

USE OF BUNDLE OF LEARNING WITH EMT STRATEGIES WITH CHILDREN
WITH LANGUAGE DELAY AND ASD

by

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Thesis

Submitted to the Faculty of
Peabody College of Vanderbilt University
in Partial Fulfillment of the Requirements
for the Degree of

Master of Education

in

Early Childhood Special Education

May 2023

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Major Area: Early Childhood Special Education Number of words: 145 words

This study examined the use of *Bundle of Learning* with Enhanced Milieu Teaching (EMT) strategies with children with language delay and ASD. An alternating treatment design (ATD) was utilized to compare the *Bundle of Learning* + EMT to repeated reading alone. The number of different words (NDW) used by the target child was the primary outcome measure used to determine the effectiveness of the intervention compared to repeated reading alone. The intervention was delivered in a small group reading activity. The participants included a 25-month-old child with a language delay and a 29-month-old child without an identified language delay. Results indicated that there was a functional relation between the Bundle of Learning + EMT strategies and the NDW of the target child during the intervention condition (shared book reading) compared to the control condition (repeated reading alone). Implications for future research and practice are discussed.

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CHAPTER I

INTRODUCTION

Language is a critical component of children's social, cognitive and academic development. Early language skills help establish social-communicative skills such as initiation, turn-taking, joint attentiveness, and responsiveness in interactions with adults and peers (Craig-Unkefer & Kaiser, 2003). Early language skills also promote successful long-term academic outcomes, such as writing and reading (DEC, 2023).

Early language intervention

Shared Book Reading as an Evidence Based Practice

Shared book reading (SBR) is an instructional approach in which an adult engages with a child during book reading and models language, book handling skills, and early literacy skills. Research has demonstrated that the use of SBR can support a wide range of skills for early learners, including vocabulary acquisition and general language skills (Noble et al., 2020). Caregivers and practitioners have been encouraged to read with young children using a set of strategies called dialogic reading. Dialogic reading strategies include expansions, recasts, and open-ended questions that have positive effects on the language development of a child (Baker & Nelson, 1984). A study on accelerating the language development of 2-year-olds using picture book reading in a dialogic reading style demonstrated positive outcomes. Children who received the dialogic reading intervention scored significantly higher on both receptive and expressive language compared to children who did not receive the intervention (Valdez-Menchaca & Whitehurst 1992). In another study on the impact of interactive SBR on young children's language skills, results indicated that the interventions using a SBR approach were effective improved caregiver reading behaviors (Nobel et al., 2020).

Throughout the last few decades, there has been a push to strengthen language development through early interventions for learners with language delays (Curtis et al., 2019). Enhanced Milieu Teaching (EMT) is an evidence-based language intervention in which the interests and initiations of children are utilized to model and prompt the use of language across everyday environments (Kaiser & Roberts, 2013). EMT utilizes six key strategies: responsiveness, environmental arrangement, modeling target language, eliciting, expanding communication, and prompting communication. Instead of directing a child's play behaviors, adults are taught to observe and imitate a child's play actions, expanding on a child's play and talking about the interest of focus for the child (Curtis et al., 2019). Expanding includes imitating exactly what a child communicated then adding new content words to link what they have already produced (Kaiser & Wright, 2013). Researchers have shown that EMT strengthens both the linguistic and social communication aspects of language use by children with disabilities (Hancock & Nietfeld, 2000).

Several studies have demonstrated that EMT is an effective intervention. EMT has been shown to strengthen children's expressive and receptive language skills immediately following intervention (Curtis et al., 2019). In a study on the effects of EMT with phonological emphasis on speech and language skills of young children with a cleft palate, it was determined that the children who received the treatment (EMT + phonological emphasis) had significantly better receptive language scores compared to the children who did not receive treatment (Kaiser et al., 2017). In another study on using EMT and book reading on the target word approximations of young children with language delays, a functional relation was found between the intervention (EMT) and the number and frequency of targeted approximations for participants (Kang & Kim, 2022).

However, there are some limitations in the existing research in terms of solely utilizing EMT as an intervention for children with early language delays. Additional research on determining language outcomes for toddlers with language delays demonstrated that toddlers did not maintain outcomes over the 12 months of the EMT intervention (Curtis et al., 2019). Early learners with receptive language delays may be able to improve their language skills to the levels of their TD peers; however, additional intervention procedures may be necessary for children with comorbid receptive and expressive language delays (Curtis et al., 2019). These findings suggest that some early learners with language delays receiving naturalistic language interventions such as EMT may require additional supports to improve language outcomes. To help strengthen language development, both caregivers and teachers can encourage the use of gestures, play skills, and vocabulary use (McLaughlin, 2011).

Gestures are a vital component of a child's expressive communication capabilities. In the early childhood years, the use of gestures such as pointing, reaching, showing, and giving allow young children to communicate with caregivers and provide caregivers opportunities to respond with specific linguistic input. The use of gestures by young children may also contribute to strengthening their receptive vocabulary by soliciting input from adults, which in turn may increase the number of words the child uses expressively (Roberts & Kaiser, 2015). Children who experience delayed gesture development may also have spoken language delays (Romano & Windsor, 2020). Adults who use gestures also serve a significant role in supporting a child's expressive communication. Research examining the relationship between expressive language delays and gestures has shown that children who have expressive language delays show significant improvements in their language use when adults incorporate the use of gestures while speaking to children (Lowry, 2016).

Play skills are also related to early language development. Play is an important context for the development and growth of exploration, problem solving, and social awareness. When young children engage in play, they have opportunities to build emergent social communication skills and social competence (Jester & Johnson, 2016). However, children with disabilities have been found to play less often and demonstrate fewer pretend play behaviors compared to children who are typically developing (Barton, 2015). Rescorla and Goossems (1992) explored the pretend play skills of toddlers with and without language delays and found that children with language delays demonstrated limited pretend play skills (i.e., relatively fewer pretend-play occurrences, forms and schemas) compared to the children without language delays.

More recently, researchers have examined the relationship between language skills and pretend play. Children with language deficits displayed fewer theory of mind skills during play compared to their peers with typical language abilities (Jester & Johnson, 2016). Children with language delays may demonstrate deficits in other domains and stages of development (e.g., manipulating objects) and are less likely to answer questions from peers, initiate routines, and design their own rules. When children have less access to language for play interactions, they may have challenges with generalizing play strategies to varied contexts, connecting past and current play experiences, and controlling their language to finish tasks (Dennis & Stockhall, 2015). Because of this, it is important that adults provide early learners with the play strategies needed to strengthen their social, cognitive, and emotional well-being. In an article on teaching generalized pretend play and related behaviors to young children with disabilities, Barton and Wolery (2010) specifically encouraged teachers

implement play-focused interventions with children who have development delays or disabilities.

Vocabulary and syntax development in early learners is related to long-term reading and academic outcomes (Dennis & Stockhall, 2015). Children with expressive delays demonstrate a delayed progression in sentence structure and articulation (American Speech Language Hearing Association, 2022). For reading comprehension, strengthening children's vocabulary attainment is a vital goal within the preschool classroom (McLeod et al., 2017). To promote language development, modeling vocabulary and sentence structure utilizing comments or descriptive commentary is highly beneficial to the learner (Badii, 2018).

Language interventions + Integrated Supports for Learning

The Bundle of Learning: Language and Literacy brings evidence-based ingredients into books and story-related materials, providing adults with techniques to strengthen a child's learning through the practice of language, social, and cognitive skills (Landa, 2021). Each bundle contains a book with prompts and icons, a backpack, and 15 toy props. The book bundles were created to reinforce play, language, and social development for children ages 12 months to 6 years of age. Gestures for verbs corresponding to the pictures are included to help children understand the meaning of the verb and to make actions salient in the narrative. The story narrative and range of toys included in the bundle provide children the opportunity to engage in play at various levels, from simple actions with objects to thematic pretend play.

Vocabulary in the books is designed to support language learning. The vocabulary is redundant across pages to allow for repeated use of a particular word. The books include nouns, verbs, prepositions, and adjectives at a range of

developmental levels to support vocabulary development across the toddler and preschool period. The bundles include embedded prompts that help adults model play, gestures, and vocabulary in ways that are likely to promote language development.

The Bundle of Learning: Language and Literacy also includes tips for adults to promote a child's engagement and learning throughout the book sharing time (Landa, 2021).

Purpose and Research Questions

There is a critical need for early interventions to strengthen language development in early learners with language delays (Curtis et al., 2019). While EMT has been utilized in both single case and group design studies (Kaiser & Hampton, 2017) there are no published studies of EMT used only in book reading. Similarly, the *Bundle of Learning* is a relatively new packaged intervention, and empirical studies using this intervention are forthcoming.

Recently, researchers explored combining *Enhanced Milieu Teaching (EMT)* and *Bundle of Learning (BB)* strategies into a single book reading intervention (Delmare, 2022; Jang, 2022; Lanier, 2022). Two studies included a single case design with one child with a language delay, and one included a single case design with two typically developing children. These studies aimed to determine if the use of BB + EMT strategies increased the number of different words, gesture use, and play actions used during book reading compared to standard repeated reading in a small group setting for the child with a language delay. Interventionists conducted intervention and control conditions where the use of BB-EMT strategies were used in the intervention sessions (i.e., language modeling, expansions, question-asking sequences) and the control sessions as standard reading alone (reading the books through with no strategies). Results determined that the use of the BB-EMT strategies

resulted in a larger NDW across participants compared to the repeated reading condition. Therefore, functional relationships were identified between the use of BB-EMT strategies in shared book reading compared to the standard repeated book reading for the target child (Delmare, 2022; Jang, 2022; Lanier, 2022).

Given this, the purpose of the present study was to replicate the previous studies by comparing the use of the blended intervention, *The Bundle of Learning + EMT*, for promoting language skills in young children, compared to a business-as-usual shared book reading condition with both the child with a language delay and the typically developing child within the same dyad. This study incorporated double the amount of intervention and control sessions as the previous researchers to expand the length of the procedure. This study also integrated play sequences through intervention sessions with improved toy quality in each book bundle set. The research questions addressed are as follows:

Research Question 1: Do children with and without language delays use a greater number of different words (NDW) during the Bundle of Learning + EMT condition compared to repeated reading in a shared book reading format in a small group setting?

Research Question 2: Do children with and without language delays use a greater number of unprompted words (UP) during the Bundle of Learning + EMT condition compared to repeated reading in a small group setting?

CHAPTER II

METHOD

Recruiting and Screening

After approval of the IRB, we asked teachers in a local inclusive preschool to nominate both children with potential language delays and peers without language delays. Parent consent for participation in the study was obtained for all nominated students. Once students were nominated, they were screened for potential inclusion in the study. The MacArthur Bates Communicative Developmental Inventories (Bruckner et al., 2007) and the Preschool Language Scales 5th edition (Hsiao et al., 2021) were administered by master's level clinicians to screen the expressive and receptive language skills of the target child and peer. Participation inclusion criteria for the target child and the peer participant are found in Table 2. After the inclusion criteria were confirmed, demographic data were collected for both participants. Participant data such as the (a) age at intake, (b) gender, and (c) race/ethnicity were collected. Detailed demographic data and child standardized assessment results for both the target child and peer participant are found in Table 1.

Table 1.

Child Characteristics

Characteristic	Target Child	Peer Child
Age at entry	25 mo	29 mo
Gender	Male	Female
Ethnicity/Race	Multiple, Non-Hispanic	White, Non-Hispanic
Diagnosis	None	None
MCDI Total words	59	346
MCDI Total words %	5 th	15 th
PLS-5 Auditory Comprehension standard score	92	112
PLS-5 Auditory Comprehension percentile	30 th	79 th
PLS-5 Expressive communication standard score	88	111
PLS-5 Expressive communication %	21 st	77 th
PLS-5 Total language score	89	112
Total language percentile	23 rd	79 th

Participants

This study was approved by the Vanderbilt University Institutional Review Board (IRB #211858). We recruited two children: one child who was reported to have a potential expressive language delay by their classroom teacher and one peer participant with no suspected expressive language delay. Participant inclusion criteria for the target child (i.e., child with a language delay) and the peer participant (i.e., child without a language delay) are in Tables 2 and 3. The target participant was a 25-month-old male toddler. A secondary participant was recruited as a peer. This peer was a 29-month-old female toddler. Language skills of both children were assessed using standardized measures. Standardized measures included the (a) MacArthur-Bates Communicative Developmental Inventories – Words and Sentences (MCDI-

WS) completed by the children's caregivers and (b) Preschool Language Scales 5th edition (PLS-5).

The results of the MCDI indicated that the target child produced 59 words at intake and was in the 5th percentile, whereas the peer participant produced 346 words at intake and was in the 15th percentile. The results of the PLS-5 indicated that the target child received a standard score of 92 on the standard auditory comprehension section in the 30th percentile, an 88 on the expressive communication section in the 21st percentile and had a total language score of 89 in the 23rd percentile. The results of the PLS-5 indicated that the peer participant scored a 112 on the auditory comprehension section in the 79th percentile, a 111 on the expressive communication section in the 77th percentile and had a total language score of 112 in the 79th percentile.

Although the peer participant was nominated as a child without language concerns, the assessments suggest that her language skills were below norms for her age. Because no specific exclusion criteria for language were proposed, the child was included as a peer. These child characteristics are found in Table 3. Demographic information of the two participants is found in Appendix B. An MCDI form is in Appendix C.

Table 2.

*Inclusion and Exclusion Criteria**Target Child Characteristics*

Inclusion Criteria	Exclusion Criteria
Child must have single word use and have at least 20 reported words that they use expressively in a multitude of modes (words, AAC, signs) as reported by parents	Have primary diagnosis of any specific disability other than language delay or autism spectrum disorder including (1) severe motor impairment (e.g., cerebral palsy), (2) sensory impairment such as blindness or deafness
Score at or below the 20 th percentile on the MacArthur-Bates Communicative Developmental Inventories ¹ word and sentence section using sex-specific norms in the last six months	Have less than 20 reported words that they use expressively in a multitude of modes (e.g., vocally, signs, AAC) as reported by parents
Expressive language delays of at least 1.0 SD below age norm on the expressive communication section of the Preschool Language Scales 5 th edition ²	Have a PLS-5 total score with 1.0 SD of age norms on the expressive communication section of the Preschool Language Scales 5 th edition
Age between 15 – 48 months	Have a MCDI score above the 20 th percentile for age and sex
Consistent attendance at school	Age below 15 months or above 48 months
Child must be able to attend to a book at least 3 minutes as observed through a probe and parent report	Does not have consistent attendance at school Is not able to attend to book for at least 3 minutes as observed through a probe and parent report

¹ MacArthur-Bates Communicative Developmental Inventories (Fenson et al., 2007)

² Preschool Language Scales 5th edition (Zimmerman, Steiner, & Pond, 2012)

Table 3.

*Inclusion and Exclusion Criteria**Peer Participant Characteristics*

Inclusion Criteria	Exclusion Criteria
Teacher recommendation for inclusion based on social interaction with peers with language impairments	Teacher did not recommend for inclusion based on social interaction with peers with language impairment
Have no diagnosed disability	Have primary diagnosis of any specific disability other than language delay or autism spectrum disorder including (1) severe motor impairment (e.g., cerebral palsy), (2) sensory impairment such as blindness or deafness
Age between 15-48 months	Age below 15 months or above 48 months
Consistent attendance at school	Does not have consistent attendance at school
Child must be able to attend to a book at least 3 minutes as observed through a probe and parent report	Is not able to attend to book for at least 3 minutes as observed through a probe and parent report

The primary researchers (hereafter referred as interventionists) were two master's students in Early Childhood Special Education at a research university in the southeastern United States. The demographic and complete description of both interventionists are shown in Table 4.

Table 4.

Interventionist and Coder Characteristics

	Primary interventionist/Reliability coder	Primary Coder
Age in Years	24	24
Race/Ethnicity	White, Non-Hispanic	Asian, Non- Hispanic
Education	BS	BS
Years of teaching or behavioral intervention experience	4	4

Setting and Materials

All sessions were conducted in an inclusive university-based preschool in the southeast United States. Participants were brought from their classroom to a separate therapy room for all sessions. The therapy room was equipped with a table and a chair, however, the implementor and the children sat on the carpeted floor for all book reading sessions.

Instructional materials included two book bundles, (1) *Bear's Applesauce Picnic* and (2) *Friend's Frosty Fun* with the corresponding book and toys.

Participants always had access to the corresponding play manipulatives for each book. *Bear's Applesauce Picnic* included: a stuffed bear, duck, dog, and mouse; play cutlery including a bowl, spoon, and knife; a truck made from a shoebox; apples with and without fastening Velcro; a small wooden box; and a small blanket. *Friend's Frosty Fun* included: a stuffed bear, bunny, mouse, and dog; a sled, a small blanket; a small muffin pan; six fabric snowballs; a scarf; a hat; and a snowman puzzle. Stickers were provided to participants after the completion of each session. Pictures of the Book Bundle materials are in Appendix D.

A stimulus book was created for pre- and post-intervention expressive probes. The book included pictures of scenes from the books *Bear's Applesauce Picnic*, (2) *Friend's Frosty Fun*, and (3) *Bear's Beary Good Cookies*. During play generalization probe sessions, participants had access to limited toys from the *Bear's Applesauce Picnic* and *Friend's Frosty Fun*. These toys included a sled, snowballs, pan, blanket, hat, truck, apples, pot, knife, spoon, bear, duck, mouse, bunny, and the dog.

Sessions were videorecorded using Zoom software on a laptop, phone or iPad. Once a session was completed, the interventionist named and uploaded the Zoom recording to Vanderbilt Box, a secure cloud-based content management software.

Session data were transcribed and coded from video recordings using DataVyu software (Gee et al., 2020) and Microsoft Excel. Data were graphed using Prism GraphPad software (Docos et al., 2022).

Experimental Design

An alternating treatments design (ATD; Ledford & Gast, 2018) was used to compare the Bundle of Learning (hereafter referred as BB) and EMT intervention to repeated reading. An ATD allowed for the comparison of two independent variables (IVs; i.e., the blended use of BB+ EMT to repeated reading alone). Additionally, this design was appropriate for reversible behaviors (i.e., number of different words used in sessions). The use of the ATD limited several threats to internal validity. For example, history threats were controlled for because both interventions were run concurrently. Changes in level or trend due to history threats would be evident in both conditions and easily identified using visual analysis. As the design was relatively brief, both history and maturation threats were controlled for. If there was a significant event that occurred outside of the study, it would affect both conditions (i.e., a diagnosis or new medicine). Although the study was brief, participants would have shown a change in behavior or maturity in both conditions if maturation was a threat (i.e., getting older).

Instrumentation threats were controlled by observers who were equipped with a coding manual containing the response definitions with examples and recording systems and were trained to a high criterion. Interventionists and coders were blind to ongoing visual analyses, meaning they were unaware of data trends until the end of the study. Maintaining blind visual analysis limited potential bias of both the interventionists and coders during the study. It is important to note that the observers could not be blind due to their knowledge of the procedures.

Visual analysis of level, trend, and variability of data was used to draw comparisons between two alternating conditions with at least five data points (Ledford & Gast, 2018). This was conducted following the completion of the intervention to limit any bias. The degree of differentiation in levels of the two data paths allowed for comparisons across the two conditions. Visual analysis also allowed for determinations about whether there were functional relations. To determine if there was a functional relation, a vertical separation between the intervention and control condition were observed.

Response Definitions and Measurement Systems

Both children's language was transcribed using SALT conventions and coded for presence of dependent variables. The number of different words (NDW) was the primary dependent variable utilized to make experimental decisions. NDW indicated the number of different words roots the participants used within a session based on SALT definitions of word roots. Proper names and the varied forms of "to be" verbs (e.g., is, was, were, are), were excluded when counting the NDW. Phrases such as "all done" and "thank you" were counted as one word. NDW was counted from the transcripts of each session. Response definitions and examples are found in Table 5.

Spontaneous, prompted, and imitated child utterances were also recorded. Child utterances included unintelligible vocalizations, imitated language, and spontaneous word use. For example, if the child said "bear" without an adult prompt, the words was counted as spontaneous word use. If an adult asked the child what was falling from the sky and the child said "snow", that would count as a word for NDW calculations but would not be considered spontaneous. And if the adult said "hat" and then the child said "hat", that would also count as a word. Each 3-15 video observation was coded using the coding protocol. Timed event sampling was used to

record how often the child used different words during the sessions. It also estimated the use of gestures, play rate, and vocabulary use of the target participant and peer participant.

Table 5.

Definitions and Examples of Child Behavior

Dependent Variable	Definition	Example	Non-example
NDW	The number of different words that the child uses during the shared book reading	Child says, “bear eats;” two different words	Child’s utterance is unintelligible or says, “roar” as an animal sound
Number of unprompted words	The number of different unprompted words that the child uses during the shared book reading	Child says, “bear is driving” without being prompted; spontaneous	Child says, “snow” after the interventionist asked, “what is falling from the sky?”

Note. NDW = Number of Different Words

EMT Coding Protocols. A Book Bundle EMT Coding Protocol was designed to code adult and child communication which is found in Appendix E and F. Child utterances were coded for single codes, communicative form, and independence. Single codes were assigned if a child’s utterance was potentially communicative but otherwise uncodeable. For example, if the child’s utterance was unintelligible, it would be coded as a potentially communicative vocalization. Non-word vocalizations were also assigned single codes. If the child communicated by saying a word, using a gesture, or using an AAC device, this would be coded based on the coding protocol. For example, if the child reached for the pot, it would be coded as a gesture (g). If the child communicated in a way that was prompted, unprompted, elicited, or imitated, this would be coded based on the codes assigned. For example, if an adult said “bear” and the child then “bear”, this would be coded as imitated.

Adult communication was coded based on single codes, turn taking, expansion, and target language codes. For single codes, when the adult read the book to the participants, this would be coded as the adult was reading. If there was any unintelligible utterance from an adult, this would be coded as unintelligible. And if the adult does not take a turn within 3 s of the child's communication, this would be coded as a no response. If the interventionist responded to any communicative act of the participants with semantically contingent content within 3 s, that utterance was coded as a matched turn. For example, if the child reached for the bear, the interventionist may have said, "You want bear!". Turns were coded as unmatched turns if the interventionists took back-to-back turns or responded non-contingently to a communicative act of the child participants. If the interventionist expanded a child participant's words into a grammatical simple sentence or recasted a speech error, that utterance was coded as an expansion. For example, if a participant said "Bear", the interventionist may have expanded by saying, "The bear is eating!".

An adult utterance would be coded as no expansion if the interventionist responded to a child's expandable utterance without completing an expansion or recasting. Question asking episodes were coded based on their quality. Possible quality scores included "outstanding performance", "not-outstanding performance", or "child loss of interest". Question asking episodes that included the interventionist maintaining the participant's interest, giving the child adequate time to respond, and expanding on their response would be coded as "outstanding performance". For example, if the interventionist asked, "What's on bear's head?" and a participant responded by saying, "Hat", the interventionist would then say, "The hat is on bear's head!". A question asking episode would be coded as "not outstanding performance" if the interventionist continued a question asking episode that did not have the

participant's interest or did not follow the correct question asking sequence. The code "child loss of interest" was coded if the interventionist abandoned the question sequence when the participant was not interested. A question asking flowchart is found in Appendix K.

Expressive Language Probes

The interventionist conducted three probes of children's book-related expressive vocabulary. Two expressive language probes were conducted before the intervention began and one session was conducted following the conclusion of intervention. The interventionist conducted sessions with the target participant and peer separately. Before each probe session began, the interventionist minimized distractions and sat face-to-face with the child. The interventionist presented one scene one-at-a-time from the two books used during the comparative design (i.e., *Bear's Applesauce Picnic* and *Bear and Friend's Frosty Fun*) as well as from a third book that child participants were never exposed to (i.e., *Bear's Beary Good Cookies*).

On the first page, the interventionist modeled an active declarative sentence describing the scene (e.g., "Bear is stirring the applesauce"). On subsequent pages, the interventionist used an open-ended prompt (i.e., "What's happening here?") to probe children's story-related expressive language skills. If 3 s elapsed with no child response, the interventionist provided a more supportive prompt (i.e., "Tell me about the bear"). Models of sentences were interspersed with prompts every two pages. The interventionist was responsive to all child responses but provided no feedback about the child's response. An expressive probe scoring checklist is in Appendix G and example of the probe book is in Appendix H.

Play Generalization Probes

The interventionist conducted one play generalization probe session before the intervention and one play generalization probe session following the intervention. The materials were pre-selected from the control read book set and intervention read book set. Before each probe session began, the interventionist minimized distractions, prepared the materials, and used a statement such as, “Let’s play with Bear and his friends!”. The interventionist would engage with the participant and peer in child-led play (e.g., comment on a child’s play and imitating play actions). Once per minute, the interventionist would comment on play (e.g., “You’re rolling the apple!”) and add a new action that was exclusive from the book actions and semantically related to the ongoing play (e.g., “Bear took a big bite of the snowball!”). An equal number of comments and an equal number of added actions from each book were used.

Procedures in the BB+EMT and Repeated Reading Conditions

Following guidelines outlined for ATDs, two conditions (i.e., the BB+EMT; repeated reading alone) were compared via rapid alternation across sessions (Ledford & Gast, 2018). An independent research assistant who did not code data or conduct the intervention used a random number generator to assign individual books to experimental conditions. *Bear’s Applesauce Picnic* was identified as the book used for all BB+EMT sessions (i.e., “intervention”) and *Bear and Friends’ Frosty Fun* was identified as the book used for all repeated reading alone sessions (i.e., “control”).

The interventionist conducted 1-2 small-group sessions per school day. Only the interventionist and participants were present during each session. Each session was 3-15 min in duration and lasted 7 minutes on average (range: 4-10 mins). When two sessions were conducted in one day, 4-5 hours elapsed between sessions to reduce carryover effects. To protect against sequencing effects, condition order was

randomized in blocks of two using a random number generator. The document containing the randomized order of sessions is in Appendix J.

Both the control and intervention sessions included the interventionist, the target participant and the peer. Throughout both the control and intervention sessions, the target participant and peer sat next to one another on one side of the wall in the therapy room. The interventionist was seated across from the participant and peer to present the book. Before each session began, the interventionist minimized distractions, prepared the book and materials, reviewed behavioral expectations (e.g., modeling and presenting visuals of rules) and used a statement such as, “Let’s read about Bear and his friends” to begin the read.

Repeated Reading Alone (Control).

A pre-selected Bundle of Learning book was presented in a manner that excluded the use of BB+EMT strategies. The book was read alone (i.e., shared book reading without BB+EMT strategies). The interventionist did not model gestures, play or specific vocabulary words outside of the flow of narrative reading. Child use of gestures, play with related toys and use of vocabulary words within the book were not prompted or suggested. The interventionist responded to the participant or peer by acknowledging their communication or responding with positive statements without using BB or EMT strategies (e.g., if the target child pointed to the bear on the page and said “bear”, the interventionist responded, “Good job, that is a bear!” and then continued reading. Behavioral expectations were enforced, if necessary. For example, the interventionist encouraged the participant and peer to share the toys with one another, to stay in the book reading area and to show a safe body (not kicking or hitting the other child). The interventionist did not use any of the intervention strategies associated with BB or EMT for the entirety of every 3-15-min control

session. At the end of the control sessions, the interventionist praised the participant and peer for staying in the session area and rewarded them with stickers.

BB+EMT (Intervention).

Intervention sessions incorporated the use of BB+EMT strategies. We incorporated an equal number of strategies distributed across four different book reading sessions, then the next four reads repeated those strategies in the same distribution. For example, “Bear’s Applesauce Picnic,” the intervention book, page 1 had one strategy (e.g., expanding language), page 2 had another strategy (e.g., pointing to show an object), and so forth. The strategies were color-coded within the book and across the four read alouds to support the interventionist’s use of the different strategies. An outline of the strategies is found in Appendix I. Behavioral expectations were enforced, if necessary, where the participant and peer were encouraged to share the toys with one another and/or have a safe body. At the end of the intervention sessions, the interventionist provided praise to the participant and peer for staying in the session area and rewarded them with stickers. A table of the intervention and control conditions are found in Table 6.

Table 6.

Intervention and Control Condition

Intervention	Control
Shared book reading with BB+EMT	Shared book reading
BB strategies: language modeling, related play with toys, and pantomime gestures	No BB strategies; related toys available
EMT strategies: Responsive interaction, language modeling and expansions, modeling joint attention gestures, question asking	No EMT strategies
Embedded toy play episodes throughout book reading	No embedded toy play episodes

Note. EMT = Enhanced Milieu Teaching

Bundle of Learning Strategies. There were three primary strategies that were incorporated in BB: language modeling, gestures of relevant actions in the book, and play models using toys from the book bundle. Vocabulary words throughout the books were included to promote language learning through repetition of key words and exposure of new words. Gestures were used to support communication by physically modeling or pantomiming actions (e.g., apples rolling down the hill, stirring the pot) and emotions (e.g., surprise, happy) via body language. The book reading incorporated toys that corresponded to the related story, providing opportunities for children to engage in play at their developmental levels using objects (e.g., play ranged from simple actions with objects to enacting a part of the story such as driving the truck over the bump and the apples falling out).

The BB books include suggestions for multiple language support strategies on each book. For this study, the complete set of suggestions was divided into four subsets, and one subset was assigned to each of the reads 1 through 4. Only one suggestion per page of text was implemented. Thus, when each page of the book was read, the pre-selected language, gesture, or play strategy was implemented. During read alouds 1-4, a different strategy was used on each page during the read. Strategies to support use of vocabulary words were integrated throughout the book. For example, if the interventionist read about bear picking apples, she could also recast the text and say, “Bear is picking apples!” to model language for the children. Gestures were used throughout the read to express or draw attention to the actions or emotions that were happening in the book. For example, if the interventionist read about bear stopping his truck, she could put up a hand to gesture the “stop” motion. Children were encouraged to interact with the materials and sometimes with each other during the opportunities for play embedded into the reading. For example, when the interventionist read, “Bear picks four red apples, and then he is done,” she could put apples into the box (model a play strategy) then hand the box to the children to add more apples.

EMT Strategies. Enhanced Milieu Teaching (EMT) strategies were also embedded throughout reading the BB books. Engagement, communication, play, and prompting strategies were incorporated into the book reading sessions. Books and toys designed for a high level of interest kept the participants engaged during the sessions. Adult behaviors such as following the child’s lead, imitating and labeling child actions, pointing to pictures while saying the label or modeling an active declarative sentence, giving objects for play and labeling objects and the child’s

actions with objects, plus responding to the child's communication supported engagement and use of language.

Modeling target language and expanding the child's language provided the child with new vocabulary and models of short sentences. For example, if a child pointed to a picture of the bear in the story and said "bear", the adult responded with an expansion in the form of an active declarative sentence, "the bear is picking the apples." If a child was interested in an object, the adult pointed to the object and labeled it using target level language tailored to the child. When modeling new actions and adding objects to a play sequence with labeling or describing the actions or objects, this provided opportunities for more language modeling and contributed to keeping child interest in play high. For example, if a child was playing with an apple, the adult might imitate the child by playing with the apple, then adding a pot and spoon to stir the apple in the pot.

The use of prompts included asking questions about the book, offering choices and using 'say' prompts when the child was unable to respond. For example, after reading about bear making applesauce, the adult might ask, "What is the bear making?" If the child responded, she expanded the child's response into a short sentence. If the child did not answer or gave an incorrect answer, the question was repeated once, then the adult modeled the answer and asked the question again. If the child still did not respond, she modeled the answer one last time. These prompts allowed for an opportunity for the child to use new language. Prompts were used about 2-3 times per reading session.

Interobserver Agreement. Interobserver agreement (IOA) data were collected for at least 33% of sessions across the participants, dependent variable, and session

conditions. IOA sessions were selected using a random number generator and assigned by a member of the research team not assigned to coding or delivery of intervention. Agreement was measured utilizing the point-by-point method. The total number of agreements, divided by agreements plus disagreements were multiplied by 100 to determine the percentage of agreements amongst coders (Ledford et al., 2018). If IOA fell below the 90% agreement criteria, coders reviewed the behavior definitions and examples to see if there were challenges determining whether a behavior met the requirements of a definition. Table 7 and 8 provide IOA data.

Table 7.

Interobserver Agreement Result: Child Behaviors

Child Behavior	Average Score	Percentage of sessions (%)
Single Code	86.99	33%
Communication Form	93.83	33%
Independence	90.65	33%
Overall	90.49	33%

Table 8.

Interobserver Agreement Result: Adult Behaviors

Adult Behavior	Score	Percentage of sessions (%)
Matched Turns	90.89	33%
Expansion	91.01	33%
Target Language	89.84	33%
Overall	90.58	33%

Coder Training. The primary coder and secondary coder (i.e., the interventionist), were trained to code videos by reviewing the response definitions with examples and non-examples. They were trained to a 90% criterion on adult and child codes for intervention and control videos from a previous cohort. Child codes included single codes, communication, and independence codes, while adult codes included single codes, turn taking, expansion, question asking episodes and target codes.

Procedural Fidelity. Procedural fidelity (PF) was measured for 33% of both the control and intervention sessions for both participants. PF was scored utilizing the recorded video clips and a separate checklist for both the control and intervention sessions. The coded sessions were determined using a random number generator.

Items on the checklists incorporated the guidelines for the interventionist's use of BB+EMT strategies with the participants. This information was collected from the DataVyu coding file. Procedural fidelity also measured the interventionist's behaviors through a checklist. Data were analyzed separately for each behavior. For both the control and intervention sessions, interventionist behaviors included, (a) arrange the

setting space by removing any distractions, (b) prepare the book and materials, (c) announce the behavioral expectations of the participants, and (d) begin with a statement such as, “Let’s read about Bear’s applesauce”. The checklists also listed the interventionist’s adherence to either withholding or incorporating Bundle of Learning and EMT strategies in the control and intervention sessions, as appropriate.

Procedural fidelity checklist rating scales for both the control and intervention sessions are found in Appendix L and Appendix M. Procedural fidelity was determined by adding all the scores of the control and intervention sessions separately and dividing that number by the maximum number of points possible. An acceptable level of fidelity was at least 85% of correct implementation to ensure that the interventionist was conducting the sessions accordingly. If procedural fidelity fell below criterion, the interventionist was re-trained by reviewing and the implementation procedures. (Ledford & Gast, 2018). Table 9 provides procedural fidelity data.

Table 9.

Procedural Fidelity Results

Session	Average (range)	Percentage of sessions (%)
Control	100 (100-100)	33
Intervention	97.33 (92-100)	33

Social Validity

To measure the social validity of the effects of the study, the interventionist collected summative data by gathering information from naïve individuals regarding their viewpoints on the intervention (Ledford & Gast, 2018). A digital questionnaire was provided to a class of students within the special education department of a university in a southeastern state. Inclusion criteria for selecting student raters were as follows: (a) not involved in the implementation of the study, (b) unaware of the control and intervention procedures, and (c) had not seen the video clips from the sessions in the study. Once students were determined to be eligible, they participated in the assessment of the social validity of the study. These students served as masked raters who were unaware of treatment assignment to help reduce bias.

Students were shown video clips of the target and peer during the BB+EMT and comparison repeated reading condition. Video clips were selected from the 5th session of both control and intervention sessions around the 3–4-minute mark. This was decided by a random number generator. A video of a 1-minute clip an intervention session and a video of a 1-minute clip of a control session was presented. The class was told to respond independently by clicking which video the child circled in red was more engaged in and communicated more. A question also asked in which video there were higher quality teaching strategies. This process was repeated for intervention and control sessions of both the target child and peer participant for videos A-H. Responses on the questionnaire were collected via REDCap to receive data on the effectiveness of the study at a rapid pace (Harris et al., 2009). The social validity data collection form is found in Appendix N.

Data Analysis

Data were collected throughout the intervention. After an equal number of sessions for the intervention (BB +EMT) and the comparison condition were completed, the data were graphed for analysis. Visual analyses were conducted in a summative manner, following the completion of all 20 sessions by the primary research in consultation with the supervising doctoral student. Visual analysis was used to determine whether there was a functional relational was identified between participants and conditions (Ledford & Gast, 2018).

CHAPTER III

RESULTS

Results for the NDW of the target child are represented in Figure 1. Results for the NDW of the peer participant are represented in Figure 2. In each graph, the numbers on the y-axis (i.e., 0-70) depict the NDW of the participants. Results for unprompted words (UP) for the target child and the peer are in Figures 3 and 4 respectively. The numbers on the x-axis (i.e., 0-20) depict the number of sessions for the intervention and control sessions. The closed circles represent the intervention sessions (i.e., BB+EMT) and the open circles represent the control sessions (i.e., shared book reading). It is important to note that the primary result of interest is the separation of graphed data paths for the intervention and control sessions for NDW and UP.

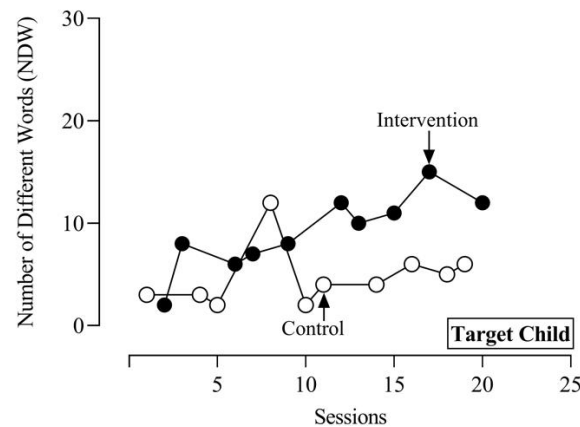


Figure 1. The number of different words used by the target child during book reading in intervention and control sessions.

Visual inspection of the level, trend, and variability of the target child's data revealed that NDW increased steadily across BB+EMT sessions. In the repeated reading condition, NDW data remained low and stable with the exception of one data point (i.e., session 8). Distinct vertical separation was observed between intervention and repeated reading condition data paths. The target participant was using a greater number of different words in the intervention condition compared to the control condition across sessions with minimal overlap between conditions. A pair-wise comparison analysis was completed to determine the number of paired data points in which the intervention condition was superior. Based on this analysis, the intervention condition was superior in 9/10 pairs. Therefore, a functional relation was identified between the use of BB+EMT strategies in the intervention condition compared to the standard repeated book reading for the target child.

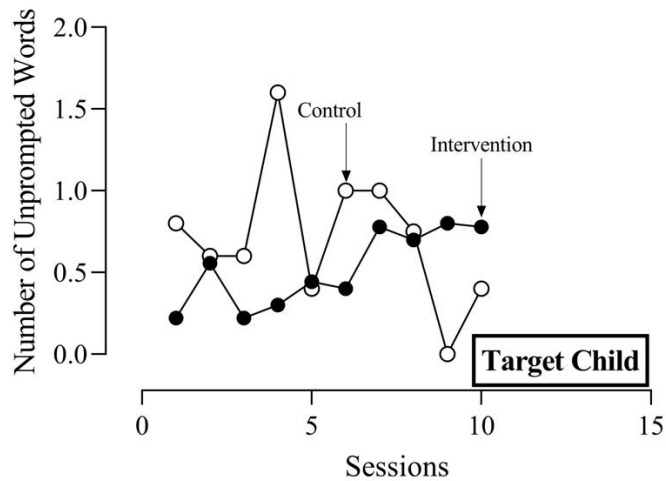


Figure 2. The number of unprompted words (UP) per minute used by the target child during book reading in both intervention and control sessions.

A visual inspection of the level, trend, and variability of the target child's data revealed that unprompted words increased slightly across intervention sessions. In the standard repeated reading condition, number of unprompted words data was variable and remained at a higher level compared to the BB+EMT condition. There was not a distinct vertical separation between conditions and overlap occurred in sessions. And based on the pair-wise comparison analysis, the control condition was superior in 7/10 pairs. Therefore, a functional relation cannot be determined between the use of BB+EMT strategies in the intervention condition compared to the standard repeated book reading for the target child.

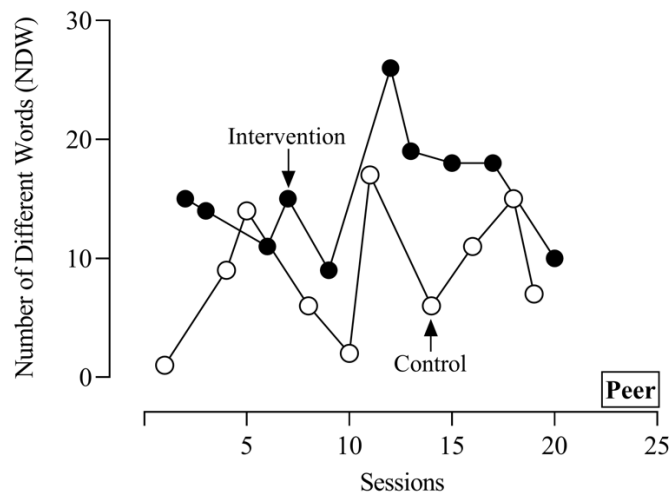


Figure 3. The number of different words used by the peer participant during book reading in intervention and control sessions.

For the peer participant, visual analysis revealed a moderate but somewhat variable use of NDW across the BB+EMT sessions. In the standard repeated reading condition, the level of NDW data was slightly lower; data were variable. There was a small degree of vertical separation between the control and intervention data paths, with moderate overlap between conditions across sessions. Based on the pair-wise comparison analysis, the intervention condition was superior in 9/10 pairs. And because of the observed vertical separation, a functional relation was identified between the BB+EMT condition and NDW, compared to repeated reading. The peer participant was using a greater number of different words in the intervention condition compared to the control condition across sessions; however, the magnitude of the differences observed between conditions was relatively small.

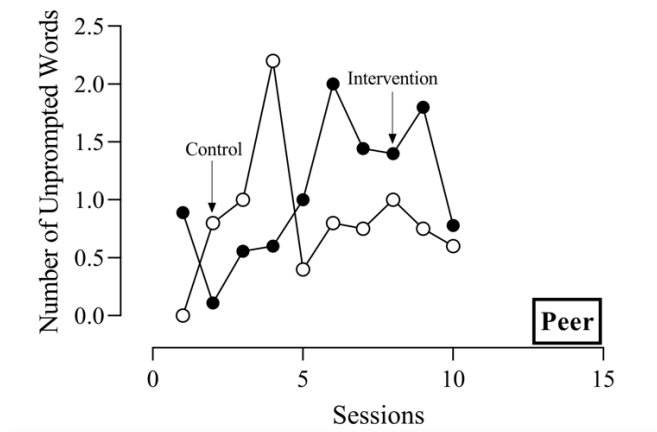


Figure 4. The number of unprompted words (UP) used by the peer participant during book reading in both intervention and control sessions.

For the peer participant, visual analysis revealed a variable use of unprompted words across the BB+EMT sessions. In the repeated reading condition, the level of unprompted words also was variable, while there was an increasing trend in unprompted words in the BB-EMT condition. There was vertical separation between the control and intervention data paths across later sessions. And based on the pairwise comparison analysis, the intervention condition was superior in 7/10 pairs. However, because of the variability in both intervention and comparison condition data, a functional relation was not established between the BB+EMT condition and child UP.

Table 10.

Target Child's Expressive Language Probes Scores

Scores	Bear and Applesauce Picnic (Experimental)	Bear and Friends Frosty Fun (Comparison)	Bear's Beary Good Cookies (Control; unread)	Total
	/9 possible	/9 possible	/9 possible	/27 possible
Semantics Pre 1	0	3	1	4
Semantics Pre 2	1	1	2	4
Semantics Post	2	6	2	10
Syntax Pre 1	0	2	1	3
Syntax Pre 2	1	1	1	3
Syntax Post	1	6	2	9

Table 11.

Peer Participant's Expressive Language Probes Scores

Scores	Bear and Applesauce Picnic (Experimental)	Bear and Friends Frosty Fun (Comparison)	Bear's Beary Good Cookies (Control; unread)	Total
	/9 possible	/9 possible	/9 possible	/27 possible
Semantics Pre 1	4	6	1	11
Semantics Pre 2	8	9	4	21
Semantics Post	8	8	5	21
Syntax Pre 1	2	6	2	10
Syntax Pre 2	7	8	7	22
Syntax Post	8	8	8	24

Expressive probe results were determined by adding each semantics score and syntax score and dividing the total score from the total possible score. The scoring system had options of 3, 2, 1, and 0 for both semantics and syntax for child responses, and therefore has total of 27 possible score. The score of the target child's response during the first pre-expressive probe session was 13, 8 for semantics and 5 for syntax.

During the second pre-expressive probe session, the target participant scored 11, 7 for semantics and 4 for syntax. For the last probe session, which occurred after the intervention, the target participant scored 26, 14 for semantics and 12 for syntax. The score of the peer participant's response during the first pre-expressive probe session was 32, 16 for semantics and 16 for syntax. During the second pre-expressive probe session, the peer participant scored 46, 21 for semantics and 25 for syntax. For the last probe session, the peer participants scored 46, 22 for semantics and 24 for syntax.

Interobserver Agreement

IOA data were collected for 33% of randomly selected sessions across the participants, dependent variable, and conditions. IOA data were collected for each child and adult behavior. These included single codes, communication forms, independence, matched turns, expansions, target language, and overall scores. For target and peer participant data, the average IOA per category was above conventionally acceptable levels. The percentage agreement was 86.99% for single codes, 93.83% for communication form, 90.65% for independence, and 90.49% for the overall average. IOA for codes for adult behaviors were also high. The percentage agreement was 90.89% for matched turns, 91.01% for expansions, 89.84% for target language, and 90.58% for an overall score.

Procedural Fidelity

Procedural fidelity data were collected for 33% of intervention and control sessions. The procedural fidelity checklist for the intervention condition was used to ensure that BB+EMT procedures were implemented appropriately. In the control condition, the procedural fidelity checklist was used to verify that BB+EMT strategies

were not used. Across both intervention and control conditions, the procedural fidelity checklist ensured that the interventionist successfully managed academic and play materials, supported positive behavior, and responded to children readily. The correct use of strategies during the control sessions were 100% and 97.33% for intervention sessions with a range of 92-100%. The implementer conducted the sessions accordingly based on the procedural fidelity rating scale.

Social Validity

Once the social validity assessment was complete, each respondents' choices for each item on the questionnaire was analyzed and then all responses were summarized to determine the percentage of respondents who selected the BB+EMT example as indicating more communication and more engagement by the target child and peer participant and the percentage of respondents who indicated higher quality teaching strategies were used in the BB+EMT vs the control condition.

All respondents (100%) indicated that the interventionist used higher quality teaching strategies in the BB+EMT video clips of the intervention compared to the control condition video clip. According to the questionnaires, 100% of respondents indicated that the target child was more engaged and communicated more in the BB+EMT video clip of the intervention compared to the control video clip. The results for the peer differed from the results for the target child. When indicating in which video clip (BB+EMT or control) the peer participant was more engaged, 56.66% selected the video clip of the BB+EMT and 44.44% of respondents selected the video clip of the control session. Only 22.22% of students selected the video clip of the BB+EMT when indicating in which video clip the peer participant communicated more.

CHAPTER IV

DISCUSSION

The aim of this current study was to determine if children used more different words (NDW) and more unprompted words (UP) during book reading with BBB+EMT strategies compared to their use of NDW and UP during repeated reading in a small group setting for children with and without language delays. We also explored children's learning of words and sentences associated with the BB+EMT book during probes of their expressive and receptive language. There was vertical separation between control and intervention data paths for the target child and a small separation between data paths for the peer participant, suggesting that the BB+EMT condition promoted use of a higher NDW compared to the control conditions. The results for unprompted words did not indicate a separation between the BB+EMT and comparison repeated reading conditions. Therefore, a functional relation could not be determined between the BB+EMT condition compared to repeated reading condition for both participants.

Results from the expressive language probes indicated that the target child scored higher in the expressive post-probe session compared to the pre-probe sessions for semantics and syntax. The target child scored a 14 in the post-session for semantics compared to scoring a 7 and 4 for pre-sessions and scored a 12 in the post-session for syntax compared to scoring a 5 and 4 in pre-sessions. For the peer participant, post-session scores for semantics and syntax were slightly higher or the same compared to pre-sessions scores. These results suggest that the target child and peer participant were able to better comprehend the images depicted in the BB and slightly improve on grammar abilities.

This study replicates the primary findings of the previous studies by Delmare, Lanier, and Jang (2022). Those studies also focused on whether the use of BB+EMT strategies increased the NDW used during book reading compared to standard repeated reading for children with and without language delays; however, the current study incorporated additional intervention and control sessions to allow a longer time frame to establish the comparison between the two conditions.

This study contributes to a better understanding of how shared book reading combined with strategies used in BB+EMT may increase child vocabulary use. Shared book reading with BB+EMT allowed for the interventionist to model language presented in the books to increase the vocabulary repertoire of the participants. EMT strategies such as expansion, following the child's lead, and asking questions related to the intervention read strengthened the social communication skills and linguistic abilities of the participants. *The Bundle of Learning* promoted vocabulary learning with the use of words that were redundant across the pages to allow for repeated uses of a particular word for a participant.

All the respondents to the Social Validity Survey indicated that the target child was using more play, language, and gesture strategies during the sessions with BB+EMT compared to the control sessions. All the respondents also indicated that the interventionist use more high-quality teaching strategies during the intervention clips compared to the control clips. However, a minority (22%) respondents indicated that the peer participant was more engaged in the intervention clip compared to the control. One possible explanation for the differences in engagement between the target child and the peer could be that the peer did not require the same level of support as provided during the intervention condition so there was little difference in her engagement and communication between the conditions. Additionally, this was a

1-minute random sample of one session, meaning it may not have been a representable display of her engagement in both conditions.

Limitations

Although the results of study indicated that both the target child and the peer used a higher NDW during the intervention condition compared to the control condition, there are notable limitations of the study. First, only one group of two children between the ages of 15-48 months at a school in southeastern United States participated in this study. Additional replications of the study are needed with children of various ages in diverse populations to acquire more information about the effectiveness of the intervention.

Second, results did not indicate that the target child or peer used a higher number of unprompted words (UP) during the intervention condition compared to the control condition. This means that there was no difference in how often participants were spontaneously using words across the two conditions. Results from the expressive and receptive probes indicated that the addition of BB+EMT strategies had somewhat limited effects of immediate vocabulary use but did not increase children's rate of talking or change their performance on probes of receptive and expressive language.

A third limitation is that the study used only two *Bundle of Learning* books with different corresponding play materials. Although the two books were randomly assigned to the BB+EMT and control conditions, there were potential differences in the narrative and the materials accompanying each set. For example, the Applesauce book contains toys that are familiar and easily manipulated by young children (apples, pot, spoons) where the Frosty Friends bundle has snowballs, a scarf and a sled, which

were less familiar to the children and may have required more pretend actions. In addition, the materials in one book set may have been more preferred, and children may have engaged with more toys in one condition over the other. This may have affected the validity of the comparison of conditions if materials were utilized in one condition differed in some important way with materials used in the other condition. In addition, participants may have been preferred one book set over the other, potentially resulting in a higher NWD with the preferred book set over the other book.

A fourth limitation was that the peer participant was in the 15% percentile compared to peers of the same age on the MCDI-WS. Although this score was low, the peer produced 346 words at intake and her PLS-5 score in the typical range. The peer used more NDW during the intervention than her target child partner, suggesting that she was an appropriate peer participant even though her reported vocabulary was not typical for her age.

A fifth limitation was that the secondary coder for child NDW and for procedural fidelity was the interventionist in the study. There may have been potential bias in completing IOA coding or in calculating IOA in child behaviors and procedural fidelity.

Implications for Research and Practice

Results from the current study illustrate the positive impact of an embedded book reading intervention on the language use by children with and without language delays. The use of BB+ EMT strategies can help caregivers, therapists, and caregivers can support children to learn a wide range of skills for through book reading. BB+EMT can allow teachers to use the books and corresponding objects to support a student's language development, teach joint attention skills, and model language. As

this study was implemented in a therapy room, future research may address how this intervention can be conducted in classrooms and by parents at home.

The current study was implemented by a master's student in an early childhood program with prior experience using EMT and the BB books and materials. Future research should involve teachers, caregivers, and practitioners and include procedures to teach them to integrate the BB and EMT the strategies into book reading. In addition, studies should investigate application of the BB+ EMT strategies into other daily activities or routines with children with and without language delays. Finally, this study focused on children between the ages of 15-48 months. Future research may consider children of different ages and especially address the needs of children with complex or significant communication needs who are older.

Conclusion

In conclusion, the current study contributes to research on the beneficial impacts of shared book reading with embedded specific language learning strategies. Overall, results from this study indicate that the use of *Bundle of Learning* + EMT promoted a higher NDW for children with and without a language delay compared to the control condition of standard repeated reading, although it did not increase children's rate of unprompted utterances or generalized gains in receptive and expressive language. Further research is needed to determine how shared book reading with embedded language support strategies can be used to promote, language, and gestures in classroom and home settings when used by practitioners, caregivers, and teachers.

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APPENDIX A STUDY CONSENT FORM

Study E-Consent

Page 1

Title

Using the Bundle of Learning to support language development within an inclusive preschool setting

Investigators and Support

Principal Investigator: Dr. Ann P. Kaiser, PhD
Institution/Hospital: Vanderbilt University

This informed consent document is for parents/caregivers of young children.

Name of Parent or Guardian _____

Age of Parent or Guardian _____

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form.

Key Information:

The first section of this document contains some key points that the research team thought you would find important. The study is described in more detail after this section. If you do not understand something, please ask someone.

Key information about this study:

The purpose of this study is to use a clinically-proven, naturalistic intervention within book reading to improve communication skills in children with and without language delays. This intervention is delivered at school by a trained therapist and will involve 1-3 of your child's peers in a small group.

Your child may benefit from this study. The intervention may be fun for your child. Additionally, your child may use more language, play more with toys, and be more engaged with peers and their teachers.

Your child may not like some of the tests or therapy activities. If this happens, that test or activity will be stopped, and your coach will discuss adaptations to improve your experience if possible.

This study requires a 3-6 month time commitment with your child. Participation will be entirely at your child's school, and will involve:

You completing brief surveys and assessments online at the beginning of the study about your child and your family. Your child participating in assessments at the beginning of the study that test your child's language and thinking skills. Your child participating in several 10-15 minute sessions weekly of book reading and play with the study therapist, for a total of 30-50 intervention sessions.

Detailed Information:

The rest of this document includes detailed information about this study (in addition to the information listed above).

You are being asked to take part in this research study because your child is between 15 and 48 months of age and has been identified as potentially having a language delay.

You do not have to be in this research study. You may choose not to be in this study and get other treatments without changing your healthcare, services, or other rights. You can stop being in this study at any time. If we learn something new that may affect the risks or benefits of this study, you will be told so that you can decide whether or not you still want to be in this study.

Procedures to be followed and approximate duration of the study: To see if your child is right for this study, we will test your child's language and thinking skills. We will ask your child to play with toys as a part of one of the tests. We will also send you a word inventory to assess your child's language use. If your child is right for the study, they will receive weekly book reading intervention sessions for 3-6 months. We will ask you to do the following things as part of the study:

Parent Forms: We will ask you about your child's understanding and use of words at the beginning of the study. We will also ask you general information about your child and your family.

Child Testing: We will test your child's thinking and talking skills at the beginning of the study.

Book Reading Sessions: You and your child will participate in 30-50 book reading sessions at school. Sessions will happen several times each week for 3 to 6 months. Each session will last about 10-15 minutes. If your child must miss a session, we will reschedule the session. If your child misses four sessions in a row and cannot make up any of these sessions, we might tell you that your child cannot be in the study anymore.

Our sessions include teaching children language and play skills within book reading. Children will participate in a small group reading activity with their peers and will play with related toys during the sessions. The therapist for these sessions will use evidence-based language and play strategies while they read. After the therapist and children finish reading the book, children will be able to play with toys together for 5 minutes.

Expected costs: There are no costs to you for being part of this study.

Description of the discomforts, inconveniences, and/or risks that can be reasonably expected as a result of participation in this study: This study requires a 3-6 month time commitment from you and your child. Your child may not like some of the tests or therapy activities. If this happens, that test or activity will be stopped. We will do what we can to keep the personal information in your child's study records private and confidential, but absolute confidentiality cannot be guaranteed. Your information or your child's information may be shared with institutional and/or governmental authorities if you or your child is in danger or if we are required to do so by law.

Compensation in case of study-related injury:

Given that this is a study of language therapy, we do not anticipate any injuries. There are no plans for Vanderbilt to compensate for injuries.

Good effects that might result from this study:

1. The benefits to science and humankind that might result from this study. This study may result in an effective book reading language intervention approach that could be offered in the community to children similar to your child and their peers.
2. The benefits you might get from being in this study. Your child may enjoy taking part in tests and activities. Your child may talk and understand more language and be more engaged with their peers at school.

At the end of the study, you will be provided a summary report of your child's assessment information and the outcomes of intervention. If desired, we will also send you articles that are published using data collected within this study.

Alternative treatments available: You can continue with any therapies your child currently receives or seek out additional therapies and still participate in this study.

Compensation for participation: There is no compensation for participating in this study.

Circumstances under which the Principal Investigator may withdraw you from study participation: If your child is unable to complete the initial testing because he/she is too upset, we might talk to you and decide this study is not a fit for your child. If your child misses more than 4 consecutive sessions that are not able to be rescheduled within the study timeframes, you may be removed from the study.

What happens if you choose to withdraw from study participation? You may withdraw from the study at any time. There are no consequences for withdrawing from the study.

Contact Information. If you should have any questions about this research study or possibly injury, please feel free to contact Kathryn Bailey at (615) 953-9608 or my faculty advisor Ann Kaiser at (615) 322-8160

For additional information about giving consent or your rights as a participant in this study, to discuss problems, concerns, and questions, or to offer input, please feel free to contact the Institutional Review Board Office at (615) 322-2918 or toll free at (866) 224-8273.

Confidentiality: All efforts, within reason, will be made to keep your personal information in your research record confidential but total confidentiality cannot be guaranteed.

All sessions of your child will be video recorded. All video recordings of sessions with your child will be kept as confidential as legally possible. Study information will be labeled with numbers and not with the names of you or your child.

All of your personal information and all video files will be kept in locked places or password protected places. Only members of the study team will see the tapes and information about you and your child.

If these video recordings are shown to other researchers and educators at workshops, seminars, or conferences, it will be done only with your knowledge and your permission. All your family information will be saved indefinitely on a secure hard drive. This will allow the study team to review all the study procedures.

Privacy: Your information may be shared with Vanderbilt or the government, such as the Vanderbilt University Institutional Review Board, Federal Government Office for Human Research Protections, if you or someone else is in danger or if we are required to do so by law.

STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY

I have read this informed consent document and the material contained in it has been explained to me verbally. All my questions have been answered, and I freely and voluntarily choose to participate.

Signature of Parent or Guardian

Date of Signature

Consent Obtained By:

Signature of Research Personnel

Date of Signature

Research Personnel Name and Title

PERMISSION FOR USE OF VIDEOTAPES AND PHOTOS

I give permission for videos/images of my child and/or me in this project to be used for training and marketing purposes. I understand that neither my name nor my child's name will be given.

Yes No

Signature of Parent or Guardian

I give permission for Vanderbilt Kidtalk to contact me about future studies they are conducting. When I am contacted about study possibilities, I can decide at that time about participating in the study or not. I understand that agreeing to be contacted in no way obligates me to be in any study in the future. I understand that they will maintain my name, phone numbers, email address, and home address to contact me, unless I request that my name and information be deleted from the contact list. To be removed from the contact list, I can call (615)322-8160 or email ann.kaiser@vanderbilt.edu and tell them I no longer wish to be contacted about future studies. I will be given a copy of this form for my records.

Yes No

Signature of Parent or Guardian

Phone Number(s)

APPENDIX B DEMOGRAPHIC FORM

Page 1

Demographic Form

Please complete the survey below.

Thank you!

Tell us about your FAMILY Please complete the survey below.

Thank you!

Survey Instructions

The following survey will take about 20 minutes to complete. We will ask you questions about yourself, your child, and your family. Please answer all questions honestly and remember that your information will remain confidential. Thank you!

What is your relationship to the child?

Mother
 Father
 Other

If other, please specify.

Child Information

Child's date of birth

Child's birth order

First born
 Second born
 Third born
 Fourth born
 Fifth born
 Sixth born

Gender of your child

Male
 Female
 Transgender

Child's race

American Indian or Alaska Native
 Asian
 Black
 Native Hawaiian or Other Pacific Islander
 White
 More than one race
 Other
 Prefer not to answer

If your child is more than one race, please check all that apply.

American Indian or Alaska Native
 Asian
 Black
 Native Hawaiian or Other Pacific Islander
 White

Ethnicity of your child

Hispanic or Latino
 Not Hispanic or Latino
 Prefer not to answer

03/25/2022 2:24pm

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Current marital status of the child's parents

Married/common law
 Not married, living together
 Separated
 Divorced/annulled
 Widowed
 Never married, not currently living with partner
 Other

If other, please specify _____

Child lives with

Biological mother and father
 Biological mother and partner
 Biological mother only
 Biological father only
 Biological father and partner
 Adoptive parents
 Relatives (but not biological mother or father)
 Other

If other, please specify _____

Mother's Information

Is the child's biological mother and custodial mother the same person? Meaning, is the maternal figure with physical custody also the child's biological parent?

- Yes
 No

What is the custodial mother's relationship to the child?

- Adoptive Parent
 Foster Parent

Custodial mother's date of birth _____

Biological mother's date of birth _____

Please answer all of the following questions about the maternal figure that has physical custody of the child (i.e., custodial mother)

Mother's race

- American Indian or Alaska Native
 Asian
 Black
 Native Hawaiian or Other Pacific Islander
 White
 More than one race
 Other
 Prefer not to answer
 Don't know

If mother is more than one race, please check all that apply

- American Indian or Alaska Native
 Asian
 Black
 Native Hawaiian or Other Pacific Islander
 White

Mother's ethnicity

- Hispanic or Latino
 Not Hispanic or Latino
 Prefer not to answer
 Don't know

Mother's Education and Employment

Mother's highest education

- Less than 7th grade
 Junior High
 Some High School
 High School graduate
 Special training after high school
 Some college
 College graduate
 Graduate/professional training or above
 Don't know

Mother's current employment status

- Not employed/Stay-at-home parent
 Self-employed part-time
 Self-employed full-time
 Employed part-time
 Employed full-time
 Employed full-time and second job
 Don't know

Mother's current occupation

- Architecture and Engineering
 Armed Forces
 Arts, Design, Entertaining, Sports, and Media
 Building and Grounds Cleaning and Maintenance
 Business and Financial Operations
 Community and Social Services
 Computer and Mathematical
 Construction and Extraction
 Education, Training, and Library
 Farming, Fishing, and Forestry
 Food Preparation and Serving Related
 Healthcare Practitioners and Technical
 Healthcare Support
 Installation, Maintenance, and Repair
 Legal
 Life, Physical, and Social Science
 Management
 Office and Administrative Support
 Personal Care and Service
 Production
 Protective Service
 Sales and Related
 Transportation and Material Moving
 Don't know

Did the mother have the same occupation before the child was born?

- Yes
 No
 Don't know

Mother's occupation prior to birth of the child

- Architecture and Engineering
- Armed Forces
- Arts, Design, Entertaining, Sports, and Media
- Building and Grounds Cleaning and Maintenance
- Business and Financial Operations
- Community and Social Services
- Computer and Mathematical
- Construction and Extraction
- Education, Training, and Library
- Farming, Fishing, and Forestry
- Food Preparation and Serving Related
- Healthcare Practitioners and Technical
- Healthcare Support
- Installation, Maintenance, and Repair
- Legal
- Life, Physical, and Social Science
- Management
- Office and Administrative Support
- Personal Care and Service
- Production
- Protective Service
- Sales and Related
- Transportation and Material Moving
- Don't know

Father's Information

Is the child's biological father and custodial father the same person? Meaning, is the paternal figure with physical custody also the child's biological parent?

- Yes
- No

What is the custodial father's relationship to the child?

- Adoptive Parent
- Foster Parent

Custodial father's date of birth

Biological father's date of birth

Please answer all of the following questions about the paternal figure that has physical custody of the child (i.e., custodial father)

Father's race

- American Indian or Alaska Native
- Asian
- Black
- Native Hawaiian or Other Pacific Islander
- White
- More than one race
- Other
- Prefer not to answer
- Don't know

If the father is more than one race, please check all that apply

- American Indian or Alaska Native
- Asian
- Black
- Native Hawaiian or Other Pacific Islander
- White

Father's ethnicity	<input type="radio"/> Hispanic or Latino <input type="radio"/> Not Hispanic or Latino <input type="radio"/> Prefer not to answer <input type="radio"/> Don't know
Father's Education and Employment	
Father's highest education	<input type="radio"/> Less than 7th grade <input type="radio"/> Junior High <input type="radio"/> Some High School <input type="radio"/> High School graduate <input type="radio"/> Special training after high school <input type="radio"/> Some college <input type="radio"/> College graduate <input type="radio"/> Graduate/professional training or above <input type="radio"/> Don't know
Father's current employment status	<input type="radio"/> Not employed/Stay-at-home parent <input type="radio"/> Self-employed part-time <input type="radio"/> Self-employed full-time <input type="radio"/> Employed part-time <input type="radio"/> Employed full-time <input type="radio"/> Employed full-time and second job <input type="radio"/> Don't know
Father's current occupation	<input type="radio"/> Architecture and Engineering <input type="radio"/> Armed Forces <input type="radio"/> Arts, Design, Entertaining, Sports, and Media <input type="radio"/> Building and Grounds Cleaning and Maintenance <input type="radio"/> Business and Financial Operations <input type="radio"/> Community and Social Services <input type="radio"/> Computer and Mathematical <input type="radio"/> Construction and Extraction <input type="radio"/> Education, Training, and Library <input type="radio"/> Farming, Fishing, and Forestry <input type="radio"/> Food Preparation and Serving Related <input type="radio"/> Healthcare Practitioners and Technical <input type="radio"/> Healthcare Support <input type="radio"/> Installation, Maintenance, and Repair <input type="radio"/> Legal <input type="radio"/> Life, Physical, and Social Science <input type="radio"/> Management <input type="radio"/> Office and Administrative Support <input type="radio"/> Personal Care and Service <input type="radio"/> Production <input type="radio"/> Protective Service <input type="radio"/> Sales and Related <input type="radio"/> Transportation and Material Moving <input type="radio"/> Don't know
Did the father have the same occupation before the child was born?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Don't know

Father's occupation prior to birth of the child

- Architecture and Engineering
- Armed Forces
- Arts, Design, Entertaining, Sports, and Media
- Building and Grounds Cleaning and Maintenance
- Business and Financial Operations
- Community and Social Services
- Computer and Mathematical
- Construction and Extraction
- Education, Training, and Library
- Farming, Fishing, and Forestry
- Food Preparation and Serving Related
- Healthcare Practitioners and Technical
- Healthcare Support
- Installation, Maintenance, and Repair
- Legal
- Life, Physical, and Social Science
- Management
- Office and Administrative Support
- Personal Care and Service
- Production
- Protective Service
- Sales and Related
- Transportation and Material Moving
- Don't know

Language at home

Primary caregiver's first language

- Arabic
- American Sign Language (ASL)
- Bengali
- Chinese
- English
- French
- German
- Hindi
- Japanese
- Javanese
- Korean
- Polish
- Portuguese
- Russian
- Spanish
- Tagalog
- Vietnamese
- Other

If other, please specify _____

Does your child hear a language(s) other than English at home?

- Yes
- No

Language(s) currently used when interacting with your child (other than English). Check all that apply.

- Arabic
- American Sign Language (ASL)
- Bengali
- Chinese
- French
- German
- Hindi
- Japanese
- Javanese
- Korean
- Polish
- Portuguese
- Russian
- Spanish
- Tagalog
- Vietnamese
- Other

If other, please specify _____

How often is another language used with your child (not English)

- Rarely (less than 25% of the time)
- Sometimes (25-50% of the time)
- Often (more than 50% of the time)
- Always (100% of the time)

Income and Assistance

What was the combined **INCOME** of all household members in the previous year? Please include money from jobs, net income from business, farm, rent, pensions, dividends, welfare, social security payments, and any other income received by you or any other family member.

Put a "-1" (negative one) if you don't know or would prefer not to answer. **DONT** use a dollar (\$) sign or commas (,.)

If you feel comfortable, please provide us with a range of your yearly household income.

- Less than \$15,000
- \$15,000 - \$30,000
- \$31,000 - \$50,000
- \$51,000 - \$75,000
- \$76,000 - \$100,000
- More than \$100,000
- Prefer not to answer

Does your family receive any form of assistance like food stamps, unemployment, SSI, Head Start, Eamed Income Tax Credit, etc.?

- Yes
- No

What forms of assistance? (check all that apply)

- Food Stamps (SNAP)
 SSI (Supplemental Security Income)
 Commodities/food pantry
 Head Start
 Child Care Assistance (CCAP)
 Earned Income Tax Credit (EITC)
 Unemployment
 TANF/Cash assistance
 WIC (Women, Infants, and Children)
 Housing Assistance
 Medicaid

How many people live in your house?

Number of adults (21 years and over) living in the child's home (include yourself).

- 1
 2
 3
 4
 5
 6
 7
 8
 9
 10

Number of children (younger than 21 years old) living in the child's home (include your child)

- 1
 2
 3
 4
 5
 6
 7
 8

Current Developmental Concerns

Does your child CURRENTLY have difficulty sleeping (e.g., nightmares, staying asleep, waking early, difficulty sleeping alone)? Options will appear if you click yes.

- Yes
 No

If yes, please check all that apply

- Difficulty falling asleep
 Difficulty staying asleep
 Nightmares
 Difficulty sleeping alone
 Early waking
 Other (write-in)

If other, please describe

Does your child CURENTLY have difficulty eating (e.g., picky, stuffs, eats non-food, doesn't eat enough, holds food in mouth)? Options will appear if you click yes.

- Yes
 No

If yes, check all that apply

- Picky eater (e.g., will only eat a few kinds of food)
- Puts too much food in mouth (e.g., stuffs)
- Holds food in mouth for longer than you would expect
- Doesn't eat enough food (poor appetite)
- Eats non-food items (e.g., dirt)
- Other (write-in)

If other, please describe

APPENDIX C
MACARTHUR-BATES DEVELOPMENTAL INVENTORY WORD AND
SENTENCE FORM

Page 1

MCDI Words Sentences

Please complete the survey below.

Thank you!

Instructions

PART I: Words Children Use

VOCABULARY CHECKLIST.

Children understand many more words than they say. We are particularly interested in the words your child SAYS.

Please go through the list and mark the words you have heard your child use. If your child uses a different pronunciation of a word (for example "raffe" instead of "giraffe", or "sketti" for "spaghetti"), mark the word anyway. Remember that this is a "catalog" of all the words that are used by many different children. Don't worry if your child says only a few of these right now.

Please only mark words that your child says spontaneously, that is, without a direct model provided by an adult.

Date of Completion

Your child's date of birth

Child's age in months at time of MCDI

Child's age in days at time of MCDI

Sound Effects and Animal Sounds

	Says
baa baa	<input type="radio"/>
choo choo	<input type="radio"/>
cockadoodledoo	<input type="radio"/>
grm	<input type="radio"/>
meow	<input type="radio"/>
moo	<input type="radio"/>
ouch	<input type="radio"/>
quack quack	<input type="radio"/>
uh oh	<input type="radio"/>
vroom	<input type="radio"/>
woof woof	<input type="radio"/>
yum yum	<input type="radio"/>

Animals (real or toy)	Says
alligator	<input type="radio"/>
animal	<input type="radio"/>
ant	<input type="radio"/>
bear	<input type="radio"/>
bee	<input type="radio"/>
bird	<input type="radio"/>
bug	<input type="radio"/>
bunny	<input type="radio"/>
butterfly	<input type="radio"/>
cat	<input type="radio"/>
chicken	<input type="radio"/>
cow	<input type="radio"/>
deer	<input type="radio"/>
dog	<input type="radio"/>
donkey	<input type="radio"/>
duck	<input type="radio"/>
elephant	<input type="radio"/>
fish	<input type="radio"/>
frog	<input type="radio"/>
giraffe	<input type="radio"/>
goose	<input type="radio"/>
hen	<input type="radio"/>
horse	<input type="radio"/>
kitty	<input type="radio"/>
lamb	<input type="radio"/>
lion	<input type="radio"/>
monkey	<input type="radio"/>
moose	<input type="radio"/>
mouse	<input type="radio"/>
owl	<input type="radio"/>
penguin	<input type="radio"/>
pig	<input type="radio"/>
pony	<input type="radio"/>
puppy	<input type="radio"/>
rooster	<input type="radio"/>
sheep	<input type="radio"/>
squirrel	<input type="radio"/>
teddybear	<input type="radio"/>

tiger	<input type="radio"/>
turkey	<input type="radio"/>
turtle	<input type="radio"/>
wolf	<input type="radio"/>
zebra	<input type="radio"/>

Vehicles (real or toy)

	Says
airplane	<input type="radio"/>
bicycle	<input type="radio"/>
boat	<input type="radio"/>
bus	<input type="radio"/>
car	<input type="radio"/>
firetruck	<input type="radio"/>
helicopter	<input type="radio"/>
motorcycle	<input type="radio"/>
sled	<input type="radio"/>
stroller	<input type="radio"/>
tractor	<input type="radio"/>
train	<input type="radio"/>
tricycle	<input type="radio"/>
truck	<input type="radio"/>

Toys

	Says
ball	<input type="radio"/>
balloon	<input type="radio"/>
bat	<input type="radio"/>
block	<input type="radio"/>
book	<input type="radio"/>
bubbles	<input type="radio"/>
chalk	<input type="radio"/>
crayon	<input type="radio"/>
doll	<input type="radio"/>
game	<input type="radio"/>
glue	<input type="radio"/>
pen	<input type="radio"/>
pencil	<input type="radio"/>
play dough	<input type="radio"/>
present	<input type="radio"/>
puzzle	<input type="radio"/>

story
toy

Food and Drink

	Says
apple	<input type="radio"/>
applesauce	<input type="radio"/>
banana	<input type="radio"/>
beans	<input type="radio"/>
bread	<input type="radio"/>
butter	<input type="radio"/>
cake	<input type="radio"/>
candy	<input type="radio"/>
carrots	<input type="radio"/>
cereal	<input type="radio"/>
cheerios	<input type="radio"/>
cheese	<input type="radio"/>
chicken	<input type="radio"/>
chocolate	<input type="radio"/>
coffee	<input type="radio"/>
coke	<input type="radio"/>
cookie	<input type="radio"/>
corn	<input type="radio"/>
cracker	<input type="radio"/>
donut	<input type="radio"/>
drink	<input type="radio"/>
egg	<input type="radio"/>
fish	<input type="radio"/>
food	<input type="radio"/>
french fries	<input type="radio"/>
grapes	<input type="radio"/>
green beans	<input type="radio"/>
gum	<input type="radio"/>
hamburger	<input type="radio"/>
ice	<input type="radio"/>
ice cream	<input type="radio"/>
jello	<input type="radio"/>
jelly	<input type="radio"/>
juice	<input type="radio"/>
lollipop	<input type="radio"/>

- meat
- melon
- milk
- muffin
- noodles
- nuts
- orange
- pancake
- peanut butter
- peas
- pickle
- pizza
- popcorn
- popsicle
- potato
- potato chip
- pretzel
- pudding
- pumpkin
- raisin
- salt
- sandwich
- sauce
- soda/pop
- soup
- spaghetti
- strawberry
- toast
- tuna
- vanilla
- vitamins
- water
- yogurt

Clothing

- Says**
- beads
- belt
- bib
- boots

button	<input type="radio"/>
coat	<input type="radio"/>
diaper	<input type="radio"/>
dress	<input type="radio"/>
gloves	<input type="radio"/>
hat	<input type="radio"/>
jacket	<input type="radio"/>
jeans	<input type="radio"/>
mittens	<input type="radio"/>
necklace	<input type="radio"/>
pajamas	<input type="radio"/>
pants	<input type="radio"/>
scarf	<input type="radio"/>
shirt	<input type="radio"/>
shoe	<input type="radio"/>
shorts	<input type="radio"/>
slipper	<input type="radio"/>
sneaker	<input type="radio"/>
snowsuit	<input type="radio"/>
sock	<input type="radio"/>
sweater	<input type="radio"/>
tights	<input type="radio"/>
underpants	<input type="radio"/>
zipper	<input type="radio"/>

Body Parts

	Says
ankle	<input type="radio"/>
arm	<input type="radio"/>
belly button	<input type="radio"/>
buttocks/bottom (or word used in your family)	<input type="radio"/>
cheek	<input type="radio"/>
chin	<input type="radio"/>
ear	<input type="radio"/>
eye	<input type="radio"/>
face	<input type="radio"/>
feet	<input type="radio"/>
finger	<input type="radio"/>
hair	<input type="radio"/>

hand	<input type="radio"/>
head	<input type="radio"/>
knee	<input type="radio"/>
leg	<input type="radio"/>
lips	<input type="radio"/>
mouth	<input type="radio"/>
nose	<input type="radio"/>
owie/boo boo	<input type="radio"/>
penis (or word used in your family)	<input type="radio"/>
shoulder	<input type="radio"/>
tooth	<input type="radio"/>
toe	<input type="radio"/>
tongue	<input type="radio"/>
tummy	<input type="radio"/>
vagina (or word used in your family)	<input type="radio"/>

Small Household Items

	Says
basket	<input type="radio"/>
blanket	<input type="radio"/>
bottle	<input type="radio"/>
box	<input type="radio"/>
bowl	<input type="radio"/>
broom	<input type="radio"/>
brush	<input type="radio"/>
bucket	<input type="radio"/>
camera	<input type="radio"/>
can	<input type="radio"/>
clock	<input type="radio"/>
comb	<input type="radio"/>
cup	<input type="radio"/>
dish	<input type="radio"/>
fork	<input type="radio"/>
garbage	<input type="radio"/>
glass	<input type="radio"/>
glasses	<input type="radio"/>
hammer	<input type="radio"/>
jar	<input type="radio"/>

keys	<input type="radio"/>
knife	<input type="radio"/>
lamp	<input type="radio"/>
light	<input type="radio"/>
medicine	<input type="radio"/>
money	<input type="radio"/>
mop	<input type="radio"/>
nail	<input type="radio"/>
napkin	<input type="radio"/>
paper	<input type="radio"/>
penny	<input type="radio"/>
picture	<input type="radio"/>
pillow	<input type="radio"/>
plant	<input type="radio"/>
plate	<input type="radio"/>
purse	<input type="radio"/>
radio	<input type="radio"/>
scissors	<input type="radio"/>
soap	<input type="radio"/>
spoon	<input type="radio"/>
tape	<input type="radio"/>
telephone	<input type="radio"/>
tissue/kleenex	<input type="radio"/>
toothbrush	<input type="radio"/>
towel	<input type="radio"/>
trash	<input type="radio"/>
tray	<input type="radio"/>
vacuum	<input type="radio"/>
walker	<input type="radio"/>
watch	<input type="radio"/>

Furniture and Rooms	
	Says
basement	<input type="radio"/>
bathroom	<input type="radio"/>
bathtub	<input type="radio"/>
bed	<input type="radio"/>
bedroom	<input type="radio"/>
bench	<input type="radio"/>
chair	<input type="radio"/>

- closet
- couch
- crib
- door
- drawer
- dryer
- garage
- high chair
- kitchen
- living room
- oven
- play pen
- porch
- potty
- refrigerator
- rocking chair
- room
- shower
- sink
- sofa
- stairs
- stove
- table
- TV
- washing machine
- window

Outside Things

- backyard
- cloud
- flag
- flower
- garden
- grass
- hose
- ladder
- lawn mower
- moon
- pool

- rain
- rock
- roof
- sandbox
- shovel
- sidewalk
- sky
- slide
- snow
- snowman
- sprinkler
- star
- stick
- stone
- street
- sun
- swing
- tree
- water
- wind

Places to Go

- | | Says |
|--------------------------------------|-----------------------|
| beach | <input type="radio"/> |
| camping | <input type="radio"/> |
| church (or word used in your family) | <input type="radio"/> |
| circus | <input type="radio"/> |
| country | <input type="radio"/> |
| downtown | <input type="radio"/> |
| farm | <input type="radio"/> |
| gas station | <input type="radio"/> |
| home | <input type="radio"/> |
| house | <input type="radio"/> |
| movie | <input type="radio"/> |
| outside | <input type="radio"/> |
| park | <input type="radio"/> |
| party | <input type="radio"/> |
| picnic | <input type="radio"/> |
| playground | <input type="radio"/> |

school	<input type="radio"/>
store	<input type="radio"/>
woods	<input type="radio"/>
work	<input type="radio"/>
yard	<input type="radio"/>
zoo	<input type="radio"/>

People

	Says
aunt	<input type="radio"/>
baby	<input type="radio"/>
babysitter	<input type="radio"/>
babysitter's name	<input type="radio"/>
boy	<input type="radio"/>
brother	<input type="radio"/>
child	<input type="radio"/>
clown	<input type="radio"/>
cowboy	<input type="radio"/>
daddy (or word used in your family)	<input type="radio"/>
doctor	<input type="radio"/>
fireman	<input type="radio"/>
friend	<input type="radio"/>
girl	<input type="radio"/>
grandma (or word used in your family)	<input type="radio"/>
grandpa (or word used in your family)	<input type="radio"/>
lady	<input type="radio"/>
mailman	<input type="radio"/>
man	<input type="radio"/>
mommy (or word used in your family)	<input type="radio"/>
nurse	<input type="radio"/>
child's own name	<input type="radio"/>
people	<input type="radio"/>
person	<input type="radio"/>
pet's name	<input type="radio"/>
police	<input type="radio"/>
sister	<input type="radio"/>
teacher	<input type="radio"/>

uncle

Games and Routines

	Says
bath	<input type="radio"/>
breakfast	<input type="radio"/>
bye	<input type="radio"/>
call (on phone)	<input type="radio"/>
dinner	<input type="radio"/>
give me five!	<input type="radio"/>
gonna get you!	<input type="radio"/>
go potty	<input type="radio"/>
hi	<input type="radio"/>
hello	<input type="radio"/>
lunch	<input type="radio"/>
nap	<input type="radio"/>
night night	<input type="radio"/>
no	<input type="radio"/>
patty cake	<input type="radio"/>
peekaboo	<input type="radio"/>
please	<input type="radio"/>
shh/shush/hush	<input type="radio"/>
shopping	<input type="radio"/>
snack	<input type="radio"/>
so big!	<input type="radio"/>
thank you	<input type="radio"/>
this little piggy	<input type="radio"/>
tum around	<input type="radio"/>
yes	<input type="radio"/>

Action Words

	Says
bite	<input type="radio"/>
blow	<input type="radio"/>
break	<input type="radio"/>
bring	<input type="radio"/>
build	<input type="radio"/>
bump	<input type="radio"/>
buy	<input type="radio"/>
carry	<input type="radio"/>
catch	<input type="radio"/>

- chase
- clap
- clean
- climb
- close
- cook
- cover
- cry
- cut
- dance
- draw
- drink
- drive
- drop
- dry
- dump
- eat
- fall
- feed
- find
- finish
- fit
- fix
- get
- give
- go
- hate
- have
- hear
- help
- hide
- hit
- hold
- hug
- hurry
- jump
- kick
- kiss
- knock
- lick

- like
- listen
- look
- love
- make
- open
- paint
- pick
- play
- pour
- pretend
- pull
- push
- put
- read
- ride
- rip
- run
- say
- see
- shake
- share
- show
- sing
- sit
- skate
- sleep
- slide
- smile
- spill
- splash
- stand
- stay
- stop
- sweep
- swim
- swing
- take
- talk
- taste

- tear
- think
- throw
- tickle
- touch
- wait
- wake
- walk
- wash
- watch
- wipe
- wish
- work
- write

Descriptive Words

- | | Says |
|----------|-----------------------|
| all gone | <input type="radio"/> |
| asleep | <input type="radio"/> |
| awake | <input type="radio"/> |
| bad | <input type="radio"/> |
| better | <input type="radio"/> |
| big | <input type="radio"/> |
| black | <input type="radio"/> |
| blue | <input type="radio"/> |
| broken | <input type="radio"/> |
| brown | <input type="radio"/> |
| careful | <input type="radio"/> |
| clean | <input type="radio"/> |
| cold | <input type="radio"/> |
| cute | <input type="radio"/> |
| dark | <input type="radio"/> |
| dirty | <input type="radio"/> |
| dry | <input type="radio"/> |
| empty | <input type="radio"/> |
| fast | <input type="radio"/> |
| fine | <input type="radio"/> |
| first | <input type="radio"/> |
| full | <input type="radio"/> |
| gentle | <input type="radio"/> |

- good
- green
- happy
- hard
- heavy
- high
- hot
- hungry
- hurt
- last
- little
- long
- loud
- mad
- naughty
- new
- nice
- noisy
- old
- orange
- poor
- pretty
- quiet
- red
- sad
- scared
- sick
- sleepy
- slow
- soft
- sticky
- stuck
- thirsty
- tiny
- tired
- wet
- white
- windy
- yellow
- yucky

Words About Time	
------------------	--

	Says
after	<input type="radio"/>
before	<input type="radio"/>
day	<input type="radio"/>
later	<input type="radio"/>
moming	<input type="radio"/>
night	<input type="radio"/>
now	<input type="radio"/>
time	<input type="radio"/>
today	<input type="radio"/>
tomorrow	<input type="radio"/>
tonight	<input type="radio"/>
yesterday	<input type="radio"/>

Pronouns	
----------	--

	Says
he	<input type="radio"/>
her	<input type="radio"/>
hers	<input type="radio"/>
him	<input type="radio"/>
his	<input type="radio"/>
I	<input type="radio"/>
it	<input type="radio"/>
me	<input type="radio"/>
mine	<input type="radio"/>
my	<input type="radio"/>
myself	<input type="radio"/>
our	<input type="radio"/>
she	<input type="radio"/>
that	<input type="radio"/>
their	<input type="radio"/>
them	<input type="radio"/>
these	<input type="radio"/>
they	<input type="radio"/>
this	<input type="radio"/>
those	<input type="radio"/>
us	<input type="radio"/>
we	<input type="radio"/>
you	<input type="radio"/>

- your
- yourself

Question Words

- | | Says |
|-------|-----------------------|
| how | <input type="radio"/> |
| what | <input type="radio"/> |
| when | <input type="radio"/> |
| where | <input type="radio"/> |
| which | <input type="radio"/> |
| who | <input type="radio"/> |
| why | <input type="radio"/> |

Prepositions and Locations

- | | Says |
|-----------|-----------------------|
| about | <input type="radio"/> |
| above | <input type="radio"/> |
| around | <input type="radio"/> |
| at | <input type="radio"/> |
| away | <input type="radio"/> |
| back | <input type="radio"/> |
| behind | <input type="radio"/> |
| beside | <input type="radio"/> |
| by | <input type="radio"/> |
| down | <input type="radio"/> |
| for | <input type="radio"/> |
| here | <input type="radio"/> |
| inside/in | <input type="radio"/> |
| into | <input type="radio"/> |
| next to | <input type="radio"/> |
| of | <input type="radio"/> |
| off | <input type="radio"/> |
| on | <input type="radio"/> |
| on top of | <input type="radio"/> |
| out | <input type="radio"/> |
| over | <input type="radio"/> |
| there | <input type="radio"/> |
| to | <input type="radio"/> |
| under | <input type="radio"/> |
| up | <input type="radio"/> |
| with | <input type="radio"/> |

Quantifiers and Articles

	Says
a	<input type="radio"/>
all	<input type="radio"/>
a lot	<input type="radio"/>
an	<input type="radio"/>
another	<input type="radio"/>
any	<input type="radio"/>
each	<input type="radio"/>
every	<input type="radio"/>
more	<input type="radio"/>
much	<input type="radio"/>
not	<input type="radio"/>
none	<input type="radio"/>
other	<input type="radio"/>
same	<input type="radio"/>
some	<input type="radio"/>
the	<input type="radio"/>
too	<input type="radio"/>

Helping Verbs

	Says
am	<input type="radio"/>
are	<input type="radio"/>
be	<input type="radio"/>
can	<input type="radio"/>
could	<input type="radio"/>
did/did ya	<input type="radio"/>
do	<input type="radio"/>
does	<input type="radio"/>
don't	<input type="radio"/>
gonna/going to	<input type="radio"/>
gotta/got to	<input type="radio"/>
hafta/have to	<input type="radio"/>
is	<input type="radio"/>
lemme/let me	<input type="radio"/>
need/need to	<input type="radio"/>
try/try to	<input type="radio"/>
wanna/want to	<input type="radio"/>
was	<input type="radio"/>

were	<input type="radio"/>
will	<input type="radio"/>
would	<input type="radio"/>

Connecting Words

	Says
and	<input type="radio"/>
because	<input type="radio"/>
but	<input type="radio"/>
if	<input type="radio"/>
so	<input type="radio"/>
then	<input type="radio"/>

HOW CHILDREN USE WORDS

	Not yet	Sometimes	Often
1. Does your child ever talk about past events or people who are not present? For example, a child who saw a parade last week might later say parade, clown, or band.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Does your child ever talk about something that's going to happen in the future, for example, saying "choo-choo" or "airplane" before you leave the house for a trip, or saying "swing" when you are going to the park?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Does your child talk about objects that are not present such as asking about a missing or absent toy, referring to a pet out of view, or asking about someone not present?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Does your child understand if you ask for something that is not in the room, for example, by going to the bedroom to get a teddy bear when you say "where's the bear?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Does your child ever pick up or point to an object and name an absent person to whom the object belongs? For example, a child might point to mommy's shoe and say "mommy".

PART II: Sentences and Grammar

Word Endings (Part I)

	Not yet	Sometimes	Often
1. To talk about more than one thing, we add an "s" to many words. Examples include cars (for more than one car), shoes, dogs, and keys. Has your child begun to do this?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. To talk about ownership, we add an "s", for example, Daddy's key, kitty's dish, and baby's bottle. Has your child begun to do this?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. To talk about activities, we sometimes add "ing" to verbs. Examples include looking, running, and crying. Has your child begun to do this?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. To talk about things that happened in the past, we often add "ed" to the verb. Examples include kissed, opened, and pushed. Has your child begun to do this?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

WORD FORMS

Following are some other words children learn. Please mark any of these words that your child uses.

Nouns:

children

Says

feet

men

mice	<input type="radio"/>
teeth	<input type="radio"/>

Verbs:

	Says
ate	<input type="radio"/>
blew	<input type="radio"/>
bought	<input type="radio"/>
broke	<input type="radio"/>
came	<input type="radio"/>
drank	<input type="radio"/>
drove	<input type="radio"/>
fell	<input type="radio"/>
flew	<input type="radio"/>
got	<input type="radio"/>
had	<input type="radio"/>
heard	<input type="radio"/>
held	<input type="radio"/>
lost	<input type="radio"/>
made	<input type="radio"/>
ran	<input type="radio"/>
sat	<input type="radio"/>
saw	<input type="radio"/>
took	<input type="radio"/>
went	<input type="radio"/>

Word Endings (Part II).

Young children often place the wrong endings on words. For example, a child might say "Auntie goed home." Mistakes like this are often a sign of progress in language. In the following lists, please mark all the mistakes of this kind you have heard your child say recently.

Nouns:

	Says
blockses	<input type="radio"/>
childrens	<input type="radio"/>
childs	<input type="radio"/>
feets	<input type="radio"/>
foots	<input type="radio"/>
mans	<input type="radio"/>

mens	<input type="radio"/>
mices	<input type="radio"/>
mouses	<input type="radio"/>
shoeses	<input type="radio"/>
sockes	<input type="radio"/>
teeths	<input type="radio"/>
toeses	<input type="radio"/>
tooths	<input type="radio"/>

Verbs:

	Says
ated	<input type="radio"/>
blewed	<input type="radio"/>
blowed	<input type="radio"/>
bringed	<input type="radio"/>
buyed	<input type="radio"/>
breaked	<input type="radio"/>
broked	<input type="radio"/>
camed	<input type="radio"/>
comed	<input type="radio"/>
doed	<input type="radio"/>
dranked	<input type="radio"/>
drinked	<input type="radio"/>
eated	<input type="radio"/>
fallled	<input type="radio"/>
flied	<input type="radio"/>
getted	<input type="radio"/>
goed	<input type="radio"/>
gotted	<input type="radio"/>
haved	<input type="radio"/>
heard	<input type="radio"/>
holded	<input type="radio"/>
losed	<input type="radio"/>
losted	<input type="radio"/>
maked	<input type="radio"/>
ranned	<input type="radio"/>
runned	<input type="radio"/>
seed	<input type="radio"/>
satted	<input type="radio"/>
sitted	<input type="radio"/>

taked

wented

Additional Language

It is OK if your child says words that were not listed above. Please write in any additional words your child says:

	Not yet	Sometimes	Often
Has your child begun to combine words yet, such as "nother cracker", or "doggy bite?"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please list three of the longest sentences you have heard your child say recently.

Please do not include sentences from songs, nursery rhymes, or social games (Examples: Peekaboo I see you, Old McDonald had a farm, Five little monkeys jumping on the bed)

Example 1 _____

Example 2 _____
(Enter NA if no more examples)

Example 3 _____
(Enter NA if no more examples)

Please list three of the longest sentences you have heard your child say recently.

Please do not include sentences from songs, nursery rhymes, or social games (Examples: Peekaboo I see you, Old McDonald had a farm, Five little monkeys jumping on the bed)

COMPLEXITY

In each of the following pairs, please mark the one that sounds MOST like the way your child talks right now.

If your child is saying sentences even more complicated than the two provided, please select the second sentence.

If your child is not yet combining words as in the example, please select the first sentence.

1	<input type="radio"/> Two shoe. <input type="radio"/> Two shoes.
2	<input type="radio"/> Two foot. <input type="radio"/> Two feet.

3	<input type="radio"/> Daddy car. <input type="radio"/> Daddy's car.
4. (Talking about something happening right now)	<input type="radio"/> Kitty sleep. <input type="radio"/> Kitty sleeping.
5. (Talking about something happening right now)	<input type="radio"/> I make tower. <input type="radio"/> I making tower.
6. (Talking about something that already happened)	<input type="radio"/> I fall down. <input type="radio"/> I fell down.
7	<input type="radio"/> More cookie! <input type="radio"/> More cookies!
8	<input type="radio"/> These my tooth. <input type="radio"/> These my teeth.
9	<input type="radio"/> Baby blanket. <input type="radio"/> Baby's blanket.
10. (Talking about something that already happened)	<input type="radio"/> Doggie kiss me. <input type="radio"/> Doggie kissed me.
11. (Talking about something that already happened)	<input type="radio"/> Daddy pick me up. <input type="radio"/> Daddy picked me up.
12. (Talking about something that already happened)	<input type="radio"/> Kitty go away. <input type="radio"/> Kitty went away.
13	<input type="radio"/> Doggie table. <input type="radio"/> Doggie on table.
14	<input type="radio"/> That my truck. <input type="radio"/> That's my truck.
15	<input type="radio"/> Baby crying. <input type="radio"/> Baby is crying.
16	<input type="radio"/> You fix it? <input type="radio"/> Can you fix it?
17	<input type="radio"/> Read me story, Mommy. <input type="radio"/> Read me a story, Mommy.
18	<input type="radio"/> No wash dolly. <input type="radio"/> Don't wash dolly.
19	<input type="radio"/> Want more juice. <input type="radio"/> Want juice in there.
20	<input type="radio"/> There a kitty. <input type="radio"/> There's a kitty.

-
- 21 Go bye-bye.
 Wanna go bye-bye.
-
- 22 Where Mommy go?
 Where did Mommy go?
-
- 23 Coffee hot.
 That coffee hot.
-
- 24 I no do it.
 I can't do it.
-
- 25 I like read stories.
 I like to read stories.
-
- 26 Don't read book.
 Don't want you read that book.
-
- 27 Turn on light.
 Turn on the light so I can see.
-
- 28 I want that.
 I want that one you got.
-
- 29 Want cookies.
 Want cookies and milk.
-
- 30 Cookie mommy.
 Cookie for Mommy.
-
- 31 Baby want eat.
 Baby want to eat.
-
- 32 Lookit me!
 Lookit me dancing!
-
- 33 Lookit!
 Lookit what I got!
-
- 34 Where's my dolly?
 Where's my dolly name Sam?
-
- 35 We made this.
 Me and Paul made this.
-
- 36 I sing song.
 I sing song for you.
-
- 37 Baby crying.
 Baby crying cuz she's sad.

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Section Totals

MCDI:WS Section 1 (Sound Effects and Animals) Total Says _____

MCDI:WS Section 2 (Animals Real or Toy) Total Says _____

MCDI:WS Section 3 (Vehicles Real or Toy) Total Says _____

MCDI:WS Section 4 (Toys) Total Says _____

MCDI:WS Section 5 (Food and Drink) Total Says _____

MCDI:WS Section 6 (Clothing) Total Says _____

MCDI:WS Section 7 (Body Parts) Total Says _____

MCDI:WS Section 8 (Small Household Items) Total Says _____

MCDI:WS Section 9 (Furniture and Rooms) Total Says _____

MCDI:WS Section 10 (Outside Things) Total Says _____

MCDI:WS Section 11 (Places to Go) Total Says _____

MCDI:WS Section 12 (People) Total Says _____

MCDI:WS Section 13 (Games and Routines) Total Says _____

MCDI:WS Section 14 (Action Words) Total Says _____

MCDI:WS Section 15 (Descriptive Words) Total Says _____

MCDI:WS Section 16 (Words About Time) Total Says _____

MCDI:WS Section 17 (Pronouns) Total Says

MCDI:WS Section 18 (Question Words) Total Says

MCDI:WS Section 19 (Prepositions and Locations) Total Says

MCDI:WS Section 20 (Quantifiers and Articles) Total Says

MCDI:WS Section 21 (Helping Verbs) Total Says

MCDI:WS Section 22 (Connecting Words) Total Says

Part 1 Scores

MCDI:WS Total Number of Words Said

MCDI:WS Total Words Percentile

MCDI:WS Total Words Age Range (in months)

Part 2 Scores

MCDI:WS Word Forms used

MCDI:WS Word Forms Used Percentile

MCDI:WS Word Endings used

MCDI:WS Verbs Sections Total

Combining Scores

MCDI:WS Length in morphemes of child's three longest sentences (M3L) mean

MCDI:WS Length in morphemes of child's three longest sentences (M3L) percentile

Complexity Scores

MCDI:WS Number of times the more complex sentence is selected _____

MCDI:WS Number of times the more complex sentence is selected percentile _____

APPENDIX D
BUNDLE OF LEARNING MATERIALS



APPENDIX E
ADULT CODE CODING PROTOCOL

<u>Single codes</u>	<u>Turn taking</u>	<u>Expansion</u>	<u>Target</u>
[ax] – unintelligible utterance	[mt] – matched turn	[yx] – expansion	[no] – non-target
[nr] – no response	[ut] – unmatched turn	[nx] – no expansion	[sw] – single word
[r] – reading		[ix] – impossible to expand	[ad] – ads
[n] – no single code	[n] – no communication	[n] – no expansion	[n] – no target

Adult Code Definitions

Adult Single Codes

1. **Unintelligible Utterances [ax]**

Any unintelligible adult utterances are coded [ax]. When parts of utterances are intelligible, still code as [ax].

Code Example:

a xxx [ax][n][n]
a bear xx [ax][n][n]

2. **No Response [nr]**

The adult does not take a turn within 3 seconds after the child's communicative act. Do not code/transcribe if the adult was not able to take turn due to external circumstance (i.e., other child/adult talking to the adult, the classroom bell rang, the child engages in challenging behavior).

Code Example:

c bear [n][w][u]
3 seconds passed
a {no response} [nr][n][n]

3. **Reading [r]**

The adult reads the book. Any utterances that are from the book or the prepared script is coded [r]. If the adult adds word(s) to the book script/text, it is transcribed and coded based on the protocol.

Code Example:

a {reads} [r]
the book text says, "the bear is eating"
a the bear is eat/ing the apple [mt][ix][ad]

Adult Turn Codes

1. **Matched turns [mt]**

Adult takes turn following a child's communicative act and are contingent and related. If the child did not take a communicative turn and at least 3 seconds have occurred since the last adult's turn, the next utterance should be coded as matched turn. If an adult responds to any communicative act that the child produces, it is coded as matched turn. The matched turn must be temporally and semantically contingent or related; however, does not have to be expansion or target language.

Code Example:

c {reaches} [n][g][u]
a you want bear [mt][ix][ad]

c bear [n][w][u]
a brown bear [mt][nx][no]

a bear is fall/ing [mt][ix][ad]
child does not respond and at least 3 sec has passed
a the bear crash/ed [mt][ix][ad]

2. **Unmatched turns [ut]**

Adult takes turn that are not matched to the child's behavior, communication, or content focus. If the adult consecutively takes turns without leaving at least 3 seconds for the child to respond or produce any communicative act, it is coded as unmatched turns. If the adult asks test question that are not qualified as question asking episodes or give demands when the child is already engaged, it is coded as unmatched turn.

Code Example:

a bear is drive/ing [mt][ix][ad]
c (beep) beep [pcv][n][n]
a you want the apple/s? [ut][ix][ad]

a applesauce is yummy [mt][ix][ad]
a it is so soft [ut][ix][ad]

c I want to hold the bear [n][w][u]
a put the bear away [ut][nx][no]

Adult Expansion Codes

1. **Yes Expansion [yx]**

The adult expands the child's word(s): (1) into a simple ADS in which the noun is in the subject position (toy talk) or (2) by recasting.

1. the adult must repeat every content word in the child's preceding utterance to expand. Linguistic others are not necessary or required to repeat. The expansion must be grammatically correct. Fully formed child utterances should be attempted with recast.

2. the adult recasts the child's preceding utterances that are already fully formed (i.e., simple sentence or toy talk) by recasting the sentence and/or adding a word to the sentence.

Code Example:

c bear [n][w][u]
 a bear is eat/ing [mt][yx][ad]
 c eat [n][w][i]
 a bear is eat/ing an apple [mt][yx][ad]

c bear drive/s [n][w][u]
 a bear is drive/ing [mt][yx][ad]

c I have apple/s [n][w][u]
 a you have four apple/s [mt][yx][ad]

2. No Expansion [nx]

The adult does not expand a communicative child act that can be expanded into a simple ADS or recast. When the child's utterance is not fully formed sentence, the adult does not repeat all of the content, adds too many words, and/or changes the child's communicative function, it is coded as no expansion.

Code Example:

c red apple [n][w][u]
 a Apple is yummy [mt][nx][ad]

c truck [n][w][u]
 a bear is drive/ing the big truck to visit his friend/s [mt][nx][no]

3. Impossible to Expand [ix]

It is impossible for the adult to expand the child's previous communicative act (i.e., unintelligible utterance, vocalization, gesture, linguistic other). Adult utterances that do not follow the child's utterances are coded [ix]. If the child's fully formed sentences are not recasted, following the definition on this protocol, it is coded as [ix].

Code Example:

c xxx [pcv][n][n]
 a bear is roll/ing [mt][ix][ad]

c {points} [n][g][u]
 a apple/s [mt][ix][sw]

c apple is red [n][w][u]
 a apple is red [mt][ix][ad]

If the child's utterance is partially intelligible, the adult should expand the word(s) that are intelligible.

Code Example:

c xx bear [n][w][u]
 a bear is eat/ing [mt][yx][ad]

c apple xx [n][w][u]
 a yummy [mt][nx][no]

Adult Target Codes

1. **Single Words [sw]**

The adult's utterance only contains a single content word with syntactic status (cf. Hadley, 1999). Words without syntactic status include: greetings (e.g., hi, byebye), social words (e.g., please), addressee terms used to get the partner's attention (e.g., Mommy), nonsyntactic markers of affirmation or negation (e.g., yeah, no), and interjections (e.g., uhoh, oops, whoa). A two-word utterance made up of one word with syntactic status and another word without syntactic status will get this code. Adjectives do not count as single words.

Code Example:

a bear [mt][ix][sw]
 a apple [mt][ix][sw]
 a animal/s [mt][ix][sw]

2. **Simple Active Declarative Sentences [ads]**

Active declarative sentences are in active voice and declarative form. This definition **excludes** single words or phrases, complex sentences, fragments, or sentences in passive voice, yes/no- questions, WH- questions, imperatives and exceptional declarative sentence structures with *fronting* or movement of syntactic structure, in which a word group that customarily follows the verb is placed at the beginning of a sentence (e.g. "here comes the train" or "there are more toys").

Code Example:

a the bear is eat/ing [mt][ix][ads]
 a the truck is roll/ing [mt][ix][ads]
 a it/'s an apple [mt][ix][ads]
 a the friend/s are come/ing [mt][ix][ad]

3. **Non-target [no]**

Adult language will be coded as non-target [no] when the adult uses language outside of single words and simple ADS. This includes questions, directives, single verbs, modifiers, phrases, and complex sentences.

Code Example:

a red apple [mt][ix][no]
 a here is the bear [mt][ix][no]
 a the bear and his friend/s are go/ing to eat the applesauce together
 [mt][ix][no]
 a are you ready? [mt][ix][no]

APPENDIX F
CHILD CODE CODING PROTOCOL

Single codes	Communication	Independence
[pcv] – potentially communicative vocalizations	[w] – word	[u] – unprompted
[n] – no single code	[g] – gesture	[e] – elicited
	[z] – AAC/ASL	[i] – imitated
		[p] – prompted
	[n] – no communication	[n] – no independence

Child Code Definition

Child Single Codes

1. **Potentially Communicative Vocalization [pcv]**

Vocalizations are non-word, unintelligible, or linguistic other (non-syntactic) utterances voiced by the child to a therapist. Utterances that are coded as vocalizations are those that cannot be understood as single or multiple words. An utterance ends when there has been a breath or a clear break of at least one second without vocalizations. The best way to determine this is to count to yourself “one thousand one.”

Can be coded with a gesture code [g]

Vocalizations are coded during:

- Sound effects (i.e., animal sound, motor sound while pushing the toy car, play related sound effects)
- Other vowel-vowel or vowel consonant combinations
- Babblings and fillers such as “mm” or “huh”
- Laughing
- Linguistic others (e.g., wow, uhoh, byebye)

Not coded as vocalization:

- Crying/screaming/vocalization for protesting
- Involuntary noises (e.g., hiccups, sneezes)

Code Example:

c xxx [pcv][n][n]
 c x bear [n][w][u]
 c {points} xx [pcv][g][u]
 c {laughs} [pcv][n][n]

Child Form Codes

1. **Words [w]**

The child says a word. A word needs to be intelligible to code. If a child uses a specific approximation for a word, transcribe and code the word as the word that is intended.

Only code for word when gesture is transcribed together

Code Example:

c bear [n][w][u]
c {points} apple [n][w][u]

2. **Gesture [g]**

The child make a gesture alone (do not code if combined with word utterance). Gestures include reaches, grabs, gives, points, shows.

Code Example:

c {points} [n][g][u]
c {reaches} [n][g][u]
c {gives} apple [n][w][u]

3. **ASL Sign or AAC [z]**

ASL Sign: The child uses a manual sign that is made in the same way each time during the session. Transcribe the ASL Sign. If the child used the ASL sign and then speaks, code as ASL [z].

Code Example:

c {signs 'more'} more [n][z][u]
c {signs 'alldone' and then says alldone} alldone [n][z][u]
c {says 'help' and then signs 'help'} help [n][w][u]

AAC Device: The child uses an AAC device to communicate. If the child uses the devices and speaks simultaneously, code as separate utterances.

Code Example:

c {presses 'apple' on aac} apple [n][z][u].
*** Child says 'bear' and presses 'bear' on acc simultaneously***
c bear [n][w][u]
c {presses 'bear' on aac} bear [n][z][u]

Child Independence Codes

1. **Unprompted [u]**

The child takes a spontaneous turn. If the child adds words or changes the mode (word to sign language or sign language to word), it is unprompted [u]. If the child repeats any or all of the preceding adult communicative act after 3 seconds have passed, it should be coded as unprompted [u].

Code Example:

a bear/z friend/s are come/ing [mt][ix][ad]
c a mouse [n][w][u]!

a {reads – “bear is making an applesauce”} [r]
 after 3 seconds
 c bear [n][w][u]
 c {grabs} [n][g][u]

2. **Imitated [i]**

The child imitates all or part of the preceding adult communicative act (words, ASL sign, gesture) within 3 seconds but does not add anything to it. If the child adds words or changes the mode (word to sign language or sign language to word), it is unprompted [u]. If the child repeats any or all of the preceding adult communicative act after 3 seconds have passed, it should be coded as unprompted [u]. If on the line of 3 seconds, code as imitated [i].

Code Example:

a bear is eat/ing an apple [mt][ix][ad]
 c apple [n][w][i]

a {points} bear [mt][ix][sw]
 c {points} [n][g][i]

a let/'s make an applesauce [mt][ix][no]
 c applesauce is yummy [n][w][u]

a let/'s play [ut][ix][no].
 c {signs play} play [n][z][u].

3. **Prompted [p]**

The child takes a turn in response to an adult prompt. These will typically be question episodes after say prompts, where the response options are included in the adult's turn. Initial and spontaneous response to the questions are not coded as [p] and only considered after adult provides prompts. Hand over hand gestures is coded as [p].

Code Example:

a say apple [ut][ix][sw]
 c apple [n][w][p]

a point to the bear [ut][ix][no]
 c {points} [n][g][p]

a where did the bear go? [ut][ix][no]
 c xx [pcv][n][n]
 a say home [mt][ix][sw]
 c home [n][w][p]

4. **Elicited [e]**

The child uses spontaneous language in response to an adult communication open prompt, question, or cue. Child utterances in response to any of the following will receive the code:

- Open question (“what do you want?”)

- Clarifying question (“what?”)
- Test question (“who is this?”)

All spontaneous response to the questions before “say” prompts within the question asking strategy should be coded as [e].

Code Example:

a {points} who is eat/ing the apple? [ut][ix][no]
c bear [n][w][e]

c xx [pcv][n][n]
a what? [mt][ix][no]
c Apple/s [n][w][e]

a what do you want? [ut][ix][no]
c I want to hold bear [n][w][e]

*****Question asking strategy*****

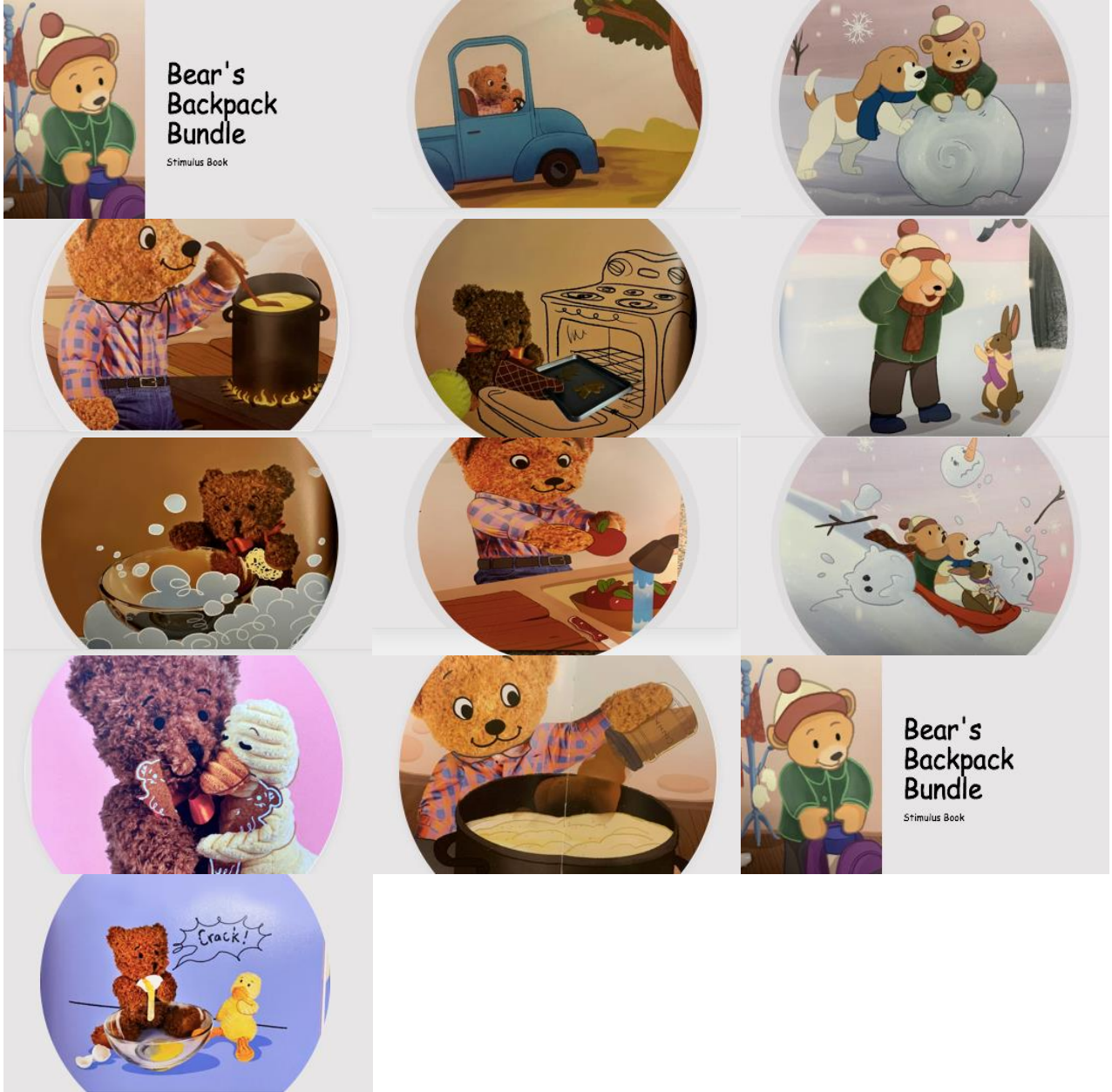
a {points} who is this? [ut][ix][no]
(child no response)
a say bear [mt][ix][sw]
c bear [n][w][p]

APPENDIX G
EXPRESSIVE LANGUAGE PROBE SCORING SYSTEM

Participant ID:
Peer or Target:
Group 1 or 2:
Date administered:
Probe session number:

Page	Prompt	Child transcript	Semantics			Syntax					
			3	2	1	0	3	2	1	0	
5	Bear is making a snowman.		Correct meaning	Partially correct / Incomplete	Demonstrate comprehension using JA or play action, echos/repeating (e.g., "Bear")	Wrong meaning (wrong noun, verb, statement incorrect)	No response / unintelligible	Active declarative sentence (noun/pronoun subject and verb)	Phrase (two or more related content words, not a sentence)	Noun or verb only (may include articles)	No response / unintelligible
7	Bear is stirring the applesauce.										
9	Bear is baking cookies.										
13	Bear is washing the bowl.										
15	Bear is washing apples.										
17	Bear is sledding / crashing.										
21	Bear is pouring cinnamon.										
23	Bear is pulling the sled.										
25	Bear is cracking an egg.										
			Total Semantics Raw Score								
			Total Syntax Raw Score	0							
			Grand Total Raw Score	0							
			Overall Percentage	0							

APPENDIX H
EXPRESSIVE LANGUAGE PROBE BOOK

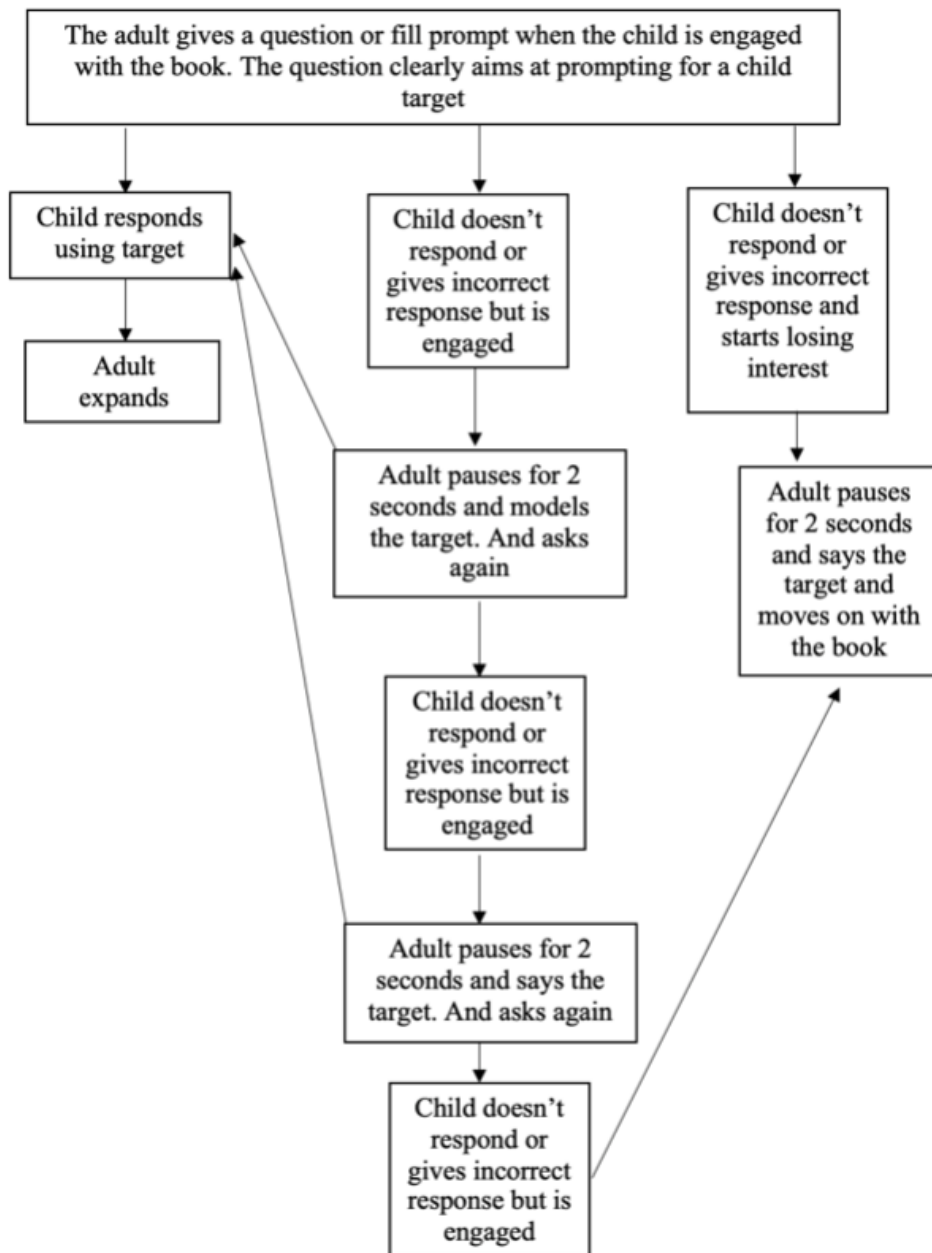


25	The apples get mushy, the way that they should.								
26	Bear shakes on cinnamon. Mmmm...that smells good!	Use block to shake cinnamon	Play	Shake/sniff	Gesture	What does Bear put on the applesauce ?	Question	"The apples are mushy."	Language
27	Here comes Bear's friends. He sees Duck, Mouse and Pup!	Wave hi	Gesture	Who is it? (point to animal)	Question				
28	He pours nice warm applesauce into each cup.	What is it? (applesauce)	Question	"Bear pours the applesauce."	Language	Pour applesauce into the cups	Play	Pour	Gesture
29	Their cups are now empty. They had so much fun.	Stack the cups	Play	All done	Gesture	What was in their cups?	Question		
30	They thank dear friend Bear, and say. "Bye" everyone."	"The applesauce is all gone."	Language	Stack the cups	Play	Wave goodbye	Gesture	Who did the friends tell goodbye?	Question

APPENDIX J
READING SET ROTATION CHART

What Book Read Am I On??? (For Intervention Only)	
Session #	Read #
01	1
02	2
03	3
04	4
05	1
06	2
07	3
08	4
09	1
10	2
11	3
12	4
13	1
14	2
15	3
16	4
17	1
18	2
19	3
20	4

APPENDIX K
QUESTION ASKING EPISODE FLOWCHART



APPENDIX L
CONTROL CONDITION PROCEDURAL FIDELITY CHECKLIST

Implementer: _____ Dyad: _____ Phase: CR Session: _____ Date: _____ Prim/Reli

Engagement & Materials	
<p>Physical Space: The adult has defined a space for the child to play with bundle toys available and without too many distractions. The adult attempts to maintain this space throughout the session.</p> <p><i>Criteria 2 = set up/maintain a defined space + removal of distractions, 1 = 1 or more criteria are missing OR criteria are not attempted to be maintained, 0 = criteria not attempted</i></p>	
<p>Correct toys are present: The adult prepares correct toy set for corresponding book</p>	
<p>Transition statement The adult makes a statement that includes "read", "bear", and "friends". Ex: "Let's read about bear and his friends!"</p>	
<p>Pre-read behavior expectations Share toys with our friends. Safe body and hands.</p>	
Strategies	
<p>Systematic introduction of toys: The adult allows access to all the toys at the beginning of the read and does not engage with the toys throughout the read.</p>	
<p>Language: The adult does not use any of the pre-determined Bundle + EMT language strategies during the read</p>	
<p>Gesture: The adult does not use any of the pre-determined Bundle + EMT gesture strategies during the read</p>	
<p>Play Action: The adult does not model any play actions using the toys during the read</p>	
<p>Question asking: The adult does not ask any questions during the read.</p>	
<p>Pointing: The adult does not use pointing or labeling the objects in the book during the read.</p>	
Responsiveness	
<p>Expanding child language: The adult does not expand the child's language by adding words to create a sentence/add to a sentence or by replacing pronouns or general words with a more specific word, defined by the coding protocol - Pull data from <u>DataVyu</u> (percentage below 30%)</p>	
Control Implementation Score:	
CORRECT STEPS:	/
% OF CORRECT STEPS:	

**APPENDIX M
INTERVENTION PROCEDURAL FIDELITY CHECKLIST**

Engagement & Materials	
<p>Physical Space: The adult has defined a space for the child to play with bundle toys available and without too many distractions. The adult attempts to maintain this space throughout the session.</p> <p>Criteria 2 = set up/maintain a defined space + removal of distractions, 1 = 1 or more criteria are missing OR criteria <u>is</u> not attempted to be maintained, 0 = criteria not attempted</p>	
<p>Correct toys are present: The adult prepares correct toy set for corresponding book</p>	
<p>Transition statement: The adult makes a statement that includes "read", "bear", and "friends". Ex: "Let's read about bear and his friends!"</p>	
<p>Pre-read behavior expectations:</p> <ul style="list-style-type: none"> • Share toys with our friends. • Safe body and hands. • Play together 	
Strategies	
<p>Systematic introduction of toys: The adult allows access to toys as prescribed by the script.</p>	
<p>Language: The adult appropriately uses the pre-determined Bundle + EMT language strategies during the read</p> <ul style="list-style-type: none"> • Miss 0=2, Miss 1=1, Miss >1=0 	
<p>Gesture: The adult appropriately uses the pre-determined Bundle + EMT gesture strategies during the read</p> <ul style="list-style-type: none"> • Miss 0=2, Miss 1=1, Miss >1=0 	
<p>Play Action: The adult appropriately uses the pre-determined Bundle + EMT play actions using the toys during the read</p> <ul style="list-style-type: none"> • Miss 0=2, Miss 1=1, Miss >1=0 	
<p>Question asking: The adult appropriately asks the questions, following the pre-determined strategy, during the read.</p> <ul style="list-style-type: none"> • Miss 0=2, Miss 1=1, Miss >1=0 	
<p>Abandon The adult appropriately abandons the question episode when the child loses interest (or never had interest) or protests.</p> <ul style="list-style-type: none"> • Pulled from DataVyu (Qlis) 	
<p>Quality This item is about the quality of the question episode and should be based off the Q3 items from coded data.</p> <ul style="list-style-type: none"> • Pulled from DataVyu. If the adult scores an Q3 on 80% of their attempted episodes, a score of "yes" should be given 	
<p>Pointing: The adult clearly points to or shows objects (at least 2x) while giving them their label (only) to make the object name more salient. This can be taken from the transcript.</p>	
Responsiveness	
<p>Expanding child language: The adult does not expand the child's language by adding words to create a sentence/add to a sentence or by replacing pronouns or general words with a more specific word, defined by the coding protocol</p> <ul style="list-style-type: none"> • Pull data from DataVyu (percentage above 30%) 	
Intervention Implementation Score:	
CORRECT STEPS:	/
% OF CORRECT STEPS:	

APPENDIX N
SOCIAL VALIDITY SURVEY FORM

BB-EMT Social Validity Form

Page 1

Please complete the survey below.

Thank you!

Which role applies to you? (Check all that apply)

- Teacher in Susan Gray School
 Graduate student in ECSE
 Research assistant in ECSE
 Other

Other: _____

What year are you in the program?

- 1st year
 2nd year
 3rd year

How many years have you worked in the early childhood education field?

- less than 1 year
 1 - 5 years 11 months
 6 - 10 years
 longer than 10 years

You will watch two videos (video A and B). You will rate the engagement and communication of the child in the red circle. Then, you will rate the teacher's use of high-quality teaching strategies.

In which video was the child more engaged?

- Video A
 Video B

In which video did the child communicate more?

- Video A
 Video B

In which video did the teacher use higher quality teaching strategies?

- Video A
 Video B

Wait until the new videos are presented.

You will watch two videos (video C and D). You will rate the engagement and communication of the child in the red circle. Then, you will rate the teacher's use of high-quality teaching strategies.

In which video was the child more engaged?

- Video C
 Video D

In which video did the child communicate more?

- Video C
 Video D

In which video did the teacher use higher quality teaching strategies?

- Video C
 Video D

Wait until the new videos are presented.

You will watch two videos (video E and F). You will rate the engagement and communication of the child in the red circle.

In which video was the child more engaged? Video E
 Video F

In which video did the child communicate more? Video E
 Video F

Wait until the new videos are presented.

You will watch two videos (video G and H). You will rate the engagement and communication of the child in the red circle.

In which video was the child more engaged? Video G
 Video H

In which video did the child communicate more? Video G
 Video H