 2508–2525. https://doi.org/10.1007/s10826-016-0424-7

McGee, G. G., Morrier, M. J., & Daly, T. (1999). An incidental teaching approach to early intervention for toddlers with autism. *Journal of the Association for Persons with Severe Handicaps, 24(3),* 133–146. https://doi.org/10.2511/rpsd.24.3.133

Parker, M. D., & Brorson, K. (2005). A comparative study between mean length of utterance in morphemes (MLUm) and mean length of utterance in words (MLUw). *First Language*, *25(3),* 365–376. https://doi.org/10.1177/0142723705059114

Pelaez, M., Virués-Ortega, J., & Gewirtz, J. L. (2011). Contingent and noncontingent reinforcement with maternal vocal imitation and motherese speech: effects on infant vocalizations. *European Journal of Behavior Analysis*, *12(1),* 277–287. https://doi.org/10.1080/15021149.2011.11434370

Rose, V., Trembath, D., Keen, D., & Paynter, J. (2016). The proportion of minimally verbal children with autism spectrum disorder in a community-based early intervention program. *Journal of Intellectual Disability Research*, *60(5),* 464–477. https://doi.org/10.1111/jir.12284

Starry, R., Stokes, T. F., Longerbeam, M., & Richardson, E. (In press). Interprofessional collaboration across disciplines: incorporating merged treatment procedures for children with autism. *Journal of Interprofessional care.*

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of*

Applied Behavior Analysis, *10(2),* 349–367. https://doi.org/10.1901/jaba.1977.10

349

Shillingsburg, M. A., Hollander, D. L., Yosick, R. N., Bowen, C., & Muskat, L. R.

(2015). Stimulus-stimulus pairing to increase vocalizations in children with

language delays: a review. *The Analysis of Verbal Behavior*, *31*(2), 215–235.

https://doi.org/10.1007/s40616-015-0042-2

Tempel, A. B., Wagner, S. M., & McNeil, C. B. (2009). Parent-child interaction therapy

and language facilitation: The role of parent-training on language development.

The Journal of Speech and Language Pathology – Applied Behavior Analysis,

3(2-3), 216-232. http://dx.doi.org/10.1037/h0100241

Tempel, A. B., Wagner, S. M., & McNeil, C. B. (2013) Behavioral parent training skills

and child behavior: the utility of behavioral descriptions and reflections, *Child &*

Family Behavior Therapy, *35:(1),* 25-40, DOI: 10.1080/07317107.2013.761009

Vietze, P., Lax, L.E.(2020) Early intervention ABA for toddlers with ASD: effect of age

and amount. *Current Psychology 39*, 1234–1244. https://doi.org/10.1007/s12144-

018-9812-z