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Using Behavior Skills Training to Increase Quality Parent Talk during a Read-Aloud

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**USING BEHAVIOR SKILLS TRAINING TO INCREASE QUALITY PARENT
TALK DURING A READ-ALoud**

A Master's Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science, Applied Behavior Analysis

By

Britnea Monaco

August 2020

USING BEHAVIOR SKILLS TRAINING TO INCREASE QUALITY PARENT TALK DURING A READ-ALoud

Psychology

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Master of Science

Britnea Monaco

ABSTRACT

Reading to children is one way to engage a child in high-level conversations that go beyond the explicit message of the book. There is a positive correlation between the amount of high-quality caregiver/child joint attention activities and language development. The purpose of this study was to use Behavior Skills Training to teach parents seven component reading skills in order to increase parents word count and quality of words read during read-alouds with their children. Results showed as parents mastered the seven reading components they increased their overall word count. Implications of these findings are discussed within the context of caregiver/child joint attention activities and suggest that caregivers who use higher word counts while reading can increase their child's overall language development.

KEYWORDS: Behavior Skills Training, Starling Word Pedometer, language development, WH-questions, joint attention

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In the interest of academic freedom and the principle of free speech, approval of this thesis indicates the format is acceptable and meets the academic criteria for the discipline as determined by the faculty that constitute the thesis committee. The content and views expressed in this thesis are those of the student-scholar and are not endorsed by Missouri State University, its Graduate College, or its employees.

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INTRODUCTION

Reading to children is much more than entertainment. Shared reading embraces the goals of educational advancement, cultural uplift, and literate discourse (Lonigan, & Whitehurst, 1998). Shared picture book reading provides an environment for children to acquire important pre-literacy skills. Pre-literacy skills are essential in teaching children language (Arnold, Lonigan, Whitehurst, & Epstein, 1994). During shared reading caregivers expose children to language that may not be in their natural environment, knowledge about print (print is meaningful, letters and symbols compose words, and print has certain rules that we follow), and phonemic awareness. Research has shown that exposure to many high-quality joint attention activities between a child and adult positively correlates with vocabulary size later in life (Yu, Suanda, & Smith, 2018).

Joint attention between a parent and child can be any activity in which both parties are engaged simultaneously (Dube, Macdonald, Mansfield, Holcomb, & Ahearn, 2004; MacDonald, Anderson, Geckeler, Green, Holcomb, & Sanchez, 2006; Holth, Vandbakk, Finstad, Gronnerud, & Sorenson, 2009). Joint attention has been defined as the ability to coordinate visual attention between two persons and an external object or event with the purpose of sharing attention (Mundy, Sullivan, & Mastergeorge, 2009). For example, gazing in the same direction with bodies oriented toward the same object. Parents who read to their child and engage in conversations that go beyond the explicit information presented in the story and engage in more high-level conversation by asking *Who*, *What*, *When*, and *Where* questions had children who performed better on vocabulary measures as compared to parents who focus on the explicit message of the story and only ask basic Yes and No questions (Wasik & Bond, 2001).

In the 1960s, Hart and Risley's ongoing study recorded all of the verbal interactions that took place in children's homes (Hart & Risley, 2003). Their sample consisted of 42 families of different socioeconomic backgrounds. There were 13 professional families, 23 working-class families, and six low-income families. They found that parents in professional families emitted an average of 487 utterances per hour and used 382 different words per hour. Lower-income families, in contrast, emitted an average of 176 utterances per hour and used 167 different words per hour. By the age of three, children living in professional families had an average vocabulary size of 1,116, used 310 utterances per hour, and 297 different words per hour. While lower-income children had an average vocabulary size of 525, used 168 utterances per hour, and only used 149 different words per hour (Hart & Risley, 2003). Later, Walker and contributors completed an in-depth follow-up study of 29 of the participants at ages nine and ten (Walker, Greenwood, Hart, & Carta, 1994). Scores for the children at age three were very similar to those scores at age 9 and 10, which showed that language growth slows after the age of three (Hart & Risley, 2003).

Over the years, evidence has suggested that reading aloud to young children exposes them to richer vocabularies with more complex syntax (Klass, Dreyer, & Mendelsohn, 2009). Research has shown that questioning strategies, praise, and modeling contribute to an increased vocabulary in children, which in turn yields higher subsequent test scores on the Peabody Picture Vocabulary Test (Whitehurst, Falco, Lonigan, Fischel, & Al, 1988; Arnold, Lonigan, Whitehurst, & Epstein, 1994). Furthermore, these skills can be taught to parents and guardians and measured to potentially improve a child's language acquisition process.

There have been several studies (Wasik & Hindman, 2013; Arnold et al., 1994; Whitehurst et al., 1988; Wasik & Bond, 2001; Okayay & Kandir, 2017) that have shown the

importance of reading to young children. They have advocated making better use of reading time by asking various WH (who, what, when, where) questions, open-ended questions, giving praise, expanding on the implicit message of the text, and modeling. There has also been significant research on the importance of talking to children while reading, as the quality and quantity of parent talk directly correlates with school readiness or lack thereof (Suskind, Leffel, Graf, Hernandez, Gunderson, Sapolich, & Levine, 2015).

Skinner (1957) used a functional approach to language to classify verbal behavior into different categories: tact, intraverbal, mand, echoic, and autoclitics. When describing verbal behavior, Skinner used verbal operants (mand, tact, etc.) which include antecedent conditions, the behavioral form, and consequences of the behavior (Casey & Bicard, 2009). The speaker is likely to emit a response in the presence of familiar stimuli if they have previously been reinforced for doing so (Skinner, 1957).

The mand is a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation (Skinner, 1957). The tact is a verbal operant in which a response of given form is evoked by a particular object or event or property of an object or event (Skinner, 1957). The intraverbal is a verbal operant that shows no point-to-point correspondence with the verbal stimuli that evoke them (Skinner, 1957). Intraverbals are used as responses in meaningful conversation where the response may be controlled by the speaker's behavior (Casey & Bicard, 2009). The echoic is a verbal operant under the control of the verbal stimuli presented before the response and generates a sound pattern similar to that stimulus (Skinner, 1957). The response in the listener shows a point-to-point correspondence between the sound of the stimulus and the sound of the response (Skinner, 1957).

Each verbal operant is important for children to master during initial language acquisition and the only way for children to acquire all the verbal operants is by experiencing the antecedent conditions and consequences associated with each verbal operant. For instance, a child says the word “cupcake,” the mand would be the child asking for the cupcake, the tact would be the child labeling the cupcake if they see it in their environment and the intraverbal may be used as a response to the child’s parents asking them what they want to eat at their birthday party. Although the word “cupcake” is the has the same formal properties in each case, the antecedent events and consequences were very different in each instance. (Skinner, 1957).

Reading aloud to children, and asking WH-questions, is a way to practice and model some of the verbal operants involved in language acquisition. Parents asking WH-questions are modeling how to mand for information to their child, and their child is able to practice using intraverbals by responding to and answering WH-questions. If the child is not yet verbal, asking and answering WH-questions is a good way for parents to model how to mand and use intraverbals in conversation. The interactions between a caregiver and child may not have an immediate effect, but the effects may be seen after many repetitions over a period of time (Cruvinel & Hubner, 2013).

Cruvinel and Hubner (2013) investigated the acquisition of verbal operants in typically developing children ages 17 months to 2 years of age. In the study, experimenters videotaped sessions in the child’s natural environment and observed all interactions between the parent and child. The experimenter kept data on all verbal behavior between the child and the caregiver, including: antecedents and consequences. The categories of verbal behavior included: vocalizations or utterances that were not considered words, listener responses, other responses, imitative responses, mands, echoics, intraverbals and tacts. As the children grew older, their

vocalizations decreased and their tacts, mands, intraverbals, and echoics increased. More than 60% of mands made by the parents were reinforced by the child's verbal responses. The results suggest that parent mands play an important role in development of the child's verbal repertoire.

Given how important it is for parents to read to their children, and how much we know about the best way to interact with children during reading, the issue becomes one of how best to approach parent training. Behavior Skills Training (BST) is a training procedure that has been shown to be an effective tool for training many different skills, such as caregiver implementation of guided compliance (Miles & Wilder, 2009), incidental teaching procedures (Hsieh, Wilder & Abellon, 2011), discrete trial training (Clayton & Headley, 2019), and mand training (Nigro-Bruzzi, & Sturmey, 2010). BST includes four components: instructions, modeling, rehearsal, and feedback.

In 1983, Yeaton and Bailey analyzed the effectiveness of individual components of their previously established training model, which consisted of Tell them, Show them, Ask them, Let them, with a feedback component after the Let them step. In this study, a crossing guard was trained and given steps on how to teach kindergarten and first grade students to safely cross the crosswalk. This training package contained all of the components of BST, yet was not labeled BST. The instruction component of BST can either be written or verbal. The purpose of this step is for the trainer to give the trainee an explanation of how to complete the skill or behavior to be taught. In the second step, modeling, the skill is demonstrated. Rehearsal is when the trainee is given the opportunity to practice the skill. The rehearsal component is an essential part of BST. The rehearsal component allows for the last component, which is feedback. After the trainee has practiced the skill, they are given feedback on the correct completion of the skill or how to attain correct completion of the skill.

In one study (Suskind et al., 2015), parents received eight weekly, 60-minute home visits from one or two trained home visitors for six months (including baseline). For 35 minutes of the time, parents watched a multi-media module. These modules were aimed at "teaching parents about the link between their own linguistic behavior and their child's early language development and eventual school readiness" (Suskind et al., 2015). In the week between modules, parents were given a LENA recording system and asked to use it during reading time. The LENA system gave the mothers data on the quantity of their talk, the frequency of their communicative interactions with their child, and their progress throughout the intervention (Suskind et al., 2015). As a result of this training, a vast majority of parents in the experimental group saw an increase in their word counts.

A study by Arnold, Lonigan, Whitehurst, and Epstein (1994) divided 64 children and parents into a control condition, a direct training condition, and a video training condition. In the direct training group, the mother received instructions regarding the technique, modeling with the experimenter serving as a model, role-play with the experimenter and an assistant, and performance feedback on their successful completion of the steps. In the video training condition, participants were taught the same content as in the direct training condition, but they were not given individualized feedback and instruction. Both conditions (direct training and video training) resulted in the children scoring higher on language posttests than in the control condition (Arnold, Lonigan, Whitehurst, & Epstein, 1994). These results show the value of training reading skills to parents and the positive results for their children.

Interventions using book reading have demonstrated significant improvements in child vocabulary and emergent literacy skills (Skibbe, Justice, Zucker & McGinty, 2008; Whitehurst Epstein et al., 1994). The success of programs such as *Reach Out and Read* in increasing

children's receptive and expressive language skills (Klass, Dreyer, & Mendelsohn, 2009) provides fertile ground for interventions designed to generalize to everyday language interactions outside of the book reading context" (Suskind et al., 2015).

Reading to children has many important consequences for children, but how children are read to is also an important factor. It is important to use WH-questions, and high-quality joint attention to increase the value of story time for children. Thus, the purpose of the current study was to use behavioral skills training to teach parents the critical components of book reading in order to increase parents' word count and quality of words read during story time with their children

METHOD

Participants

Three different mother-child dyads of typically developing children (age 12 to 18 months) living in southwest Missouri served as participants in this study. Participants were recruited from personal contacts at the local preschool. Parents of preschool children could participate if they had a younger child at home that met the age requirement. The age range of the children was restricted due to concerns that younger children would be less cooperative and older children would be more verbal and complicate data collection. None of the participants had previous experience in reading training programs.

The first participant (Participant A) was a mother of four children (ages 18-months to seven-years-old) with a two-year Associate of Arts degree. Participant B was a mother of three children (ages 15-months to five-years-old) with a Masters degree in Spanish Literature. The third participant (Participant C) was a mother of three children (ages 12-months to five-years-old) with a Masters Degree in Speech-Language Pathology. In each case, the youngest child in each family was the child that was read to during the course of the study. IRB approval number IRB-FY2019-227 was obtained on September 30, 2018 prior to working with participants (See Appendix: Human Subjects IRB Approval).

Setting

All data collection took place in the participants' homes (Participant A, and C) or a preschool classroom after school hours (Participant B). During home sessions, parents were required to turn off all audio equipment (e.g., television, radio, phones) during data collection.

This ensured that no extraneous words or sounds contaminated data collection. If there were other siblings in the home, they were asked to stay in another room during data collection. All home sessions took place after school hours (3:30 and 5:30). During sessions, the experimenter set up the iPad on a table or chair in the home. To reduce reactivity, the experimenter let the parents choose a story to read out of several books prior to beginning baseline sessions. During preschool sessions, training took place in an empty preschool room (4:00 - 7:00). Participants were asked to sit on the carpet with their child for the duration of the session and during home sessions parents were asked to find a comfortable chair to sit in.

Materials

Throughout the study, the experimenter used a *Starling* word pedometer to count the number of words spoken by parents (VersaMe, 2017). The *Starling* is a wearable device that clips onto clothing and can be worn throughout the day. The device connects to the *Starling* smartphone application. The application records the number of words emitted by the *Starling* user. During the experiment, the parent wore the *Starling* during all read-aloud activities. After the read-aloud was complete, the experimenter noted the word count and turned the *Starling* off. All sessions were videotaped using an iPad, so if the child talked during the session, the experimenter could re-watch the video and subtract those words from the *Starlings* word count.

For each session, the parents were asked to read a story to their child. The choice of books was determined by consulting with two Master's-level teachers with expertise in children's literature. The *Llama Llama* series by Anna Dewdney was selected due to the consistency of reading level and the average number of words per book. All parents read the

books in the same sequence, as follows: Session 1 – *Llama Llama and the Bully Goat*. Session 2 – *Llama Llama Mad at Mama*. Session 3 – *Llama Llama Gram and Grandpa*. Session 4 – *Llama Llama Misses Mama*. Session 5 – *Llama Llama Time to Share*. Session 6 – *Llama Llama Red Pajama*. Participant A began baseline with the Session 2 book and continued in the same sequence as the other two participants. The experimenter began Participant A with the Session 2 book for a more accurate comparison when compared to Participant B and C since the books had a varying number of words.

Dependent Measures and Data Collection

The first dependent measure was the number of component skills (out of seven) used correctly during the parent-child read-aloud. Each session consisted of one trial, during which the observer marked whether each of the seven components were "observed" or "not observed." The experimenter took the number of observed components and divided by the total number of components to get the percentage of components correctly completed.

The seven components of caregiver reading behavior consisted of (a) sit in an area without distractions and place the child on your lap or beside you where the book is in their direct line of vision, (b) point to and read the title and authors name, (c) ask three or more different WH questions (who, what, when, where, why) throughout the story to expand on what is happening on each page, (d) stop to ask the child to point to items on the page by describing them using positional concepts (e.g.. above, beside, below, in front, behind, on top), (e) ask questions that expand on what characters and animals may be doing or feeling (e.g., "How did it make him feel when his toy was broken?"),(f) talk about the setting of the story (e.g., Where it takes place What time of day What the weather is like), and (g) use as many voices and facial

expressions as you can to portray the characters and their feelings. A correct response was scored "observed" when the caregiver implemented the component as described above, and if there was no response, the examiner marked "not observed." A Reading Checklist (Figure 1) was used to score responses with a detailed description of each component. Sessions were videotaped so that a second examiner could score the session at a later time to obtain an interobserver agreement, and so that the experimenter could go back and re-watch videos if they were unsure whether they observed a component or not.

The second dependent measure was the parents' word count during the read-aloud session using the *Starling* word pedometer. The experimenter used a formula of words said/words in the book multiplied by 100 to standardize this measure. If the child or any family member spoke or interrupted the parent while reading, the experimenter subtracted those words from the total count. During each session, the parent read a new book for a total of six books read throughout the study (see above).

Experimental Design

A nonconcurrent multiple baseline across parent-child dyads was used to compare the effects of treatment during the course of the study. Participant B and C had 3 sessions of baseline before beginning the intervention and Participant A only had 2 sessions of baseline before intervention (Figure 2). Participant A had a very high word count during baseline sessions and it increased from the first to second baseline session. Out of the components b,c,d,e, and f were used to observe the parent modeling one or multiple verbal operants to their child. The experimenter decided to continue with treatment instead of waiting for both dependent variables to stabilize because Participant A was only observed using 1 out of 5 (20%) of the verbal operant

components during baseline Session 1, and 2 out of 5 (40%) during baseline Session 2. The decision to end baseline was made so the experimenter could begin teaching the reading checklist components in hopes of improving the quality of Participant A's spoken language during the read-aloud.

Interobserver Agreement

Interobserver agreement (IOA) was obtained for 35% of the sessions. The experimenter randomly selected sessions for each participant to score using the Excel formula =RANDBETWEEN(1,17). For the remaining sessions, the experimenter trained her co-teacher on how to collect data on the reading components by watching session videos. The experimenter and trainee scored several sessions together and the trainee was encouraged to ask questions on any disagreements they had during the training sessions. IOA was then calculated using Trial-by-Trial agreement. The experimenter took the total number of trials agreed upon and divided it by the total number of trials. The primary and reliability data were in 93% agreement.

PROCEDURE

Baseline

During baseline, the experimenter met the parent in their home or an empty preschool classroom. The parent was asked to attach the *Starling* and was given a book to read to their child. The experimenter asked the parent to find a spot in the room to sit and begin reading after being given a 3-2-1 countdown. While the parent read, the experimenter sat nearby and collected data using the checklist and afterward checked the word count using the *Starling* application. Before data collection began, the experimenter set up the camera and asked the parent to read a short story to their child. Parents were asked to choose a book from five that the experimenter made available and were not part of the study for the first unrecorded session to decrease reactivity prior to baseline. For Participant A and B, baseline was collected for sessions 1, 2, and 3, treatment began on session 4 and continued until session 6. For Participant C, baseline was collected for sessions 1 and 2, and treatment began on session 3 and continued until session 5. Once the first session of baseline began, each participant read the same sequence of books to their child from Dewdney's *Llama Llama* series. The parent read one book to their child per session. After each participant completed baseline sessions, the experimenter sent home the reading checklist with the parents so they could look it over before the next session. The reading checklist described each component and gave examples for each.

Parent Training

During parent training, the experimenter modeled each component of the instructions with the parent at the beginning of the session. The experimenter asked the parents if the child

could sit on her lap during the read-aloud. All but one child (Participant A's child) allowed the experimenter to sit them on her lap. Each component was described verbally and the experimenter modeled what the behavior should look like when reading by either sitting the child on her lap or holding a doll where the child should be (for Participant A only).

During Component One, the experimenter verified that the parent was sitting in a quiet and distraction-free location. The experimenter used a doll or their child to model different spots that the child could sit during the read-aloud where the child could also easily view the book.

During Component Two, the experimenter held up the book and pointed to the title and author's name while saying, "This story is called "How Do Dinosaurs Say I Am Mad by Jame Yolen and Mark Teague." During this component the experimenter explained the importance of teaching their child the correspondence between printed and spoken words.

During Component Three, the experimenter began reading the story and stopped at least three times to model various WH questions and answers. For example, "Who is sticking out their tongue? The dinosaur and the little girl are sticking out their tongues. Where do you think the dinosaur is? Is he at school? The grocery store? His bedroom? He looks like he is in his bedroom. There is a dresser, a bed, and toys." Questions and answers for each WH question were modeled throughout the entire book. Parents were encouraged to ask a variety of WH-questions and model the intraverbal response if their child did not respond

During Component Four, the experimenter modeled various positional concepts such as "I see the sword, it is underneath the treasure map. That dinosaur must be mad, he kicked the chair above the window. Oh no! The cat almost got hit. Thankfully, she was sitting below the mug." The experimenter explained how positional concepts were important for their child to acquire for everyday tasks such as following one- and two-step directions. Acquisition of

positional concepts allows for the child to be able to receptively or expressively answer or follow a mand presented to them by another individual.

During Component Five, the experimenter expanded on the characters feelings and actions. For example, “Poor kitty! I bet she felt scared when the dinosaur threw the coffee mug at her. The dinosaur's mom feels happy when her son says I am sorry. Oh no! When the dinosaur throws toys it makes his mom feel upset.”

During Component Six, the experimenter described the setting of the story. For example, "Where do you think the dinosaur is? Is he at school? The grocery store? His bedroom? Look out the window. It looks like it is springtime. The leaves are green, and there is a little bird outside.” The experimenter asked the parent to describe the setting by location, time of day, season, month, etc.

While teaching Component Seven, the experimenter used a variety of voices for different characters. The experimenter used an angry voice when the dinosaur says, "I AM MAD," and a gentle, apologetic voice when the dinosaur tells his mother, "I am sorry." The experimenter verified that the child could see her face during this component. The experimenter asked the parents to use inflection in their voice and a variety of facial expressions to portray different characters and their emotions.

After all of the components were explained and modeled to the parent, they were asked to refer to the written instruction or reading checklist between sessions. Parents were encouraged to keep the written instructions (the checklist) with them during the read aloud. Before each session, the experimenter modeled a read-aloud, making sure to model checklist items on multiple occasions when possible. The parent was then asked to read the next book in the sequence to their child. Once the read-aloud was complete, the parents were immediately given

feedback on checklist items observed and not observed and shown their word count in comparison with their baseline sessions.

RESULTS

Figure 3 depicts the percentage of additional words said versus words in the books across all baseline and treatment sessions. The experimenter took the number of words said during the read-aloud divide by the number of words in the book multiplied by 100 to get the percentage of additional words added. If the participant only read the words in the book and did not add any additional words the data point would be plotted on the X axis at 0% additional words added.

Below each participant's word-count are columns of boxes with each box representing one of the seven components. The open boxes indicate checklist items that were not observed during each session and the shaded boxes depict the checklist item was observed during that session. In Figure 1, the components are ordered 1-7 (top-to-bottom) below each of the participant's word-count data. .

During baseline, Participant A read an average of 62% more words than appeared in the text of the book. During Session One, Participant A read 42% more words than appeared in the text of the book, and 81% more words than appeared in the text during Session Two. Participant A also used 28.57% of the reading components (a, c, d, g) during Session One and 42.85% during Session Two. During baseline sessions Participant A's data shows an accelerating trend in word count that continued into treatment sessions. The level changed from moderate to high levels of additional words added from baseline to treatment. The mean remained consistent throughout baseline and treatment sessions with little variability in data points, suggesting that the treatment may have been ineffective in regards to participants word count.

During the intervention phase, Participant A read an average of 115% more words that appeared in the text of the book. During Session Three Participant A read 82% more words than

appeared in the book, 121% in Session Four, and 143% more words than appeared in the book during Session Five. Participant A covered all seven of the reading components by the end of treatment. Participant A's mean remained consistent throughout baseline and treatment sessions with little variability in the data points and the level shifted from moderate levels of responding at the beginning of baseline to high levels of responding at the end of treatment.

During baseline, Participant B read an average of 22% more words than appeared in the text of the book. During Session One, Participant B read 12% more words than appeared in the text of the book, -1% fewer words than appeared in the text during Session Two and 13% more words said in Session Three. Participant B also used 43% of the reading components (a,e,g) during Session One, 29% during Session Two, and 14% during Session Three. Participant B's baseline data shows no trend in word count. The number of reading components also decreased in baseline sessions from three components used in the first session to one in the third session. The mean remained consistent in baseline with little variability in data points.

During the intervention phase, Participant B read an average of 127% more words than appeared in the text of the book. Participant B covered all seven of the reading components by the end of treatment. During Session Four, Participant B read 50% more words than appeared in the text of the book, 90% more words than appeared in the text during Session Five and 166% more words said in Session Six. Upon visual inspection, Participant B's data in the treatment phase shows an upward trend accelerating at a rapid rate. Participant B's responding increased from low levels of responding in baseline to moderate-high levels in the treatment phase. The mean remained consistent in treatment with little variability in data points. Participant B's responding in the treatment phase had a short latency of change. During treatment, Participant B used 6 out of 7 reading components during each session.

During baseline, Participant C read an average of 8% more words than appeared in the text of the book. Participant C also used 14% of the reading components (a) during Session One, 14% during Session Two, and 14% in Session Three. During Session One, Participant C read 24% more words than appeared in the text of the book, 11% more words than appeared in the text during Session Two and 32% more words said in Session Three. Participant C's baseline data shows no trend in word count. Only reading component (a) was covered by participant C throughout baseline sessions. The mean remained consistent in baseline with little variability in data points.

During the intervention phase, Participant C read an average of 90% more words that appeared in the text of the book. Participant C covered all seven of the reading components by the end of treatment. During Session Four, Participant C read 93% more words than appeared in the text of the book, 124% more words than appeared in the text during Session Five and 265% more words said in Session Six. Participant C's data in the treatment phase shows an upward trend accelerating at a rapid rate. Participant C's responding increased from low levels of responding in baseline to moderate-high levels in the treatment phase. The mean level also increased from baseline to treatment sessions with little variability in data points. Participant C's responding in the treatment phase had a short latency of the change. During treatment, Participant B used 6 out of 7 reading components during each session.

After the experiment was complete, each participant was given a survey to establish social validity. The survey included four questions: 1) I am reading more frequently to my child, 2) I think the training procedure was helpful, 3) I am having better interactions with my child during story time, 4) I continue to use the components during story time with my child. The participants were then asked to rate each question by marking 1 – Strongly Agree, 2 – Agree, 3 –

Neutral, 4 – Disagree, and 5 – Strongly Disagree (Table 1, Figure 4). The social validity results are also included in Figure 2. All participants marked “Strongly Agree” to all the questions on the survey, with the exception of question 2, Participant B marked “Agree”. Participant B explained that they already read quite often, but she was reading more meaningfully.

DISCUSSION

Overall, Behavior Skills Training may be effective in increasing word count and teaching reading skills to parents. The current study was flawed in some aspects, which makes it difficult to determine if BST was completely effective for all participants. As Participant B and C mastered more of the BST components, they increased their overall word count. This suggests that the reading checklist components were effective in increasing Participant B and C's word count. However, Participant A had too few data points during baseline to determine whether or not the treatment was actually effective in increasing word count. For Participant A, the data points in baseline suggest that the participants word count was increasing at a more rapid rate in baseline than in the treatment phase. Participant A's results seem inconclusive, as one cannot completely determine whether the treatment actually caused the change in responding. All three participants increased their word count significantly from baseline to the last treatment session, and all three of the participants covered all seven of the reading components by the end of the last treatment session.

However, the study had several limitations as well. During baseline, the experimenter was faced with the decision to continue in baseline until both dependent variables stabilized, or continue with treatment to begin teaching the reading checklist components. If this study were to be replicated, there should be a minimum criterion before moving on for only one dependent measure. After completing the study, the reading checklist items appear to be more important than the actual word count. As we saw with Participant A who had a very high word count but was not necessarily using quality words. By teaching the reading checklist components

Participant B and C's word count increased which leads us to believe that it is the more important dependent variable.

Another limitation during the study was that some of the children had a difficult time engaging in joint attention with the adult for the duration of the book. During many sessions Participant B and C had to re-direct their child back to them or to the book. Participant B and C's child would try to remove themselves from the parents lap at times disengaging in joint-attention and causing the parent to rush through the text. If this study were to be replicated increasing the age range of the children would allow for the parent to possibly focus and perform during the sessions. By increasing the age range from 12-18 months to 18-24 months would make a significant difference in the duration of time engaged in joint-attention.

Another limitation is that the Starling software counts words uttered and does not give the wearer or experimenter a list of different types of words said or words repeated. Participant A used a lot of filler words, and Participant B repeated words frequently to draw their child back to the story when distracted. The LENA word pedometer tracks word count and the different words said. Replacing The Starling software with The LENA software would allow for the experimenter to track what words were new and what words were being frequently repeated. This would be another measure that would be helpful to track to determine if the quality of words said was increasing.

Another limitation is the weakness introduced into the multiple baseline design by not using different length baselines. Although each participant began the study at a different point in time, two of the baselines were identical and the third was only slightly different. Participant A only had 2 data points during baseline and the upward trend was unhelpful as well. This makes conclusions about the efficacy of treatment difficult with this participant. Had the experimenter

continued baseline sessions further, the data may have leveled out which would have shown whether or not treatment was effective. Participant B and C began treatment after 3 baseline session and both participants improved during the treatment phase. If the experimenter started them at different lengths of baseline and still saw improvement in treatment-then one could draw a better conclusion that the treatment was actually effective.

Since there were no criteria for the dependent measures, the baselines did not differ very much in length. In future research it would be important to add a criterion for advancing to treatment. Participant A had very high word count from the beginning of baseline and it continued to get higher throughout the study. Since all parents' word count is going to fluctuate during baseline, it would be more consistent to set a minimum criterion of participants completing two components or fewer on three consecutive trials before beginning treatment instead of a certain percentage of words spoken. If access to the LENA device was made possible, it would be beneficial to add a criterion of percentage of different words said before moving to baseline as well. This would allow for the experimenter to see if the quality of the words said also increased after the parent was trained on the reading checklist items. Lastly, it would be interesting to introduce a control group in future research. The control and experimental group could each be given a standardized language test such as the Test of Early Language Development or the Peabody Picture Vocabulary Test upon entering preschool to see which yielded higher scores.

The current research suggests that Behavior Skills Training is a relatively efficient and cost effective way to teach parents book reading skills to use with their children. The more reading checklist components that were observed during a read-aloud the more words were spoken to the child. Also, the more joint-attention activities a child engages in with their parent,

the more words a child hears throughout the day. Increased joint attention activities are correlated with school readiness and language development (Yu, Suanda, & Smith, 2018). By teaching parents a few basic reading skills they will be able to increase their word count and the quality of conversations they have with their children in the future.

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Table 1. Social validity questionnaire results for each participant. Responses to a Likert Scale of 1—strongly agree, 2—agree, 3—neutral, 4—disagree, and 5—strongly disagree.

Questions	Participant A	Participant B	Participant C
I am reading more frequently to my child	2	1	1
I think the training procedure was helpful	1	1	1
I am having better interactions with my child during story time	1	1	1
I continue to use the components during story time with my child	1	1	1

Component	Description	Observed	Not Observed
(a) Sit in an area without distractions and place the child on your lap or beside you where the book is in their direct line of vision	Find an area in your home that is quiet, where you are not likely to be disturbed. Sit your child where they can easily view the story, on your lap or beside you.		
(b) Point to and read the title and authors name.	Point to the title and say: “this story is called ___” “let’s read ___” “the name of this book is ___”, then say “written by ___” and “Illustrated by ___”.		
(c) Ask a variety of WH questions (who, what, when, where, why) to expand on what is happening on each page, and model answers.	Throughout the story, stop and ask WH questions about the story, model the answer until your child is able to answer questions or point to items on their own. Ex. “Who barks?”, “Where is the cat hiding?”. “What could they have done differently?”, Why did the cat climb the tree?”, etc.		
(d) Describe items on the page by pointing to them and using positional concepts to describe their location (ex. above, beside, below, in front, behind, on top).	Point to items on the page and describe them in terms of their position to other items on the page. Ex. “Look at the shoe, it is under the table”, or “I can see the cat’s tail, she is hiding behind the chair”, and “look at the fish, he is swimming between the coral and the seaweed”.		
(e) Make statements that expand on what characters and animals may be doing or feeling;	Point to a character and explain their facial expressions and/or body language. Ex. “The boy must be feeling mad, his eyebrows are arched, his teeth are clenched and he has his hands on his hips”, “Look how excited the girl is feeling, she is smiling and jumping up and down”.		
(f) Talk about the setting of the story (where it takes place, what time of day, what the weather is like, etc.)	Talk about setting of the story by pointing to pictures in the scenery and describing them. Ex “Brr...It must be winter because the little girl is wearing a coat, hat and mittens, and there is snow on the ground”, “I can tell it is night time in this story because the animals are all sleeping, the moon is in the sky, and it is dark outside”.		
(g) Use a variety of voices and facial expressions to portray characters and feelings.	Animate your own face to mirror characters within the stories, and how they are feeling. Use different voices for different characters. Ex. If there is a small or scared character use a meek soft voice, and if there is a large mean character use a loud brash voice.		

Figure 1. Reading checklist used by experimenter during each read-aloud.

Participants	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
Participant A	Baseline	Baseline	Instructions, Modeling, rehearsal, and feedback.	Modeling, rehearsal, and feedback.	Modeling, rehearsal, and feedback.	
Participant B	Baseline	Baseline	Baseline	Instructions, Modeling, rehearsal, and feedback.	Modeling, rehearsal, and feedback.	Modeling, rehearsal, and feedback.
Participant C	Baseline	Baseline	Baseline	Instructions, modeling, rehearsal and feedback.	Modeling, rehearsal, and feedback.	Modeling, rehearsal, and feedback.

Figure 2. Session schedule for all participants during baseline and treatment

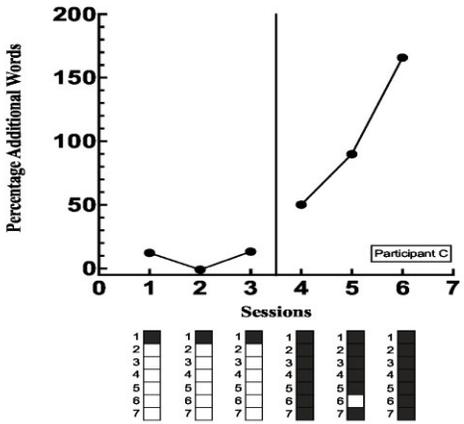
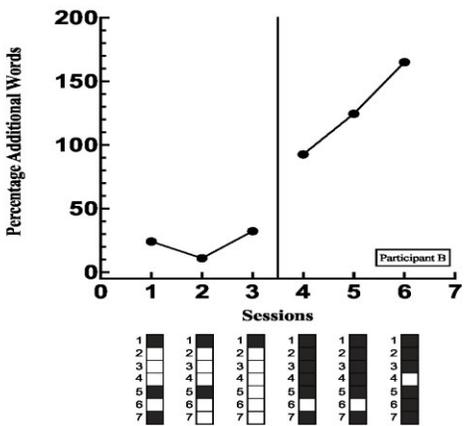
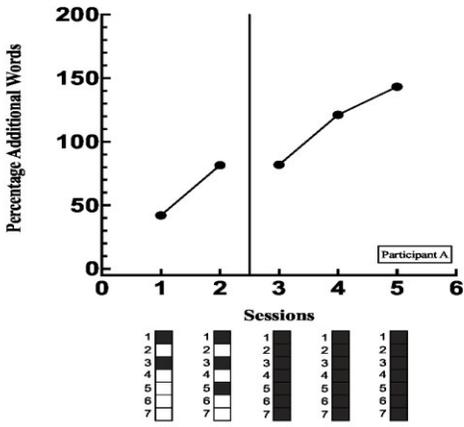


Figure 3. Percentages increase in words and completed component skills for each participant throughout baseline and treatment.

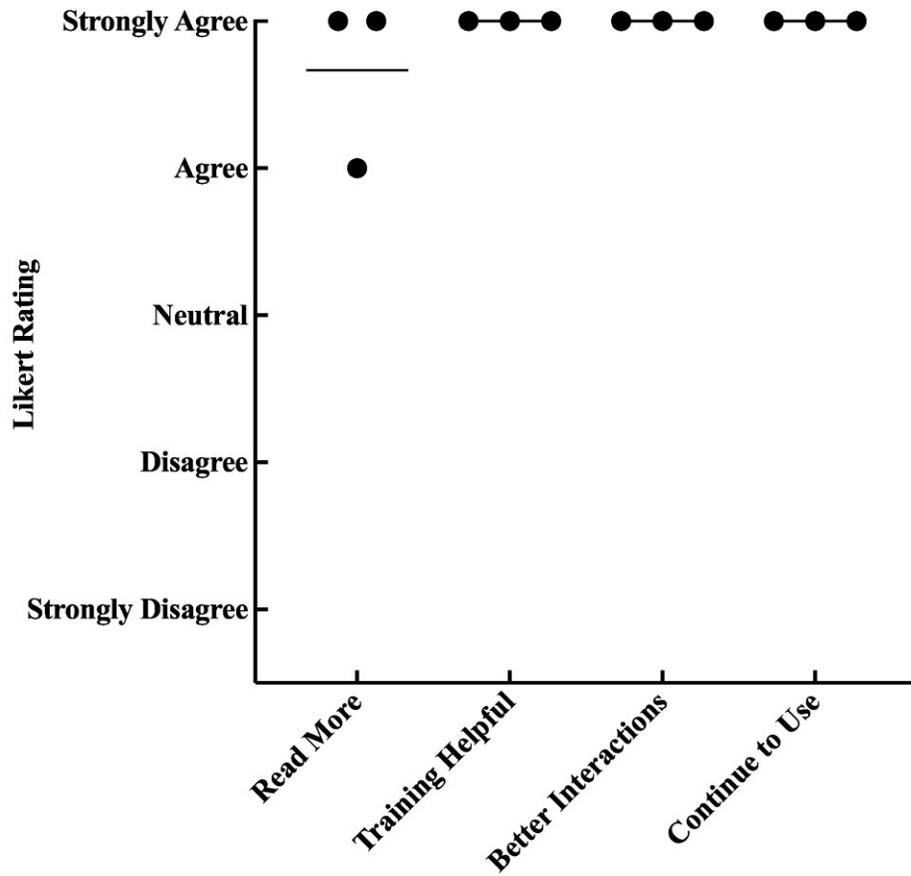


Figure 4. Social validity questionnaire results for each participant. Responses to a Likert Scale of 1—strongly agree, 2—agree, 3—neutral, 4—disagree, and 5—strongly disagree.

APPENDIX: HUMAN SUBJECTS IRB APPROVAL

IRB #: IRB-FY2019-227

Title: Increasing Parent Talk During a Read-Aloud with Behavior Skills Training

Creation Date: 9-30-2018

End Date: 1-27-2021

Status: **Approved**

Principal Investigator: Michael Clayton

Review Board: MSU

Sponsor:

Study History

Submission Type	Initial	Review Type	Expedited	Decision	Approved
Submission Type	Renewal	Review Type	Expedited	Decision	Approved

Key StudyContacts

Member	Michael Clayton	Role	Principal Investigator	Contact	MClayton@MissouriState.edu
Member	Britnea Monaco	Role	Primary Contact	Contact	monaco25@live.missouristate.edu
Member	Michael Clayton	Role	Co-Principal Investigator	Contact	MClayton@MissouriState.edu
Member	Britnea Monaco	Role	Investigator	Contact	monaco25@live.missouristate.edu

Initial Submission

1.

What is the full title of the research protocol?

1A.

Increasing Parent Talk During a Read-Aloud with Behavior Skills Training

Abstract/Summary

1B.

Please provide a brief description of the project (no more than a few sentences). Parents of children ages 3 months-18 months will be given Behavior Skills Training on ways to increase their word-count and quality while reading to their children. With training, we predict that parents will increase the quantity and quality of language that their child hears, which will increase the child's language acquisition later in life.

Who is the Principal Investigator?

1C.

This MUST be a faculty or staff member.

Name: Michael Clayton Organization:

Psychology

Address: 901, S. National Avenue , Springfield, MO 65897-0027

Phone:

Email: MClayton@MissouriState.edu

Who is the primary study contact?

- 1D. *This person may be the Principal Investigator or someone else (faculty, staff, or student). This person, in addition to the PI, will be included on all correspondence related to this project.*

Name: Britnea Monaco Organization:

Psychology

Address: 901 S. National Ave. , Springfield, MO 65897-0027 Phone:

Email: monaco25@live.missouristate.edu

Select the Co-Principal Investigator(s).

- 1E. *This MUST be a faculty or staff member. **Persons listed as Co-PIs will be required to certify the protocol** (in addition to the PI). This person will also be included on all correspondence related to this project.*

Name: Michael Clayton Organization:

Psychology

Address: 901, S. National Avenue , Springfield, MO 65897-0027

Phone:

Email: MClayton@MissouriState.edu

Select the Investigator(s).

- 1F. *An investigator may be faculty, staff, student, or unaffiliated individuals.*

Name: Britnea Monaco Organization:

Psychology

Address: 901 S. National Ave. , Springfield, MO 65897-0027 Phone:

Email: monaco25@live.missouristate.edu

If you could not locate personnel using the "Find People" button, please request access at [Cayuse Logon Request](#)

For additional help, email irb@missouristate.edu.

Describe the proposed project in a manner that allows the IRB to gain a sense of the project including:

- the research questions and objectives,
- key background literature (supportive and contradictory) with references, and the manner in which the
- proposed project will improve the understanding of the chosen topic.

Will Behavior Skills Training improve parent talk during read-aloud with children. References

Goldin-Meadow, S., Graf, E., Gunderson, E. A., Hernandez, Leffel, K. R., Leininger, L., Levine, S. C., M. W., Sapolich, S. G., Suskind, D. L., Suskind, E. (2014). A parent-directed language intervention for children of low socioeconomic status: A randomized controlled pilot study. *J. Child Lang.* 43, 366-406.

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- 2A. Arnold, D. H., Epstein, J. N., Lonigan, C. J., Whitehurst, G. J. (1994). Accelerating language development through picture book reading: Replication and extension to a videotape-training format. *Journal of Educational Psychology*, 86(2), 235-243.

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Hart, B., Risley, T. R. (2003). The Early Catastrophe: The 30 Million Word Gap by Age 3. *American Educator*, 4-9.

Miles, N. I., Wilder, D. A., (2009). The Effects of Behavior Skills Training on Caregiver Implementation of Guided Compliance. *Journal of Applied Behavior Analysis*, 42. 405-410.

Hsieh, H., Wilder, D. A., Abellon, O. E., (2011). The Effects of Training on Caregiver Implementation of Incidental Teaching. *Journal of Applied Behavior Analysis*, 44. 199-203.

Nigro-Bruzzi, D., Sturmey, P., (2010). The Effects of Behavior Skills Training on Mand Training by Staff and Unprompted Vocal Mands by Children. *Journal of Applied Behavior Analysis*, 43. 757-761.

If an easy procedure such as Behavior Skills Training can teach parents to read to their children using higher quality interactions and exposing them to more language then more parents will be able to adopt these effective methods.

2B. Check all research activities that apply:

- ✓ Audio, video, digital, or image recordings
 - Biohazards (e.g., rDNA, infectious agents, select agents, toxins) Biological sampling (other than blood)
 - Blood drawing
 - Class Protocol (or Program or Umbrella Protocol)
- ✓ Data, not publicly available Data,
 - publicly available Deception
- ✓ Devices
 - Diet, exercise, or sleep modifications
 - Drugs or biologics
 - Focus groups
 - Internet or email data collection
 - Materials that may be considered sensitive, offensive, threatening, or degrading Non-invasive medical procedures
- ✓ Observation of participants Oral
 - history
 - Placebo Record
 - review

Specimen research Surgical

procedures

- ✓ Surveys, questionnaires, or interviews (one-on-one) Surveys,
questionnaires, or interviews (group) Other

Describe the procedures and methods planned for carrying out the study. Make sure to include the following:

- site selection,
- the procedures used to gain permission to carry out research at the selected site(s),
- data collection procedures,
- and an overview of the manner in which data will be analyzed.

Provide all information necessary for the IRB to be clear about **all** of the contact human participants will have with the project.

2C. The Experimenter will meet with the parents in their homes or in an empty preschool classroom after school hours. Parents will give the experimenter permission to use their home by signing a form giving consent. The principal of the school will also receive a consent form so the participants and experimenter can use the school room after hours.

Data will be taken two ways during the experiment. The parents will wear a Starling word pedometer to collect their word count. The data will be collected by syncing the Starling to the experimenter's cellphone and retrieving word count from the Starling app. The word count will be collected each session and recorded on a separate paper form for each individual. A reading checklist will also be used during the read-aloud. The experimenter will mark whether each component is "observed" or "not observed". To obtain IOA, the experimenter will ask for permission in the consent form for the individual to be videotaped. During IOA, a second observer will also use the checklist to mark whether components are "observed" or "not observed". The experimenter will take the number of observed components and divide them by the total number of components to get a percentage. The percentage will be recorded at the bottom of the checklist to be compared and graphed throughout the study.

- 2D. Attach surveys, questionnaires, and other social-behavioral measurement tools, if applicable.
-

[Reading Checklist 2019.docx](#)

3A. Specify the participant population(s). Check all that apply.

Adults

Children (<18 years)

Adults with decisional impairment

Non-English speaking

Student research pools (e.g. psychology)

Pregnant women or fetuses

Prisoners

Unknown (e.g., secondary use of data/specimens, non-targeted surveys, program/class/umbrella protocols)

Specify the age(s) of the individuals who may participate in the research.

3B.

The participants in the study will be parents ages (18-40) of children 3-18 months old. We will be looking at changing the parent's behavior, although they will have their child with them during the read-alouds.

3C.

Describe the characteristics of the proposed participants, and explain how the nature of the research requires/justifies their inclusion.

The participants can be male or female, 18-40 years in age. The only requirement is that the parents are available for all training and that they have a child that is 3-18 months in age.

3D. Provide the total number of participants (or number of participant records, specimens, etc.) for whom you are seeking Missouri State IRB approval.

There will be 6 participants in total.

3F. Estimate the time required from each participant, including individual interactions, total time commitment, and long-term follow-up, if any.

Participants will meet with the experimenter for five 1-hour sessions. After two weeks the experimenter will meet with the participant once again for a 1-hour follow-up session.

3G. Describe how potential participants will be identified (e.g., advertising, individuals known to investigator, record review, etc.). Explain how investigator(s) will gain access to this population, as applicable.

Participants will be individuals known to the investigator. The investigator will call the potential participants and ask if they would be interested in participating.

3H. Describe the recruitment process; including the setting in which recruitment will take place. Provide copies of proposed recruitment materials (e.g., ads, flyers, website postings, recruitment letters, and oral/written scripts).

The recruitment process will be informal, through phone conferencing.

3H.1. Attach recruitment materials, if applicable.

3I. Will participants receive compensation or other incentives (e.g., free services, cash payments, gift certificates, parking, classroom credit, travel reimbursement, etc.) to participate in the research study?

Yes

No

From the list below, indicate how consent will be obtained for this study.

4A. _____

Check all that apply.

Written/signed consent by the subject

Written/signed consent (permission) for a minor by a Parent or Legal Guardian

Written/signed consent by a Legally Authorized Representative (for adults incapable of consenting).

Request for Waiver of Documentation of Consent (e.g. Verbal Consent, Anonymous Surveys, etc.)

Waiver of parental permission

Consent will not be obtained from subjects (Waiver of Consent)

Describe the consent process including where and by whom the subjects will be approached, the plans to ensure the privacy of the subjects and the measures to ensure that subjects understand the nature of the study, its procedures, risks and benefits and that they freely grant their consent.

4B. _____

Parents will be contacted by phone by the experimenter. The experimenter will explain the possible risks and benefits of the procedure and ask parents if they are willing to participate. If the parent are not willing or decide to withdraw from the experiment there will be no penalty. The experimenter will explain that any consent forms signed will be stored at the University in a locked file cabinet.

4B.1. Attach all copies of informed consent documents (written or verbal) that will be used for this study.

[informed consent.docx](#) Sample documents: [Informed Consent Examples](#)

4B.2. Attach all copies of assent documents that will be used for this study, if applicable.

Sample documents: [Assent Examples](#)

5.

Describe all reasonably expected risks, harms, and/or discomforts that may apply to the research. Discuss severity and likelihood of occurrence.

5A.

Consider the range of risks - physical, psychological, social, legal, and economic.

There are no expected risks to the participants.

5B. Describe the steps that will be taken to minimize risks and the likelihood of harm.

The researcher is being supervised by a PH.D Psychologist to ensure there are no risks.

List the potential benefits that participants may expect as a result of this research study. State if there are no direct benefits to individual participants.

5C.

As a result of this research study, parents will increase the quantity and quality of words said during a read-aloud with their child. We predict that this skill will generalize across all settings in which the parent speaks to their child. This will in hopes increase the child's overall receptive and expressive language acquisition.

5D. Describe any potential indirect benefits to future subjects, science, and society.

We expect that the children of the parents receiving BST will have higher language scores in the future.

5E. Discuss how risks to participants are reasonable when compared to the anticipated benefits to participants (if any) and the importance of the knowledge that may reasonably be expected to result.

There are no anticipated risks, and only expected benefits from the study. Parents will learn valuable skills to use with their children in the future.

Missouri State University is committed to keeping data and information secure. Please review the Missouri State [Information Security policies](#). Discuss your project with the MSU Information Security Office or your College's IT support staff if you have questions about how to handle your data appropriately.

Statement of Principal Investigator Responsibility for Data

- 6A. The principal investigator of this study is responsible for the storage, oversight, and disposal of all data associated with this study. Data will not be disseminated without the explicit approval of the principal investigator, and identifying information associated with the data will not be shared.
-

- By checking this box, all personnel associated with this study understand and agree to the Statement of Principal Investigator Responsibility for Data.

- 6B. How will the data for this study be collect/stored?
-

Check all that apply.

- Electronic storage format
- On paper

Describe where the data will be stored (e.g., paper forms, flash drives or removable media, desktop or laptop computer, server, research storage area network, external source) and describe the plan to ensure the security and confidentiality of the records

(e.g., locked office, locked file cabinet, password-protected computer or files, encrypted data files, database limited to coded data, master list stored in separate location).

6C.

At minimum, physical data should always be secured by lock and key when stored. Electronic data should be stored on University secure servers whenever possible (Office 365 or other secure campus server). If data has to be stored off campus, the files should be encrypted and the device password protected. Additionally, any data to be shared outside the University network will require a SUDERS request be filed and approved.

See <https://mis.missouristate.edu/Central/suders/creat...>

Data will be stored on Missouri State University Campus in a locked file cabinet. All files will be deleted after 3 years.

Describe how data will be disposed of and when disposal will occur.

6D.

At minimum, Federal regulations require research records to be retained for at least 3 years after the completion of the research (45 CFR 46). Research that involves identifiable health information is subject to HIPAA regulations, which require records to be retained for at least 6 years after a participant has signed an authorization. Finally, funded research projects may require longer retention periods, you may need to follow the sponsoring agency guidelines.

Paper files will be shredded and electronic files will be deleted.

7.

Is this study externally funded?

7A.

For example, this research is funded by a source outside Missouri State; a federal agency, non-profit organization, etc.

Yes

No

Potentially (this study is being submitted for funding, but has not yet been awarded)

Is this study internally funded?

7B.

For example, this research is funded by a source inside Missouri State; departmental funds, the Graduate College, etc.



Yes

Please list the internal funding source.

Graduate College

No

Potentially (this study is being submitted for funding, but has not yet been awarded)

Does your study contain protected health information (PHI)?

8A.

PHI is any information in a medical record or designated record set that can be used to identify an individual and that was created, used, or disclosed in the course of providing a health care service, such as a diagnosis or treatment.

Yes

No

Human Subjects Training Certificates

- 9A. *Attach human subjects training certificates for all listed personnel. To access your training documents, please go to [CITI Training](#).*
[Citi 1.pdf](#)
[Citi 2.pdf](#)

HIPAA Training Certificates

- 9B. *Attach HIPAA training certificates for all listed personnel, if applicable.* To get more information about HIPAA training and/or to access your training documents, please go to [HIPAA Information for Researchers](#).

Informed Consent Documents

- 9C. *Attach all copies of informed consent documents (written or verbal) that will be used for this study.*
[informed consent.docx](#) Sample documents: [Informed Consent Examples](#)

Assent Documents

- 9D. *Attach all copies of assent documents (written or verbal) that will be used for this study.*

Sample documents: [Assent Examples](#)

Recruitment Tools

9E.

Attach copies of proposed recruitment tools.

Surveys/Questionnaires/Other Social-Behavioral Measurement Tools

9F.

Attach surveys, questionnaires, and other social-behavioral measurement tools.

[Reading Checklist 2019.docx](#)

Other Documents

9G.

Attach any other documents that have not been specified in previous questions, but are needed for IRB review.

10.

10A. Would you like to add additional information?

Yes

No

Renewal Submission

1

This Renewal Request is intended to continue your previously approved study for an additional period of time, if approved. Any modifications to the research study must be submitted via a Modification Request.

1A. Indicate the current status of the research:

Research has not yet started at any location

Research is open to accrual of new participants (for specimen/data only research, the collection of new specimens or records is ongoing)

Closed to accrual: accrual is temporarily on hold

Closed to accrual: clinical interventions, surveys, or similar participant interactions are continuing. Closed to accrual: remaining activity is limited to collection of participant long-term follow-up data. Closed to accrual: remaining activities limited to analysis of data/specimens already collected.

Other

Please provide a summary of your progress with this research to date, including any interim findings since the last review.

2A.

The thesis committee has approved the proposal but data collection has yet to begin. Outside circumstances delayed the proposal meeting and preparations for data collection.

We expect to begin data collection next week.

2B. Have there been any significant problems or issues with the research since the last review?

Yes

No

Have there been any changes in the research, new risk information, or any other new information since your last review which would alter the following presumptions about the research?

- 2C.
- Risks to participants in this research project are minimized.
 - Risks to participants are reasonable in relation the the anticipated benefits to the participant or importance of the generalizable knowledge expected as a result of this research.
 - The selection of participants, specimens or data is equitable.
 - Provisions for obtaining and documenting informed consent are adequate. Appropriate data monitoring is in place to ensure safety of participants.
 - Appropriate safeguards are in place to protect participants' privacy and confidentiality.
 - Appropriate safeguards are in place to protect participants who may be vulnerable to coercion or undue influence.

Y
e
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N
o

2D.

Have all members of the research team received and remained up-to-date on the required training on Human Subjects Protection?

Note: Any new members to the research team must be added via a Modification Request.



Y
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N
o