

The Effectiveness of a Supplemental Pre-Kindergarten Vocabulary Intervention

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THE EFFECTIVENESS OF A SUPPLEMENTAL PRE-KINDERGARTEN
VOCABULARY INTERVENTION

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Abstract

Oral vocabulary is a strong predictor of young children's later reading development. Many children enter kindergarten with weak vocabulary knowledge and could benefit from an extra level or higher tier of intentional instruction in vocabulary that supplements the Tier 1 core curriculum in language. Recent findings from research developing a Tier 2 storybook intervention for vocabulary and comprehension with embedded instruction indicated that some children are slower than others making progress because they needed more experience learning to engage fully the embedded instruction contained in the storybooks. The purpose of this study was to explore the effects of adding components to the Tier 2 intervention (designed to provide additional explicit teaching and multiple opportunities to respond to questions, promote children's active engagement, and provide more examples of the ways in which words are used) in promoting children's gains in vocabulary knowledge. A combined repeated acquisition and multiple baseline single-case design (Kennedy, 2005) was used to examine whether the addition of the Tier 2⁺ vocabulary intervention to the Tier 2 intervention would improve the rate of children's vocabulary growth. Results indicated that two of the three children learned more target vocabulary words when listening to storybooks with the supplemental Tier 2⁺ intervention compared to weeks in which they listened to storybooks with the Tier 2 intervention only. Implications discussed include the potential for using Tier 2⁺ storybook intervention in pre-kindergarten classrooms and its efficiency and feasibility for use within a multi-tiered system of support.

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CHAPTER 1

Overview: Investigation, Purpose, and Scope of Dissertation Research

Early oral language skills are critical for later academic success in school and later life. A growing body of studies has documented that oral language skills in preschool and kindergarten are strong predictors of students' later reading achievement and overall academic performance (Catts, Fey, Zhang, and Tomblin, 1999; NICHD Early Child Care Research Network, 2000; 2005; Storch & Whitehurst, 2002). Oral vocabulary is an essential language skill that contributes to later reading comprehension in upper elementary grades and even in high school (Cunningham & Stanovich, 1997; Stahl & Nagy, 2006). By third grade, if children do not have at least average levels of vocabulary knowledge, the impact on their reading comprehension is readily apparent (Biemiller, 2006).

In optimal settings, children's understanding and production of words grows exponentially in the earliest years of life estimated at approximately at seven new words per day (Snow, Burns, & Griffin, 1998). However, enormous individual variability in vocabulary growth is evident across children even before they reach three years of age with a gap in word knowledge especially apparent between children from high and low socioeconomic backgrounds (Farkas & Beron, 2004). Hart and Risley (1995) reported that by the age of three, children from professional families knew a thousand more words than their peers' from low income backgrounds. In addition, vocabulary is cumulatively acquired, and this gap becomes even larger in the primary and secondary school years (e.g., Biemiller & Slonim, 2001; Walker, Greenwood, Hart, & Carta, 1994). Moreover, because intentional vocabulary instruction rarely occurs in preschool classrooms, not much progress is made at closing the gap (Neuman & Dwyer, 2009).

To accelerate children's rate of vocabulary growth, vocabulary interventions have been designed and implemented with young children, but they have not proven effective in accelerating the word knowledge of all children. Previous studies reported that the degree of children's response to vocabulary interventions was influenced by children's age, their initial oral language abilities, the level of their engagement in activities, or their first language status (Justice, Meier, & Walpole, 2005; Mol, Bus, de Jong, & Smith, 2008; Silverman, 2007). For example, dialogic reading was more effective for children with no risk for language impairment. When some children do not respond to an intervention adequately, they may benefit from supplementary or more intensive intervention.

Therefore, the purpose of this dissertation research was to (a) review the empirical research on vocabulary interventions for preschool and kindergarten children in order to understand the critical features of effective vocabulary interventions; (b) explore the effects of a supplemental vocabulary intervention designed as a booster intervention for prekindergarten children who show lack of adequate progress in learning vocabulary words within a multi-tiered system of support; and (c) discuss implications for research and practice.

Review of Literature

The literature review discussed in Chapter 2 provides an overview of empirical studies with a focus on vocabulary interventions for kindergarten and preschool children. Chapter 2 begins with a discussion of the importance of vocabulary knowledge, the size and rate of vocabulary development, and the rationale for early vocabulary intervention. What follows is a description of the overall effectiveness of vocabulary interventions, a review of different types of vocabulary interventions, and an examination of critical features of effective vocabulary

interventions. Finally, effective vocabulary interventions used in multi-tiered systems of support (MTSS) are discussed.

Research Study

Interventions are not equally effective for all children in the same way and to the same degree. Recent single case research reported that not all children demonstrated adequate progress in learning vocabulary words in response to a Tier 2 intervention that was designed to promote oral language interventions for children with limited vocabulary (Greenwood et al., 2012; Spencer et al., in press). Findings indicated that children's vocabulary gains were influenced by children's levels of engagement in the embedded instruction that for some students was accelerating slowly across storybooks (Greenwood et al., 2012). This finding led to the hypothesis that children who showed inadequate response to the Tier 2 intervention might benefit from a supplemental intervention component designed to increase children's engagement in the embedded Tier 2 intervention.

A combined repeated acquisition and multiple baseline single-case design (Kennedy, 2005) selected to examine the effects of a supplemental Tier 2 – plus, termed Tier 2⁺ below, vocabulary intervention as a booster intervention in facilitating children's engagement and vocabulary learning. In the study, children who showed inadequate progress were selected to receive the supplemental intervention, and their gains in vocabulary word scores, which were measured using weekly assessments, were examined. The methodology of this study including participants, measurement, experimental research design and analysis is discussed in Chapter 3. Results regarding treatment effects are discussed in Chapter 4 and the implications discussed in Chapter 5.

CHAPTER 2: LITERATURE REVIEW

Children's early vocabulary development plays a critical role in their later reading achievement. A large vocabulary in the years before kindergarten is a strong predictor of later reading comprehension and achievement (Cunningham & Stanovich, 1997; Snow, Tabors, Nicholson, & Kurland, 1995). Since early vocabulary has a strong influence not only on children's academic success but also on their later success in life, it is important to understand young children's vocabulary development and the factors that influence its growth. Children increase their vocabulary size rapidly and incidentally in the early years, but research has shown that a vocabulary gap exists in young children from high and low socioeconomic families due to the differences in the exposure that these two groups have in large numbers of novel words (Farkas & Beron, 2004; Hart & Risley, 1995). When children who have limited vocabularies at age 3 begin formal schooling, they still lag behind their peers in vocabulary knowledge and rarely are able to narrow the gap as they move into the higher grades (Biemiller & Boote, 2006; Hirsch, 2003). Therefore, to accelerate children's vocabulary development, early intervention is essential. While a number of vocabulary interventions have been designed for children to strengthen children's vocabulary learning, interventions are not effective for all children to the same degree. As a result, the level of intensity of instructional strategies should be matched to the level of child's need to increase their vocabulary.

In the following sections, the literature on vocabulary interventions for young children is reviewed, including a description of early vocabulary development, existing evidence for the effectiveness of vocabulary interventions, and the different types and features of vocabulary interventions. Finally, an overview of the common features of multi-tiered systems of support (MTSS) is provided along with empirical studies of vocabulary interventions within MTSS.

Early Vocabulary Development

Researchers have begun to pay attention to the process involved in children's acquisition of word meanings and the size of their vocabulary development. Children develop vocabulary knowledge long before they begin their formal schooling. Young children learn word meanings primarily from social contexts through interacting their families, teachers, and peers. Such incidental learning occurs within verbal contexts which provide rich cues (e.g., physically presented referents, gestures, or intonations) to help children to acquire word meanings readily (Nagy & Herman, 1987). Incidental learning of words also occurs through reading or listening to stories. Additionally, children increase their vocabulary from direct instruction such as engaging in early literacy activities at school.

The rate at which children learn new words is astounding. Researchers have determined in the years before Grade 3, an average child learns approximately 1000 new vocabulary growth (about 1,000 root words) per year (Angline, 1993; Biemiller, 2005). Although many children appear to increase their vocabulary growth rapidly without difficulty, children show widely varying rates of vocabulary growth in the years before grade 3 (Biemiller, 2005; Biemiller & Slonim, 2001). For example, Biemiller and Slonim (2001) reported that at the end of grade 2, children in the lowest quartile of their study learned 2,000 fewer words than the number of words an average child acquired. Moreover, this gap was also observed before kindergarten.

Discrepancy in Vocabulary Knowledge

Many young children enter kindergarten with limited vocabulary. A landmark study by Hart and Risley (1995) reported a substantial gap in vocabulary knowledge between children from low and high socioeconomic status (SES) when they entered preschool. Researchers have documented the onset of this disparity in word knowledge begins at the earliest stage of word

learning, and that the gap continues to grow through the preschool years and into kindergarten (Farkas & Beron, 2004), and then is maintained through elementary grades (Biemiller & Slonim, 2001; Farkas & Beron, 2004; Walker et al., 1994). A vocabulary gap also has been observed between children who speak English as their second language and their peers who speak English as their first language (Carlo et al., 2004). A low level of vocabulary knowledge is often reported as a barrier to middle elementary children's comprehension of reading materials (NRP, 2000). Moreover, children with vocabulary deficits at early school grade are likely to have later reading disabilities (Catts, Hogan, & Adolf, 2005). While researchers are of mixed opinion about whether this gap can be reduced over time, it is obvious that closing the vocabulary knowledge gap will not occur without intervention aimed at this problem. Early interventions are necessary for some children to accelerate the rate of their vocabulary growth.

Effectiveness of Vocabulary Interventions

A growing body of research has examined the effectiveness of interventions for improving children's vocabulary (e.g., Coyne, McCoach, & Kapp, 2007; Neuman, Neuman, & Dwyer, 2011; Silverman & Hines, 2009). In a meta-analysis, Marulis and Neuman (2010) reported that on average, vocabulary interventions carried out with pre-kindergarten and kindergarten children resulted in large effect sizes on children's oral language development ($\delta = .88$). Similarly, the National Early Literacy Panel report (NELP, 2008) and a meta-analysis conducted by Mol and her colleagues (Mol, Bus, & de Jong, 2009) reported moderate effect sizes (e.g., $d = .60$ and $.62$) for interventions aimed promoting children's vocabulary growth. Moreover, researchers have reported that children's gains in vocabulary knowledge resulting from instruction maintained after intervention had ceased: A number of studies have demonstrated that kindergarten children who received vocabulary instruction could maintain

their acquired word knowledge over 1-8 weeks after intervention (Coyne et al., 2007; Coyne, McCoach, Loftus, Zipoli, & Kapp, 2009; Loftus, Coyne, McCoach, Zipoli, & Pullen, 2010).

One of the most effective interventions for improving vocabulary knowledge is shared book reading (Collins, 2005; Coyne, Simmons, Kame'enui, & Stoolmiller, 2004; Hargrave & Senechal, 2000). Shared book reading is frequently used to increase vocabulary knowledge in young children because it allows children to explore word meanings within various contexts and it promotes children's active engagement (NICHD, 2000). Empirical research on shared book reading has documented its efficacy on kindergarteners' and preschoolers' word knowledge and conceptual development (Beck & McKeown, 2007; Neuman et al., 2011; Penno, Wilkinson, & Moore, 2002). Studies investigating the use of shared book reading with young children have employed three types of instruction for teaching children's vocabulary in this context: (a) incidental exposure to new words within the story, (b) embedding interactive dialogue within the story, and (c) explicit instruction in vocabulary.

Incidental instruction. Shared reading provides children with exposure to new words while they are simply reading or listening to storybooks being read aloud. It is assumed that children learn words incidentally through listening to new words. For example, Senechal and Cornell (1993) reported that a single listening to a story improved four- and five- year old children's receptive knowledge of target words. Specifically, four-year old children increased from an average score of 1.30 to 2.55 points, and five-year old children increased from an average score of 1.95 to 3.65 out of a possible 10 points. It was also reported that repeated listening to a story further improved preschool children's learning of target words (Senechal, 1997). Children who participated in a repeated reading condition performed significantly better on receptive and expressive vocabulary tests than children who participated in a single reading

condition (a large effect size of 1.50 was reported in the study). Moreover, other research reported that children with higher baseline receptive vocabulary learned more target words through incidental exposure during shared reading than children with low receptive vocabulary (Robbins & Ehri, 1994; Senechal, Thomas, & Monker, 1995).

Dialogic reading/interactive book reading. A second type of shared book reading instruction based on the child's active role as a storyteller, called dialogic reading, was developed by Whitehurst and colleagues (Whitehurst et al., 1988). Dialogic reading is based on three principles: (a) the use of evocative techniques to encourage the child to talk (e.g., open-ended questions), (b) the incorporation of informative feedback (e.g. expansion) in the conversation with the child, and (c) adapting a reading style to the child's developmental level (Whitehurst et al., 1988; Hargrave & Senechal, 2000). Another very similar technique to dialogic reading, interactive reading, also focuses on expanding children's vocabulary by asking open-ended questions, supporting the child's enthusiasm and relating a story to the child's personal experiences (Mol et al., 2009). Empirical studies have demonstrated that dialogic and interactive book reading interventions were effective in improving children's vocabulary, especially their expressive vocabulary knowledge (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Hargrave & Senechal, 2000; Lever & Senechal, 2011; Wasik, Bond, & Hindman, 2006; Whitehurst, Arnold, Epstein, Angell, Smith, & Fischel, 1994). However, a meta-analysis reported that older children (e.g., 4 and 5 year-old children) and children at risk for language and literacy impairment benefited less from dialogic reading compared to younger children or children not at risk (Mol et al., 2008).

Explicit instruction. Explicit instruction involves providing children with the definitions of words or specific analytical methods to teach new words (NRP, 2000). Explicit

teaching is sometimes embedded within shared book reading or is implemented within book-related extension activities before or following shared book reading (Coyne et al., 2009; Lugo-Neris, Jackson, & Goldstein, 2010; Wasik & Bond, 2001). Examples of activities used in conjunction with book reading include semantic knowledge activities (e.g., grouping words into a category) and using video clips demonstrating target words' meanings (Neuman et al., 2011; Zipoli Jr. Coyne, & McCoach, 2011).

Empirical studies on intervention that embedded explicit teaching in shared book reading reported that both children with low and high receptive vocabulary skills demonstrated gains in knowledge of new vocabulary words following vocabulary interventions (Coyne et al., 2004). Other studies have demonstrated that children are most likely to acquire a more complete understanding of specific words when they are provided with intensive vocabulary interventions (Beck & McKeown, 2007; Coyne et al., 2007; Coyne et al., 2009; Silverman, 2007a). Intensity has been increased in a variety of ways across studies including providing children with more examples of the words' usage, assisting children in analyzing words, and also providing children with more explicit instruction in order to reinforce their acquisition of target words.

Critical Features of Vocabulary Instruction

Across the studies of shared book reading, researchers have identified a number of critical features in these interventions for increasing children's learning of new vocabulary (NRP, 2000). One critical feature is the use of repeated exposures to the same story or to novel words (Senechal, 1997). For example, repeated listening of a story (e.g., three times) has been found to produce greater vocabulary gains compared to a single listening of the same story (Senechal, 1997). Other researchers have reported that multiple exposures to words in various contexts facilitate the memory processes of encoding, storage, and retrieval, and thus improve

learning of new vocabulary words (Pullen, Tuckwiller, Konold, Maynard, & Coyne, 2010; Senechal, 1997).

A second type of shared reading uses explicit teaching for enhancing children's vocabulary knowledge, especially for those children at risk for later reading difficulties (Biemiller & Boote, 2006; Justice et al., 2005). Literature on vocabulary instruction suggests that explicit teaching is more effective in enhancing children's vocabulary knowledge than incidental teaching (Coyne et al., 2007; Penno et al., 2002). For example, Penno and his colleagues (2002) reported that children who listened to a story with explanations of word meaning scored higher on vocabulary measures than children who did not. Similarly, Coyne and his colleagues reported that when explicit instruction was embedded in shared storybook reading, children who initially had smaller vocabularies had greater gains in word knowledge compared to children with larger vocabularies (Coyne et al., 2004).

A third feature known to increase the effectiveness of these interventions is children's active participation during storybook listening (Senechal, 1997; Senechal et al., 1995). For example, Senechal and her colleagues reported that when preschool children actively participated in storybook readings doing such things as labeling and pointing to pictures, they were more likely to acquire new vocabulary words than children who passively listened to storybook readings. Moreover, other studies reported that interventions that requested children to actively participate when responding to questions benefited more in their learning of target words compared to passive reading interventions that did not require children to respond (Ewers & Brownson, 1999; Walsh & Blewitt, 2006).

These critical features of interventions (i.e., repeated exposures to new vocabulary, explicit instruction, and children's active participation) will be effective for most children, but

the intensity of instruction needs to be differentiated depending on children's initial levels of vocabulary (Loftus et al., 2010). The National Reading Panel recommended that future research should examine the most effective ways to teach young children who differ in ability levels and ages in authentic school contexts (NICHD, 2000).

Multi-Tiered System of Support (MTSS)

One approach to differentiating instructional intensity based on individual students' needs is multi-tiered system of support (MTSS) or Response to Intervention (RTI). This prevention-oriented system seeks to provide every child with the appropriate level of support that matches his or her needs as early as possible; this is applied to ensure that all children are successful (Buysse & Peisner-Feinberg, 2000; Jackson, Pretti-Frontczak, Harjusola-Webb, Grisham-Brown, & Romani, 2009). The features of RTI include (a) evidence-based instruction that varies in intensity across a hierarchy of support, (b) high-quality curriculum for all children, (c) universal screening and continuous progress monitoring, and (d) collaborative problem-solving process (DEC, NAEYC, & NHSA, 2013; Fox, Carta, Strain, Dunlap, & Hemmeter, 2010).

In MTSS or RTI models, evidence-based instruction that varies by level of intensity is offered in three (or more) tiers of support. With each tier level, the level of instruction increases in intensity, frequency, and individualization. In Tier 1, all children are provided with a research-based core curriculum. In Tier 2, children who do not demonstrate adequate progress in response to Tier 1 receive a supplemental, small group intervention based on their demonstrated needs. When the children continue to show inadequate progress in response to Tier 2 instruction, they are at increased risk for developing more significant problems. Therefore, in Tier 3, these children receive more intensive and individualized instruction and work on more foundational

skills than in Tier 2 intervention. The level of tiers of support are changed based on a child's current developmental and academic needs, so MTSS/RTI use a dynamic and interactive process of implementing instruction, evaluating responses to instruction, and making decision (DEC, NAEYC, & NHSA, 2013).

Empirically-validated Tier 2 or Tier 3 interventions for RTI models in early education settings have recently been emerging. One experimental study examining the effects of a Tier 2 study focusing on improving children's word knowledge reported that children at risk for later reading difficulties made greater gains in learning target words that they learned both from supplemental and classroom-based instruction compared to target words than those they learned only from classroom-based instruction (Loftus et al., 2010). A second study reported that a supplemental Tier 2 intervention improved target word knowledge of kindergartners at risk for later reading difficulties ($d = .33$), but did not show statistically significantly higher scores than were predicted without Tier 2 instruction (Tuckwiller, Pullen, & Coyne, 2010). Both studies indicated Tier 2 vocabulary interventions improved kindergartners' vocabulary knowledge, but neither demonstrated that children's gain in vocabulary knowledge resulting from the intervention was adequate to close the gap with typically developing peers.

In addition to the question of accelerating their growth of vocabulary to a rate compatible to typically developing peers,' there is limited information to guide the development of Tier 2 or 3 vocabulary interventions. While various approaches to vocabulary instruction have been developed for young children at risk for later reading difficulties (Hargrave & Senechal, 2000; Justice et al., 2005; Neuman et al., 2011), relatively few of them have been within MTSS models (Gettinger & Stoiber, 2007; Loftus et al., 2010; Tuckwiller et al., 2010). As a result, many questions exist about the more effective and efficient ways to design interventions for

prekindergarten children. Little is known, for example, on the best ways to embed these interventions into the curriculum, what words should be selected for these interventions, how many weeks these interventions should take place, and how they can be designed to make them easy for teachers to implement with high fidelity.

The Center for Response to Intervention in Early Childhood (CRTIEC) has recently developed an approach for Tier 2 vocabulary intervention focused on procedures that are easy for teachers to implement with high fidelity. The intervention, called the “Story Friends,” has been designed to give children explicit teaching within storybooks for the purpose of improving preschool children’s vocabulary and comprehension skills by embedding vocabulary and comprehension lessons into pre-recorded and automated stories (Spencer et al., in press).

The Tier 2 Story Friends intervention incorporates critical features identified as effective strategies in the literature: the use of explicit teaching, the provision of repeated exposures to the vocabulary words, and the promotion of active child engagement. For example, during the storybook intervention, children listen to a storybook and receive multiple exposures to specific new words. They also receive explicit instruction on the words embedded within the story (e.g., defining a word: “‘Ill’ means ‘sick.’ Tell me, what word means ‘sick?’”). In addition, to promote their active participation, children receive multiple prompts to engage in a variety of actions during the story (e.g. “put your hands on your tummy and pretend it hurts”). Children are exposed to each story three times. Appendix A includes an example of a script of the embedded instruction.

The words targeted in the Tier 2 Story Friends intervention fall into the broad category of “Tier 2 words” described by Beck, McKeown, and Kucan (2002). Beck and her colleagues divided words into three categories based on their level of utility: Tier 1 words—commonly used

words familiar to most preschool children. (e.g., “baby”); Tier 2 words—words frequently used by mature language users and of high utility for instruction (e.g., “speedy”); and Tier 3 words—those related to specific content areas and have low utility (e.g., “isotope,” “lathe,” and “peninsula”). Among the categories, “Tier 2 words” are very useful for improving verbal functioning especially for children with small vocabulary because they are often likely to appear in academic written language and conversation (Beck et al., 2002). Therefore, useful but unfamiliar Tier 2 words were selected as the focus of the storybook intervention.

A single case study by Spencer et al. (in press) examined the efficacy of the Tier 2 Story Friends intervention on nine pre-kindergarten children who had limited language skills. Of the nine children, eight were African American and one was European American, and none had an Individual Education Plan (IEP). Children received the Tier 2 Story Friends intervention implemented by research staff over 11 weeks. Increases in children’s vocabulary were measured through the use of weekly mastery monitoring probes that assessed children’s learning words. The authors reported that five of nine children learned at least 14 words of the 18 target words.

In a replication of this study, the same Tier 2 Story Friends intervention was implemented across 11 weeks with nine participants including four English language learners and three children with an IEP (Greenwood et al., 2012). The overall outcome of this study was similar to one reported in Spencer et al. in that the extent of gaining knowledge of new words varied across children and books. Five of nine children learned at least 10 of the 18 target words. Additionally, there was a direct correspondence between children’s level of correct responses during the narrated instruction embedded into the storybook reading and their level of growth on weekly monitoring probes of children’s vocabulary.

The outcomes of these two studies indicated that not all children demonstrated adequate progress in learning vocabulary words (Greenwood et al., 2012; Spencer et al., in press). While some children showed improvement in vocabulary, other children did not show sufficient progress in learning words in response to Tier 2 Story Friends intervention. The study by Greenwood and colleagues reported that children with the greatest gains in word knowledge on weekly vocabulary assessments were those who exhibited higher levels of engagement in the instructional tasks embedded into the storybook listenings. This finding led to the hypothesis that children who are initially unresponsive to the Tier 2 intervention might benefit from strategies that increase their level of active engagement to the Tier 2 intervention. Therefore, a Tier 2⁺ vocabulary intervention was designed to provide additional explicit teaching and increase children's active engagement as a means of improving their learning of vocabulary words. As noted earlier, the Tier 2⁺ intervention will incorporate the following three features identified in previous studies as being critical features of effective vocabulary instruction: (a) providing children with additional explicit teaching in a one-on-one format of instruction, (b) providing children with more exposures to the target vocabulary words that are not in the storybook, (c) promoting active engagement and providing children with more opportunities to respond to questions through the use of puppets and additional visual cues. While another option for children who showed lack of adequate progress to Tier 2 would be to move the children to Tier 3, the current effort was focused on adding more intensive but brief experiences to the Tier 2 intervention as a means of improving efficacy.

The purpose of this study was to investigate the hypothesis that for children who do not make adequate progress in response to Tier 2 intervention alone, the booster Tier 2⁺ vocabulary intervention (designed to provide additional explicit teaching and multiple opportunities to

respond to questions, promote children's active engagement, and provide more examples of the ways in which words are used) will be effective in promoting children's gains in vocabulary knowledge. Thus, the following research questions were addressed.

1. For children who do not show a consistent pattern of improvement in new vocabulary in response to the Tier 2 Story Friends intervention (Baseline), will a Tier 2⁺ vocabulary intervention produce greater weekly vocabulary gains compared to their weekly vocabulary gains in response to Tier 2 intervention alone?
2. How do the patterns of weekly vocabulary gains for children receiving both the Tier 2 and Tier 2⁺ interventions compare to patterns attained by peer comparison children who were, and were not, responsive to the Tier 2 intervention alone?
3. Will children who receive a combination of the Tier 2 and Tier 2⁺ interventions demonstrate summative gains on standardized norm-referenced language measures administered before and after they experienced the vocabulary intervention series of storybooks?

CHAPTER 3: Method

Participants

Upon approval of the University of Kansas' Institutional Review Board (IRB), pre-kindergarten teachers and children were recruited. Once classroom teachers agreed to participate in the study, parent consent forms were distributed to parents of children who were deemed good candidates for Tier 2 and 2⁺ interventions based on converging evidence from multiple resources (See the criteria employed below). Appendix B includes teacher and parent consent forms.

Preschool classrooms that were part of a state-funded prekindergarten in a large Midwestern school district served as the recruitment site for this study. All classrooms were half-day and provided Tier 1 early literacy instruction delivered by general education classroom teachers. Activities of Tier 1 early literacy instruction varied among classrooms. For this study, universal screening took place in four classrooms, and 12 children who were four-year-old kindergarten-bound children could benefit from Tier 2 vocabulary intervention based on the following criteria:

1. On the Picture Naming Preschool Individual Growth and Development Indicator IGDI (Bradfield et al., submitted), a child received a score between 0 and 11.
2. On the Peabody Picture Vocabulary Test (PPVT- IV; Dunn & Dunn, 2007) and the Clinical Evaluation of Language Fundamentals Preschool (CELF – P2; Wiig, Secord, & Semel, 2004), a child received a standard score between 70 and 92 or between .5 and 2.0 standard deviations below the normative mean.
3. On a questionnaire, the teacher responded that a child had moderate or significant delay in oral language skills and had difficulty paying attention within large group activities.

Because the second goal of the study was to examine the efficacy of a set of instructional strategies that could be used to supplement the Tier 2 Story Friends intervention, three participants who enrolled in one classroom were selected from those children who showed inadequate response to the Tier 2 intervention. Inadequate Tier 2 progress was defined as a gain of 2 points or a less out of a total possible gain of 4 on weekly pre- and post- mastery monitoring probes across two consecutive books. One of the three was finally dropped from the study at the 5th week of the intervention due to after multiple refusals to join the intervention.

The three children's scores on the PPVT ranged from 63 to 76 (see Table 1). Two children had an Individual Education Plan (IEP): speech language delay and communication disorder. According to the information from parent questionnaires, all three children were Hispanic and their home language was both English and Spanish. To investigate the children's proficiency level of Spanish and expressive skills, the Spanish-bilingual edition of Expressive One-Word Picture Vocabulary Test (EOWPVT—SBE; Brownell, 2001) was administered to the three children. The three children's scores on EOWPVT—SBE ranged from 55 to 93.

For a case comparison, an additional five children under the Tier 2 intervention were included (see Table 1). All five children received the same battery of assessments and had been receiving the Tier 2 Story Friends in the similar period and in the same book order as the three children targeted for the Tier 2⁺ intervention. Five children were purposively selected for a case comparison: three who were most responsive and two who were least responsive to the intervention. The five children scored between 79 and 92 on PPVT-IV. Like the children targeted for the Tier 2⁺ intervention, three of the five children selected to be peer comparisons were exposed to English and Spanish at home.

Settings

A listening center for the Tier 2 Story Friends and/or the Tier 2⁺ supplemental interventions was set up within the classroom during center or small group time. The specific setting and time for the interventions were determined in collaboration with the classroom teachers. The Tier 2 intervention was implemented in a small-group format (3 or 4 children), and Tier 2⁺ intervention was delivered in a one-to-one format.

Tier 2 Story Book Intervention

Instructional Targets and Embedded Instruction. The Tier 2 Story Friends Intervention (Spencer et al., in press) developed by the CRTIEC research team at Ohio State University has been structured around nine storybooks and each contains themes likely to be familiar to preschool children as well as common story grammar elements. Two Tier 2 vocabulary words are embedded into each story (for a total of 18 total words across the 9 storybooks in the intervention) and each are targeted for explicit lessons during the storybook reading. Table 2 presents a list of the target vocabulary words. These include seven verbs and 11 adjectives. The words selected as targets for the Tier 2 Story Friends intervention are words that met the following criteria: (a) they are likely to be unfamiliar to preschool children with limited language skills but have high utility for instruction, and (b) they can be defined simply, and (c) they lend themselves to examples that children can relate to from events that have occurred in their past experience. More detail about how the target words were selected can be found in Spencer et al. (in press).

Within the story, two embedded lessons for each target word are provided to children. The first time the target word appears in a story, the lesson includes the following elements.

1. A vocabulary word is used in a story context, and its definition is provided implicitly (e.g., “Ellie is ‘enormous.’ She is really big.”)
2. The child is asked to repeat the word (e.g., “‘Enormous.’ Say ‘enormous.’”)
3. A definition of the word is explicitly provided and the child is asked to produce the word in response to a question about it (e.g., “‘Enormous’ is really big. What word means really big?”)
4. An appropriate model of the word is provided as well as words of encouragement (e.g., “‘Enormous,’ Great job!”)
5. The child is prompted to answer a question that allows him or her to demonstrate knowledge of the word as it relates to the child’s typical past experiences (e.g., “Can you tell me something that is ‘enormous?’”)
6. The child is provided with an activity related to the word to promote the child’s active engagement (e.g., “Pretend you are going to give Ellie a hug. Remember she is ‘enormous,’ so make your arms really big.”)
7. The child is asked to say a definition of the word and providing a model and encouragement (i.e., “What does ‘enormous’ mean? Really big. That’s right.”).

The second lesson occurs at the end of the story and includes providing an implicit definition for the word; asking a child to produce the word; and offering a model and encouragement (e.g., “Look at the picture of the dump truck. It is really big! The dump truck is ‘enormous.’ Say ‘enormous.’ Tell me, what does ‘enormous’ mean? Really big! Great job.”).

Materials. Materials included a series of nine storybooks designed specifically for the intervention (Spencer et al., in press), pre-recorded audio files with the story narration and embedded lessons, mp3 players, and headphones. The storybooks are designed to teach

vocabulary knowledge and comprehension, feature a group of animal characters, and address familiar themes to preschool children such as a visit to the dentist. The series includes one training book and nine books with embedded lessons. The training book, which does not include embedded lessons, is designed to provide children with opportunities to become familiar with story characters and the procedures of the interactive storybooks prior to the intervention. The intervention books are 16 to 19 pages and the pre-recorded stories each last between 9 to 11 minutes.

Procedures. During the Tier 2 Story Friends intervention, a small group of children (four children) listened to a pre-recorded story of a book on headphones. Children listened to the story, responded to prompts during the reading, and followed along with their own copy of the storybook. Each of these Tier 2 intervention sessions took place once per day three days a week and continued for nine to ten weeks to complete the entire book series. At the end of each unit consisting of three books, the children listened to a review book that included target words that had been taught throughout one unit. Children had make-up any sessions that they missed before moving on to the next listening session.

Prior to the intervention session, the Tier 2 Story Friends facilitator set up the equipment and four books at a small table within the children's classroom. The facilitator invited the four target children to join the center. After the children were seated at the table, the facilitator welcomed them and briefly reviewed the listening center rules with children: "(1) We put our headphones on our ears; (2) We put our hands on our own books; (3) We listen to and answer the lady's questions." The children were instructed to put the headphones on their ears, and the facilitator began to play an audio file containing the recorded story for the day. During the Tier 2 Story Friends intervention, the role of the facilitator was to help children stay on the right page,

provide a model of correct response, and encourage the children to appropriately engage in the activity by using praise and acknowledgement for following the rules for appropriate behaviors. Based on the Tier 2 Story Book intervention manual, the facilitator acted as one of the participants and did not provide additional content or repeat the instructions provided on the audiotape.

At the beginning of the study, the facilitator introduced a training book to children. This training phase provided children with opportunities to practice following the instructions and carrying out the behaviors that would be required during the book reading—including turning the pages, lifting flaps, and responding to questions. Children listened to the training book twice before listening to intervention books.

Tier 2⁺ Supplemental Intervention for Vocabulary.

Instructional Targets and Explicit Instruction. The Tier 2⁺ supplemental intervention was designed to provide additional explicit teaching to children who are struggling with learning new words. The intervention incorporates the following key features for vocabulary instruction: (a) providing additional explicit teaching and multiple opportunities to respond to questions, (b) promoting children’s active engagement (use of a puppet and prompts/scaffolding), and (c) offering more examples of using words (use of different pictures from those in the stories of the books).

The procedures of the supplemental Tier 2⁺ instruction are based on instruction that teachers used for kindergartners in Beck and McKeown’s study (2007) as well as the Tier 2 Story Friends intervention developed by Spencer et al. (in press). In the Beck and McKeown study, after a teacher reads a story to children, the teacher would provide this following instruction.

1. Talk about a word that was contextualized in the story
2. Provide a definition of the word and ask the children to repeat the word
3. Provide examples that were not used in the story
4. Have the children make judgments about examples
5. Ask the children to create their own examples
6. Ask the children to produce phonological representation.

Instructional procedures in this study modified those used by Beck and McKeown in that the lessons are less intensive and promote more active engagement in ways that are developmentally appropriate for preschool children (e.g., Lessons use pictures and puppets to promote children's active engagement and they are shorter in duration). The modified procedures include the following components.

1. The use of examples that were not used in the story (e.g., "Look at this picture. A dolphin leaps.")
2. The explicit definition of target words (e.g., "'Leap' means to jump.")
3. Requesting children to repeat the word and providing more opportunities to practice it using "I-do, we-do, you-do" strategies (e.g., "Say the word with me, 'Leap.' Now it's your turn. What word means 'to jump?' 'Leap.' Great thinking!")
4. Asking children to demonstrate receptive vocabulary performance by making discriminations between pictures depicting different vocabulary words (e.g., "Look at these pictures. Point to the animal that 'leaps.'")
5. Asking the children to produce a phonological representation (e.g., "Say the word with me, 'Leap.' What does 'leap' mean?").

The first three components (a, b, and c) were provided using audio-recorded instruction, and the last two components (d and e) were delivered in person in a game format using a puppet.

Materials. Materials included a puppet, pictures that illustrated meanings of the target words, pre-recorded audio files, and mp3 players. A puppet and picture cards were presented to a child while he/she was listening to supplemental instruction on headphones and playing a game. The instruction on audio file was provided in a child's native language or a language in which a child feels most comfortable.

Procedures. Immediately following each of the Tier 2 interventions, a child who did not make adequate progress in response to the Tier 2 intervention stayed in the listening center and received the Tier 2⁺ intervention. In the first session, the facilitator introduced a puppet to the child as a friend who would want to join their activity. For each session, the facilitator began to play the audio file and present pictures to the child. As the child listened to the Tier 2⁺ audio recorded instruction, the facilitator prompted and reinforced the child's responses to promote his or her active engagement. At the end of the instruction, a narrator on the pre-recorded audio file said, "our friend, the wolf (puppet) wants to play a fun game with you. Look at the wolf and listen very carefully." When the audio instruction ended, the child took off the headphones, and the facilitator used a puppet to play a game with the child. The facilitator used a target word to describe a picture, and asked the child if he knew the meaning of the target word and to choose a picture that described the word. If the child did not respond to one of the questions correctly, the facilitator praised the child's attempt at an answer and provided the child with scaffolding to respond to the question correctly (e.g., describing a picture). This intervention took place 5 minutes per day, 2 or 3 days per week, for 5-10 weeks or until the end of the Tier 2 intervention.

Measurement

Dependent Variables: Mastery Monitoring Probes. Mastery monitoring probes were developed by Spencer et al. (in press) to examine the efficacy of the Tier 2 Story Friends intervention on preschool children’s oral language skills. These mastery monitoring probes were designed to assess comprehension skills and vocabulary words that are targeted and embedded in the books of the Tier 2 Story Friends intervention. In this study of Tier 2⁺ intervention, only the vocabulary questions were administered. Throughout the intervention phase, mastery monitoring probes were administered individually to children for each book. These probes were administered weekly: once at the pre-intervention (prior to listening to the book) and once at the post-intervention (following listening to the story three times during the week) for each book. Each probe took approximately two minutes to administer. Children received the posttest on the day they listened to the storybook the third time.

Each mastery monitoring probe included two target vocabulary word questions which were definitional questions (i.e., “Tell me what does “enormous” mean?”). A definitional question was scored from 0 to 2 points; a child received a score of 2 for a complete and accurate responses, 1 for an incomplete but acceptable responses (which reflected partial knowledge of a word), and 0 for an incorrect, unrelated/nonsensical, or inadequate response. The highest score for each mastery monitoring vocabulary probe was 4 points.

Besides target words, mastery monitoring probe included a definitional question for a control word which appeared in the story but were not taught in embedded lessons during the Tier 2 Story Friends intervention. The same scoring system with points for each word ranging from 0 to 2 points was applied to control words. These were scored separately from target words. Appendix C includes one sample of the mastery monitoring probe.

Overall Language Skill Measures. To assess children's overall oral language skills, a standardized assessment: the *Peabody Picture Vocabulary Test-4* (PPVT-4; Dunn & Dunn, 2007) were administered at the pre- and post-intervention. First, children's overall receptive English vocabulary knowledge was assessed using the PPVT-4. In the PPVT-4, an assessor presented four pictures to a child and asked him/her to point to one picture that described the meaning of a stimulus word. The PPVT-4 is a norm-referenced measure based on a sample of approximately 3500 individuals who closely matched demographics of the U.S population. This test is appropriate for use with individuals aged 30 months to 90 years and older. Test-retest reliability was reported to be .93 and split-half reliability was reported to be .94 (PPVT-4; Dunn & Dunn, 2007).

Reliability

All scoring was completed based on guidelines in the Tier 2 Story Friends intervention manual (Spencer et al., in press). For reliability, approximately 30% of pretests and posttests were randomly selected across participants and books, and a second person, who was a primary scorer of the mastery monitoring probes on the CRTIEC research team, independently scored them. Item-by-item interobserver agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. As a result, interobserver agreement was 94%.

Fidelity of Implementation

Approximately 30% of the Tier 2 and Tier 2⁺ interventions were videotaped to evaluate the degree to which an intervention agent (a facilitator) implemented all critical components of intervention as intended by the developers using the Tier 2 Story Friends intervention and the Tier 2⁺ intervention fidelity of implementation checklists (See Appendix D and E). An observer,

who was a Tier 2 interventionist (a graduate student in psychology) with the CRTIEC center, watched the videos and completed the fidelity of implementation checklists, each of which included seven items. Fidelity was reported using percentage of items on the implementation checklist that were observed to be correctly implemented. The percentage of fidelity of implementation was calculated by dividing the total number of correctly implemented items by the total number of items and multiplying that number by 100. The fidelity of implementation was 100 percent for both the Tier 2 and the Tier 2⁺ interventions. Appendices D and E include the Tier 2 Story Friends intervention and the Tier 2⁺ intervention fidelity of implementation checklists.

Design and Procedures

A combined repeated acquisition and multiple baseline single-case design (Kennedy, 2005) was used to examine the effect of the Tier 2⁺ intervention as well as the Tier 2 intervention for increasing children's vocabulary. Acquisition of learning new words was measured using weekly pre- and post- mastery monitoring probes for each book. The pre-intervention mastery monitoring probe administered prior to children's exposure to each book was used as a baseline and then compared to children's scores on the post-intervention mastery monitoring probes. A functional relation was established by repeatedly replicating this process across the nine books for each of the eight children. The repeated acquisition feature was selected to minimize the requirement in a traditional multiple baseline design for children to respond to long lists of words each week that they did not know. Moreover, the Tier 2⁺ supplemental vocabulary intervention was introduced to each child at a different point in time, so a functional relation was established between the introduction of the intervention and children's weekly vocabulary gains. The

multiple baseline design was selected because of the difficulty of reversing the behavior of learning vocabulary words (Kennedy, 2005).

Data Analysis

Results were analyzed by graphically depicting the data from the pre- and post-intervention mastery monitoring probes (see Figure 1). First, individual child scores on each mastery monitoring probe were graphed for each book and then the mean level (average) of the vocabulary scores in baseline and treatment conditions were computed. To demonstrate a treatment effect, the same criterion used in the Spencer et al. study (in press), a gain score of at least 1 for each vocabulary word, was applied to this study. Second, the trend of the data was reviewed by examining whether mean vocabulary scores for each child indicated upward or downward trajectory. Third, variability, which is the distance between the highest score and the lowest score, was inspected. Finally, the immediacy of effect between baseline and treatment conditions was reviewed. Along with this visual analysis, two effect sizes were computed using the percentage of non-overlapping data (PND; Scruggs & Mastropieri, 1998) and the standardized mean differences (Olive & Smith, 2005).

CHAPTER 4: RESULTS

Research Question 1. For children who do not show a consistent pattern of improvement in new vocabulary in response to the Tier 2 Story Friends intervention (Baseline), will a Tier 2⁺ vocabulary intervention produce greater weekly vocabulary gains compared to their weekly vocabulary gains in response to Tier 2 intervention alone?

Out of three children selected from those showing inadequate progress in learning new vocabulary words in response to the Tier 2 intervention, two children (Ian and Carter) received the Tier 2⁺ intervention. As shown in pretest scores in Table 3, two children had little knowledge of the targeted words prior to listening to a storybook. After children listened to the Tier 2 Story Friends with embedded lessons, Ian and Carter showed little gain in vocabulary, demonstrating a mean gain of 1 and 1.25 each out of a possible 4 points (See Table 3). Their posttest scores ranged from 0 to 4 points in response to the Tier 2 Story Friends intervention alone (See Figure 1).

In contrast, after the supplemental Tier 2⁺ intervention was added to the Tier 2 Story Friends intervention at the 3rd week for Ian and at the 5th week for Carter, both Ian and Carter increased their mean posttest scores considerably. After Ian received the supplemental Tier 2⁺ intervention, his mean posttest of 4 (SD = 0) was higher than his mean posttest scores following the Tier 2 intervention alone (M = 1; SD = 1.41). Similarly, Carter's mean posttest score of 3.2 (SD = 1.30) following the Tier 2⁺ intervention was higher than his mean posttest score of 1.25 (SD = 1.89) in response to the Tier 2 Story Friends alone. As shown in Figure 1, Ian and Carter also consistently demonstrated pre- and post- vocabulary gains across books. Moreover, once Ian and Carter began receiving the Tier 2⁺ intervention in addition to Tier 2 Story Friends intervention, their posttest scores were also less variable than those they received in response to

the Tier 2 Story Friends intervention, and they nearly always achieved the maximum possible score of 4 (or 2 words learned) (See Figure 1). The supplemental Tier 2⁺ treatment effects were demonstrated across seven books for Ian and five books for Carter. Out of 18 total targeted words, Ian learned 15 and Carter learned 12. To be considered to have learned a word, a child had to receive at least 1 point out of a possible 2 points.

The effect sizes (PNDs) for the Tier 2⁺ intervention were 100 for both Ian and Carter. Given the average (level), trend, variability, and effect sizes for the two children receiving the Tier 2⁺ intervention, the study demonstrates that adding Tier 2⁺ intervention to Tier 2 Story Friends has successfully helped the two children who showed inadequate progress in acquiring the meaning of new vocabulary words in response to Tier 2 alone.

In addition to target words, the effectiveness of the Tier 2⁺ intervention was demonstrated with control words. As shown in Figure 1, the children had little knowledge of control words—words that were never taught in the Tier 2 or Tier 2⁺ interventions—at pretest and posttest. In contrast to increasing knowledge of target words at posttest, the children did not demonstrate knowledge of control words at posttest. Neither of the two children showed any gain on the control words. These results suggested that in the absence of the Tier 2 or Tier 2⁺ explicit instruction, children would show no gain in knowledge of target words. This adds evidence that intervention was necessary to produce gains in knowledge of words on the mastery monitoring probes.

Research Question 2. How do the patterns of weekly vocabulary gains for children receiving both the Tier 2 and Tier 2⁺ interventions compare to patterns attained by peer comparison children who were, and were not, responsive to the Tier 2 intervention alone?

Ian's and Carter's patterns of weekly vocabulary gains reported in research question one were compared to those attained by five peer comparison children: two children (Kate and Diane) selected for their low level of responsivity to the Tier 2 and three children selected for their high degree of responsivity to the intervention (Mina, Oliver, Aden). First, Kate's and Diane's scores of target words on mastery monitoring probes were compared to scores of Ian and Carter targeted for Tier 2⁺ intervention. Just like Ian and Carter who were targeted for the Tier 2⁺ intervention, Kate and Diane demonstrated little knowledge of vocabulary words as evidenced by their pretest vocabulary scores prior to listening to each Tier 2 Story Friends (See Table 3).

Following the Tier 2 Story Friends alone, Kate and Diane demonstrated patterns of weekly vocabulary gains similar to those of Ian and Carter prior to receiving the Tier 2⁺ intervention. After Kate and Diane listened to Tier 2 Story Friends, they showed a somewhat upward trend in the four books, but a small gain. Kate's and Diane's mean weekly posttest scores were .89 and 1.11 out of a possible 4.0 points. Both Kate and Diane demonstrated mean vocabulary score gains of less than 1 point. Their gains were similar to Ian's and Carter's mean score gains before they received the Tier 2⁺ intervention.

However, when compared to the gains of Ian and Carter made in response to the Tier 2⁺ intervention, Kate and Diane did not show as much gain as Ian and Carter. Kate's and Diane's mean score gains of .56 and .89 were much lower than Ian's and Carter's mean score gains of 4 and 3.20. Moreover, as shown in Figure 1, while Ian and Carter who received the Tier 2⁺ intervention consistently learned two target words that were taught in each book across three to seven books, Diane and Kate learned none of target words across at least five books, and across three or four books, they acquired only one of the target words. Treatment effects were also shown across smaller number of books for Kate and Diane compared to Ian and Carter.

Treatment effects were demonstrated across three books for Kate and four books for Diane. The effect sizes for the Tier 2 intervention were $d= 0.79$ for Kate and $d= 1.33$ for Diane, and their PNDs were zero, much lower than PNDs of Ian and Carter who received the additional Tier 2⁺ intervention. At the end of the intervention, out of a total possible 18 words, Kate had learned a total of three words, and Diane had learned four words, many fewer than the 12 and 15 words that Carter and Ian had learned. Correspondingly, when weekly vocabulary score gains were summed across books, out of a total possible 36 points, the cumulative scores of Kate and Diane were 5 and 8 total points; this was much lower than the 30 and 20 points that Ian and Carter achieved (See Figure 2).

Second, the weekly vocabulary gains of Carter and Ian targeted for the supplemental Tier 2⁺ intervention was compared to those of three peer comparison children (Mina, Aden, and Oliver) selected for their high degree of responsivity to the Tier 2 intervention. As Carter and Ian showed on their pretest vocabulary scores, all three peer comparison children demonstrated little knowledge of the vocabulary words prior to listening to each Tier 2 Story Friends. On the other hand, after the children listened to the Tier 2 Story Friends with embedded lessons, three children (Mina, Aden, and Oliver) demonstrated their learning of new words (See Figure 3). In response to the Tier 2 intervention alone, Mina's, Aden's, and Oliver's mean weekly posttest score of 3.56 (SD = .88), 2.67 (SD = 1.41), and 3.78 (SD = .67) were much higher than Carter's and Ian's mean weekly posttest score of 1.25 (SD = 1.89) and 1.0 (SD = 1.41).

Despite a substantial difference in vocabulary gains noticed between children targeted for the Tier 2⁺ intervention and the three peers comparison children in response to the Tier 2 intervention alone, the gap of vocabulary gain disappeared after Ian and Cater received Tier 2⁺ intervention. When compared to the extent of vocabulary gains Ian and Cater achieved in

response to both the Tier 2 and the Tier 2⁺ intervention, the three peer comparison children's weekly vocabulary gains were similar to those of Ian and Carter. At posttest, Mina's and Oliver's mean weekly posttest score of 3.56 (SD = 0.88) and 3.78 (SD = 0.67) out of a possible 4 points were close to Ian's and Carter's mean weekly posttest score of 4 (SD = 0) and 3.20 (SD = 1.3). Aden's mean weekly posttest scores of 2.67 (SD = 1.41) was even somewhat lower than Carter's and Ian's.

Moreover, as shown in Figure 3, once the Tier 2 Story Friends intervention was introduced to the children, Mina, Aden, and Oliver consistently showed higher posttest scores than pretest scores across the books except one occasion on book 5 for Aden. Similarly, once the Tier 2⁺ intervention was added to the Tier 2 Story Friends Intervention, Carter and Ian always demonstrated higher posttest scores than pretest scores.

At the end of intervention, Ian and Carter learned as many words as Mina, Aden, and Oliver. As outcomes of Ian and Carter were reported under research question 1, Ian learned 15 words, and Carter learned 12 words. Likewise, out of total 18 target words across the 9 books, Mina learned the meaning of 15 target words with the one target word she had already known at a pretest, Aden learned 12, and Oliver learned 16. With regard to the cumulative vocabulary score gains, out of a total of 36 points, Ian achieved 30 points—as many as Mina and Oliver acquired. Effect sizes for the Tier 2⁺ intervention for Ian and Carter (PND = 100) was higher than Oliver and Aden's PNDs of 88.89, and that of Mina (PND = 77.78). Table 3 presents the two children targeted for the Tier 2⁺ intervention and the five other peer comparison children's mean level (average) and effect sizes: PND and SMD.

As for control words, all five peer comparison children demonstrated as the same pattern as observed in the two children targeted for the Tier 2⁺ intervention : None of them demonstrated

any gain on control words while they were learning target words at posttests. Only Mina and Oliver scored 1 point with a possible 2 at Book 8 pretest, but neither showed any gain at the posttest.

Research Question 3. Will children who receive a combination of the Tier 2 and Tier 2⁺ interventions demonstrate summative gains on standardized norm-referenced language measures administered before and after they experienced the vocabulary intervention series of storybooks?

It was hypothesized that children would demonstrate no change in standardized measures at the end of the study because demonstrating the same standardized scores over time means children are making typical growth in vocabulary and the participants in this study were selected because they were exhibiting delays in vocabulary growth. Contrary to this hypothesis, in this study, two children targeted for the Tier 2⁺ intervention improved in the receptive vocabulary scores. On the PPVT-4 (Dunn & Dunn, 2007), Ian increased 74 to 75, and Carter increased 76 to 91.

CHAPTER 5: DISCUSSION

The purpose of this study was to investigate the hypothesis that for children who do not make adequate progress in response to Tier 2 intervention alone, the booster Tier 2⁺ vocabulary intervention (designed to provide additional explicit teaching and multiple opportunities to respond to questions, promote children's active engagement, and provide more examples of the ways in which words are used) will be effective in promoting children's gains in vocabulary knowledge. In summary, out of four children who demonstrated lack of adequate progress in response to the Tier 2 intervention, two children who had only received the supplemental Tier 2⁺ intervention successfully demonstrated learning new vocabulary words. When a combined repeated acquisition and multiple baseline single-case design was used to test the effectiveness of the Tier 2⁺ intervention, treatment effects were shown across two children (Ian and Carter) and across five to seven books on the measure of mastery monitoring probes. Moreover, the two children who received the Tier 2⁺ intervention made vocabulary gains that were as large as those of the three children (Mina, Aden, and Oliver) who showed high responsiveness to the Tier 2 intervention alone. The two children (Ian and Carter) who demonstrated gains in response to the Tier 2⁺ intervention also either increased their receptive language skills or showed typical receptive language growth over the 11 weeks of the intervention as measured by the PPVT-IV. This preliminary finding suggests that the Tier 2⁺ intervention is a promising supplemental intervention and could possibly have benefited the other two children (Kate and Diane) who did not receive the supplemental intervention.

The theory of change underlying this study was that the Tier 2⁺ intervention would promote children's learning of new words by (a) promoting their active engagement in learning, (b) providing additional explicit teaching and multiple opportunities to respond to questions, and

(c) providing more examples of using words. In a 2012 study, Greenwood and colleagues reported that children's active engagement in a Tier 2 vocabulary intervention was highly related to children's gain in vocabulary knowledge. This finding suggested that children who did not show increase in vocabulary in response to a Tier 2 vocabulary intervention might benefit from a modification in the intervention that promoted more active engagement. In the Tier 2⁺ intervention, audio-recorded instruction was combined with use of puppets in a one-to-one format of instruction. As was shown in other previous studies (Tuckwiller et al., 2010; Wasik & Bond, 2001), adding puppets to instruction appeared to promote children's active engagement in answering questions about word meaning and this was accompanied by increases in learning new words as reflected in their pre-post gains on mastery monitoring scores.

Another feature of the intervention, explicit teaching, has been frequently used to improve vocabulary of primary school-aged children (Biemiller & Boote, 2006; Maynard, Pullen, & Coyne, 2010; Puhalla, 2011) and children at risk for language delays (Justice et al., 2005). Previous studies with preschool or kindergarten children reported that explicit teaching that was embedded in shared storybook reading was effective in improving children's vocabulary in classes (Beck & McKeown, 2007; Coyne et al., 2007; Coyne et al., 2009). The current study supported findings of previous studies and also suggests that following embedded explicit teaching in shared book reading, additional explicit teaching with use of pictures and puppets can accelerate prekindergarten children's learning of new vocabulary words for children who may struggle with learning words in the embedded lessons of shared storybook reading.

A third feature of the Tier 2⁺ intervention is giving children multiple examples of new words and asking children to point to pictures that illustrate the target words. The strategy of using multiple examples of target words in different contexts has been effective in teaching

students new vocabulary words (Beck & McKeown, 2007; Coyne et al., 2009). Additionally, using a picture is a common practice used to teach preschool children in place of real materials. Empirical studies on vocabulary intervention reported that providing more pictures illustrating the meaning of target words helped students to acquire the meaning of words and generalize the skills (Loftus et al., 2010; Pullen et al., 2010; Silverman, 2007b; Tuckwiller et al., 2010). The study supported the findings of previous studies that providing more examples of target words would result in increasing children's exposure to target words, and is ultimately an effective strategy for increasing students' knowledge of vocabulary words.

Taken together, the findings expand on the literature on the efficacy of vocabulary intervention on preschoolers' learning of new words. The Tier 2⁺ supplemental vocabulary intervention including the three features—increasing explicit teaching, child active engagement, and opportunities to respond to questions—expands our knowledge of some of the critical components that can contribute to boosting preschoolers' learning of new vocabulary words, especially children who do not make adequate progress in learning new words. This study is the first attempt to improve some children's responses to intervention at Tier 2 through embedding additional components into a supplemental intervention (the Tier 2⁺ supplemental intervention) in a multi-tiered support approach.

Moreover, adding the Tier 2⁺ intervention to the Tier 2 intervention was shown to be one of the ways to increase the intensity of the intervention instead of increasing the amount of shared storybook reading. To adjust the intensity of instruction to fit it to children's needs, the Tier 2⁺ intervention was provided along with three repeated listening of the Tier 2 Story Friends intervention for some children who showed inadequate progress in learning new words. Previous studies examined the effects of different amounts of instruction on children's

vocabulary learning (Beck & McKeown, 2007; Biemiller & Boote, 2006; Coyne et al., 2007; Coyne et al., 2009). The outcomes of the studies indicated that the more instruction children received, the more children gained in vocabulary knowledge. Still, more evidence is needed to address the optimal number of times a storybook should be repeatedly read to a child to increase vocabulary but not lose his or her attention, how the frequency of listening to stories should be adjusted when explicit teaching is added to a storybook reading, and how a child's entry level of language skills influences the amount of instruction needed.

In terms of the extent of vocabulary gains achieved, the children receiving the Tier 2⁺ intervention (e.g., Ian and Carter) learned almost as many target words as their peers who received Tier 2 intervention alone (e.g., Mina, Aden and Oliver). Specifically, the children who received the Tier 2⁺ intervention improved their expressive language skills, which were measured using mastery monitoring probes. They were able to provide definitions of as many target words as children who were responsive to the Tier 2 intervention (e.g., Mina, Aden, and Oliver), and much more words than the children with low vocabulary knowledge who received the Tier 2 intervention only (e.g., Kate and Diane). Given that expressive word knowledge is a higher level of word knowledge than receptive word knowledge, it was noteworthy that the children identified for the Tier 2⁺ intervention, who were more at risk than the other peers at Tier 2, made as great increases in their expressive vocabulary word knowledge as measured by the mastery monitoring probe as their peers showing responsiveness to the Tier 2 intervention. Providing children with multiple opportunities to practice and produce phonological representations of words and answer questions about the meaning of words seems to have had a considerable impact on their expressive vocabulary. The results suggest that when children received a more intensified intervention of Tier 2 vocabulary intervention, children at risk for

later reading difficulties could make progress in their expressive target word knowledge comparable with their peers (e.g., Mina, Aden, and Oliver) at Tier 2. If Kate and Diane had received the Tier 2⁺ intervention at the second week, they might have learned as many target words as their peers at Tier 2. It is worth considering whether receiving supplemental intervention early in the school year might help struggling learners reach the same rate of learning new vocabulary word as their peers in Tier 2.

While children demonstrated consistent increases in their weekly gains in knowledge of targeted vocabulary words, the children did not demonstrate improvement in their scores on untaught (control) words on the mastery monitoring probes. This contrast implies that these children needed both the Tier 2 and the Tier 2⁺ interventions in order to learn new words. These results are consistent with the findings of Coyne and his colleagues' study indicating that kindergarten children in the treatment group demonstrated greater gains in only taught words, not untaught vocabulary, compared to those in the control group (2004). However, other previous studies reported that prekindergarten or kindergarten children learned new words that were not explicitly taught, for example, through incidental exposure during a single shared storybook reading or through repeatedly listening to a storybook (Robbins & Ehri, 1994; Senechal & Cornell, 1993). Interesting findings were also reported by Penno and his colleagues (2002). In the study, kindergarten children with high language abilities made more accurate use of untaught words than children with low language abilities did when they were asked to retell a story.

Compared to children in the other previous studies, it is important to notice that the children in the current study included children with more limited vocabulary. The findings of Penno and his colleagues (2002) support the results of the current study, suggesting that children with limited vocabulary would need supplemental instruction to learn novel words. Another

difference in the current study compared to previous studies lies on a measure that researchers have developed to assess the extent of children's gains in vocabulary knowledge following an intervention. Similar to Coyne and his colleagues' study (2004), the current study used a measure which requested a child to define a word, while other studies used a multiple choice measure or a measure which used illustrations of target words. As mentioned earlier, given that expressive word knowledge is a higher level of word knowledge, it is not surprising that the current study and a study of Coyne et al. reported similar results: Children showed no or little gain on untaught words. In other words, explicit teaching is necessary for these children to demonstrate gains in higher level expressive word knowledge. Finally, the level of word difficulty is another factor that could influence children's learning of untaught words. Untaught words in this study were selected based on a difficulty level compatible with the level of target words, which were categorized as "Tier 2 words." "Tier 2 words" might be difficult for children with limited vocabulary to learn incidentally without instruction. Taken together, findings of this study imply that children with limited vocabulary would need explicit interventions in order to acquire expressive word knowledge of novel Tier 2 words. When examining whether children learn untaught word through incidental exposure, future studies should consider the three factors (child's vocabulary level, the type of measure used to assess vocabulary, the difficulty level of words) and investigate how the factors influence the effects of an intervention on children's learning of untaught words.

Another finding in this study was that while the children selected for the study (Ian and Carter) were identified based on their lack of response to Tier 2, their pretest scores on a standardized vocabulary measure (PPVT-IV) were lower than the comparison children who demonstrated responsiveness to Tier 2. This finding corresponds to the outcomes of other

studies (Coyne et al., 2009; Tuckwiller et al., 2010) that children's initial receptive language scores, which were most often measured by a standardized measure, the PPVT-IV, influenced the extent of children's responses to intervention. The studies (e.g., Robbins & Ehri, 1994; Senechal et al., 1995) reported that children with more limited vocabularies who received vocabulary interventions learned and produced fewer target words in response to the intervention than children who were higher performing in vocabulary skills. Children, such as Ian and Carter, who needed a supplemental intervention, are likely to have somewhat lower initial language scores than those who made adequate progress in response to the Tier 2 intervention at the beginning of school. This finding provides important implications about early identification of the best candidates for a Tier 2⁺ intervention. If children who could benefit from the additional support from a Tier 2⁺ intervention could be identified through screening at the beginning of the school year, it would allow children to receive this support more quickly. It would also reduce the need for them to go through several weeks of unresponsiveness to Tier 2 before they receive the instructional support they need to begin learning new vocabulary words.

In response to the Tier 2 intervention alone, three children demonstrated their learning of new words. The efficacy of the Tier 2 intervention on young children's vocabulary is consistent with the results of previous studies. The previous studies demonstrated that interventions which featured repeated readings of stories and/or explicit teaching was effective in improving young children's new vocabulary words (Biemiller & Boote, 2006; Silverman, 2007a). Additionally, as a replication of Spencer et al. (in press) and Greenwood et al. (2012) studies of the Tier 2 Story Friends intervention with different participants, the findings from this study support the findings of the other two studies that the Tier 2 Story Friends intervention,

which used repeated readings of stories and explicit teaching in an automated and audio-recorded way, was effective in helping children gain new vocabulary word knowledge.

Receptive knowledge of target words was not assessed in this study, but overall receptive language skills of children targeted for the Tier 2⁺ intervention was measured using standardized assessment of the PPVT-IV. All two children targeted for the Tier 2⁺ intervention improved in their standardized scores on the PPVT-IV. Unfortunately, the standardized scores of the peer comparison children were not available because administering the PPVT-IV was not a part of the research plan in that year of the CRTIEC study. However, it is important to notice that the two children targeted for a Tier 2⁺ intervention accelerated their receptive vocabulary (increasing from 75 (SD = 1.41) to 83 (SD = 11.31) in their mean) compared to the receptive language growth of a normative population of children.

Limitations

First, due to the limited number of days available in one semester, there was no opportunity either to examine the generalization or the maintenance effects of the interventions in the current study. The generalization and maintenance effects are critical to understanding whether children's vocabulary knowledge would generalize to new settings and would be maintained over time. Previous studies have examined maintenance effects, but the outcomes have been inconsistent. While some authors have reported that children were able to maintain their learning of words from 1-8 weeks after the intervention (Loftus et al., 2010; Tuckwiller et al., 2010), others reported that only children who were not at risk for language difficulties could maintain vocabulary learning over time (Pullen et al., 2010). On the other hand, Coyne and his colleagues (2009) reported that children who received intensive intervention lost some of expressive knowledge of words that they acquired in eight weeks following the intervention,

suggesting that higher and more complete knowledge may be subject to be lost. Therefore, future studies need to examine longer term effects of diverse types of intervention and should attempt to identify the specific features of interventions that would facilitate maintenance effects of vocabulary instruction for young children.

Considering that both the Tier 2 and the Tier 2⁺ interventions are relatively brief periods of instruction, which take 10-12 and 3-5 minutes for each, children might not be able to develop sufficient depth of word knowledge. However, if teachers or parents use words that are taught in the interventions throughout daily routines at class and home, even children at risk for later reading difficulties might be able to maintain word learning. Future study needs to examine whether children are able to maintain expressive knowledge of target words over time following the Tier 2 and/or the Tier 2⁺ interventions and also investigate if maintenance effects would last longer when teachers and/or parents use target words throughout daily routines. Moreover, since the Tier 2⁺ intervention was designed for children with limited vocabulary within a multi-tiered support approach, future study examining maintenance effects of the intervention will provide practitioners with implications regarding decision-making about when children should return to lesser intensive instruction, which is the Tier 2 intervention alone, and ultimately to Tier 1 classroom-based instruction.

Second, the Tier 2⁺ intervention targets 18 words that are the focus of the Tier 2 Story Friends intervention. Like other vocabulary interventions, the Tier 2⁺ intervention covers only a small percentage of words that children need to learn. It is important to notice that the Tier 2⁺ intervention is a supplemental intervention for children at risk for later reading difficulties who show inadequate progress in response to the Tier 2 intervention. The Tier 2⁺ intervention and Tier 2 Story Friends should not replace Tier 1 classroom-based instruction. Children targeted for

the Tier 2⁺ intervention should receive a teacher's classroom based instruction: regularly occurring shared storybook reading (Tier 1) as well as the Tier 2 intervention. Additionally, rich language environments, which lead to incidental vocabulary learning, should not be overlooked because they are necessary but not sufficient for some children at risk for later reading difficulties.

Third, as noted earlier, since children in this study were selected to receive the Tier 2⁺ intervention based on their lack of response to Tier 2, two of the children were able to receive the Tier 2⁺ intervention and they were from dual language backgrounds: both English and Spanish. While experimental controls showed the effectiveness of the intervention, further replication studies need to be conducted with more children and with more linguistically diverse child populations.

Fourth, while the intervention was implemented in a preschool classroom, it was implemented by research staff. Even though the Tier 2⁺ intervention lasts only 3-5 minutes, children showed considerable gains in expressive target word knowledge which was shown on mastery monitoring probes and increased receptive language scores on the PPVT-IV. Given that these are very promising results, this study needs to be replicated with diverse interventionists including teachers, assistant teachers, and parents in order to generalize the effect of the Tier 2⁺ intervention on preschooler's word learning in real life.

Implications for Practice

Since only a few empirically validated vocabulary interventions are available for preschool children at risk for later reading difficulties, this study has important implications for practitioners. First, this study provides a feasible example of a way to provide multi-tiered supports for children who are struggling with learning new vocabulary words. When teachers

discover that instruction does not facilitate a child's vocabulary learning, they need to modify the instruction, provide a supplemental intervention, or move the child to the next level of the Tier in order to meet a child's needs. This study shows one of the ways in which a teacher can offer supplemental intervention incorporating three critical features of providing explicit teaching and multiple opportunities to practice, using materials to promote children's active engagement, and offering diverse examples of how words are used.

Second, the Tier 2⁺ vocabulary intervention is brief enough to fit into the preschool daily routine schedule. It takes only 3-5 minutes to carry out and can be easily embedded during center time. Given that time-efficiency is one of the important considerations in implementing Tiered intervention, the Tier 2⁺ intervention is a promising supplemental intervention for children who struggle with learning words.

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Table 1

Participant Characteristics

	Targeted Children				Peers				Mean (SD) or Count
	Carter	Francisco	Ian	Mina	Oliver	Kate	Aden	Diane	
Age (month)	55	57	59	57					57 (1.63)
Gender	Male	Male	Male	Female	Male	Female	Male	Female	5 M 3 F
IGDI PN	0	1	3	7	6	4	8	3	4 (2.82)
PPVT-IV	76	63	74	90	92	79	86	89	81.13 (9.94)
EOW	85	55	93	120	137				98 (31.81)
Parent Language	E & S	S	E ^a	E & S	E & S	E & Hmong	E	E	E = 3 S = 1 E&S = 3 E&Hmong = 1
Child Language	E & S	E & S	E	E & S	E & S	E & Hmong	E	E	E = 3 E&S = 4 E&Hmong = 1
IEP		Yes	Yes						Yes = 2 No = 6
Note		Dropped							1 of 8 Dropped

Table 2

Target Vocabulary Words (Spencer et al., in press)

	Book	Vocabulary Words
1	Ellie's First Day (EFD)	enormous, different
2	Leo's Brave Face (LBF)	brave, grin
3	Jungle Friends Go to the Beach (JFB)	gorgeous, soaked
4	Marquez Monkeys Around (MMA)	reckless, ruin
5	If Elephant Could Fly (ECF)	imagine, soar
6	Leo Loses His Roar (LHR)	ill, comfort
7	Ellie Gets Stuck (EGS)	leap, pause
8	A New Jungle Friend (NJF)	speedy, wise
9	Marquez's Backwards Day (MBD)	ridiculous, tumble

Table 3

Vocabulary Scores and Effect Sizes for Children Under Tier 2 and Tier 2⁺ Conditions

			Children Targeted for Tier 2 ⁺		Peer Comparison Children				
			Ian	Carter	Mina	Aden	Oliver	Kate	Diane
Tier 2	Pretest	Mean	0	0	.22	0	.44	.33	.22
		SD	0	0	.67	0	.73	.71	.67
	Posttest	Mean	1.00	1.25	3.56	2.67	3.78	.89	1.11
		SD	1.41	1.89	.88	1.41	.67	1.01	1.05
	Pre-/Post-test Gain	Mean	1.00	1.25	3.34	2.67	3.34	.56	.89
	Effect Size	SMD			4.99		4.58	0.79	1.33
		PND		50.00	77.78	88.89	88.89	0	0
	Tier 2 ⁺	Posttest	Mean	4.00	3.20				
SD			0	1.30					
Pre-/Post-test Gain		Mean	4.00	3.20					
Effect Size		SMD							
		PND	100.00	100.00					

Note. Abbreviations are as follows: PND = Percentage of Non-overlapping Data, SMD = Standardized Mean Difference

Figure 1. Vocabulary gains of targeted and peer comparison children with low responsiveness to Tier 2

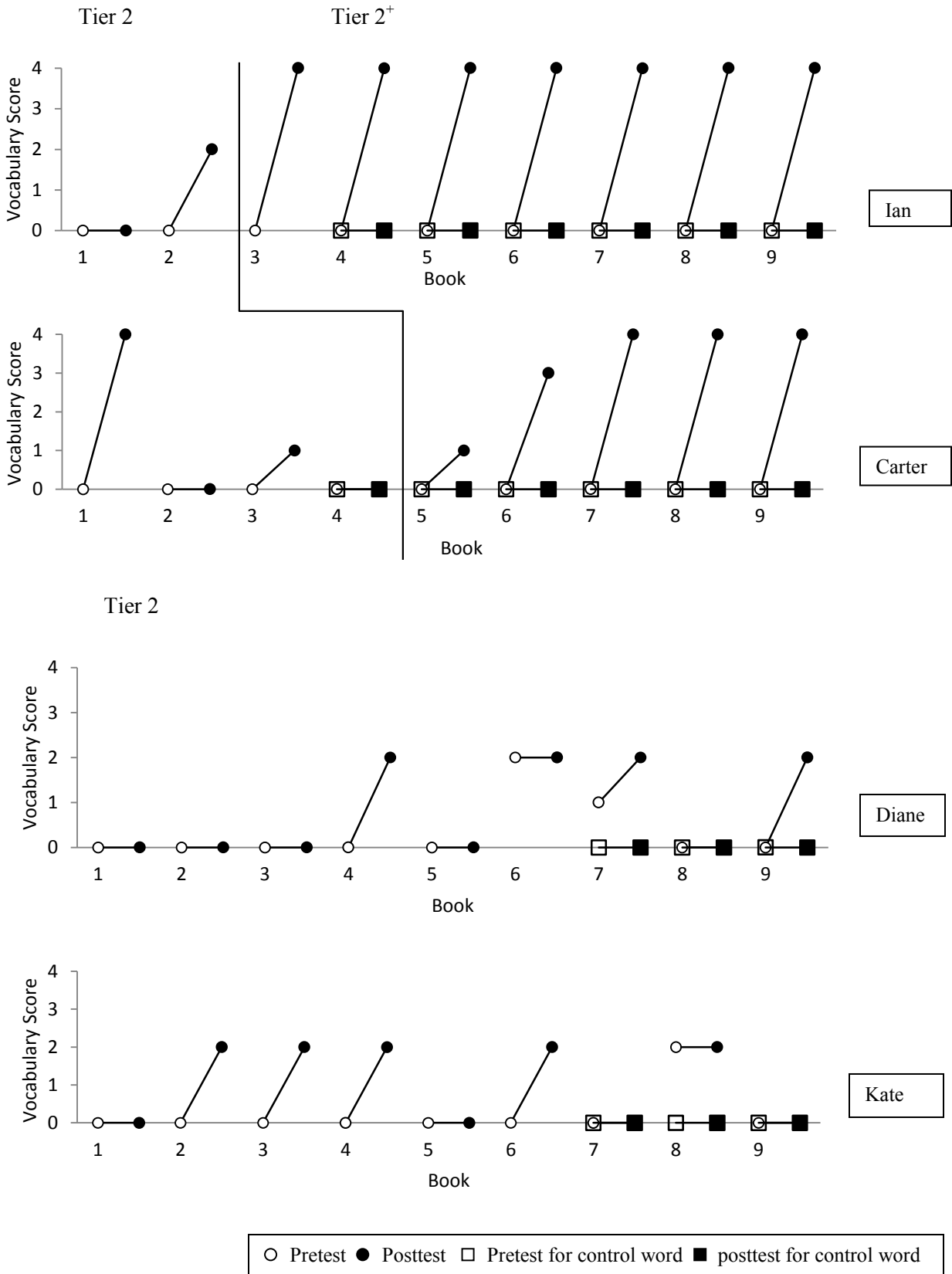
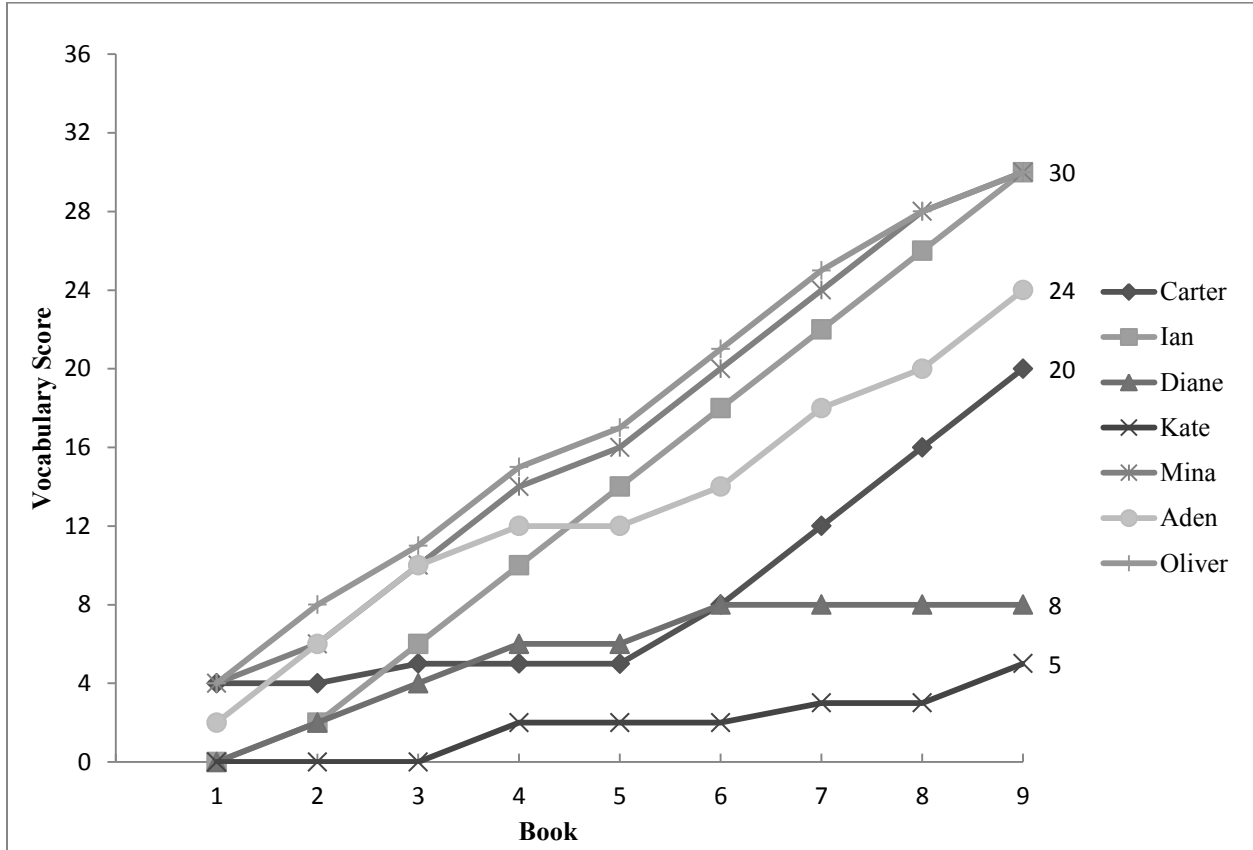
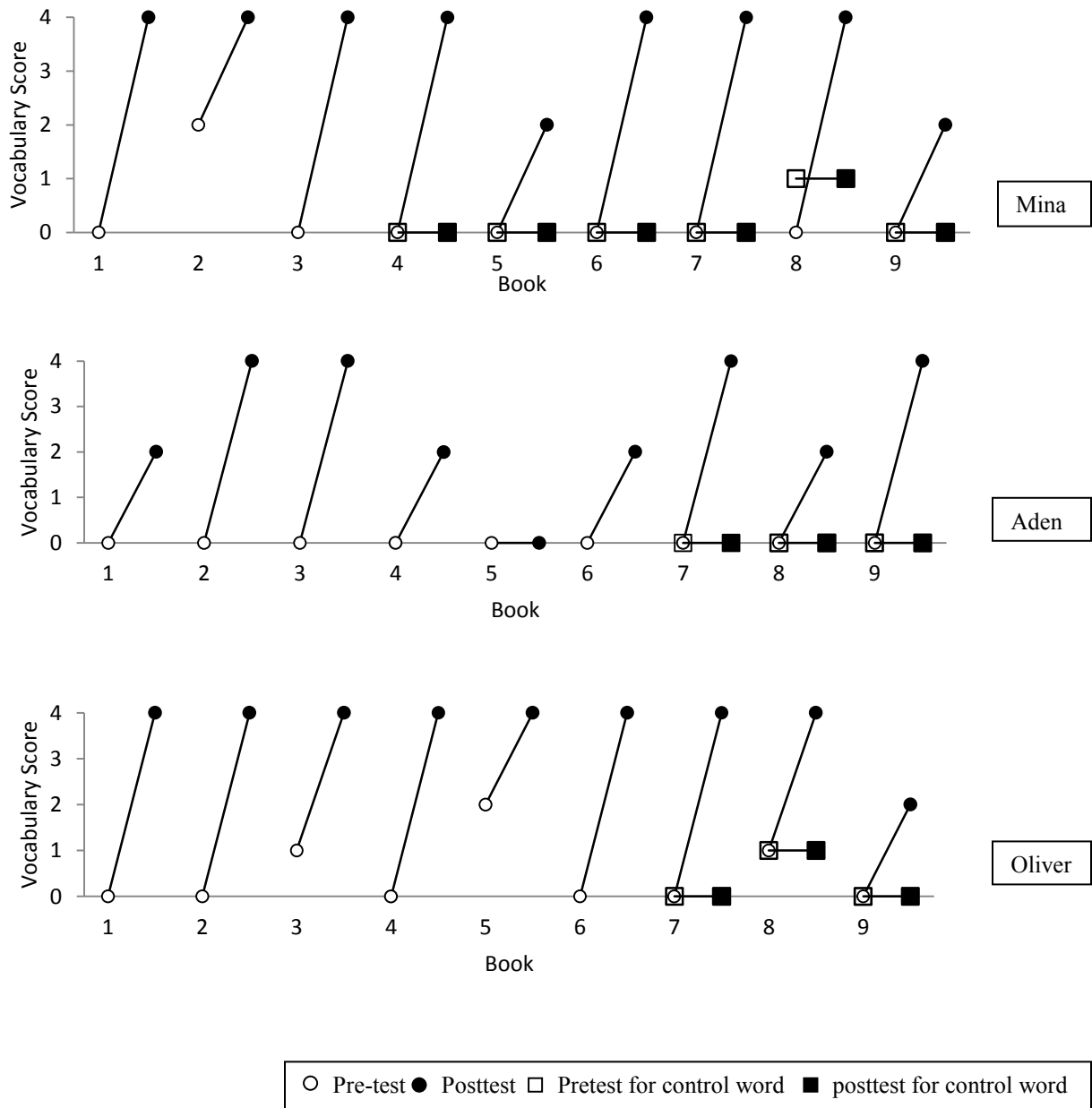


Figure 2. Cumulative Weekly Vocabulary Score Gains Across Books



Note. A supplemental Tier 2+ intervention was implemented with Carter in book 5 and Ian in book 2.

Figure 3. Vocabulary gains of peer comparison children with high responsiveness to Tier 2



Appendix A

Example of a script of the embedded instruction (Spencer et al., in press)

Look at Leo. He is grinning. He had fun at the dentist, so he is smiling! Grin. Say grin.

Grin means to smile. Tell me what word means to smile?

Grin! Great job. Now *you* grin. Smile and say, "Cheese!"

That's fun! Now, open the doors.

This little boy is grinning, too.

Tell me, what does grin mean?

To smile! Great job!

Juniper Gardens Children's Project
University of Kansas
Teacher Consent Form

Dear Teacher:

Thank you for agreeing to be part of the CRIEC intervention study to support children's early literacy. This consent form describes a related study that would provide supplemental instruction for dual language learners. If you agree, we would like to provide this supplemental instruction in your classroom, in conjunction with CRTIEC's Tier 2 intervention (Story Book Listening Centers). Children with limited English proficiency are more likely to encounter difficulties in acquiring the knowledge of English vocabulary, so supplemental instruction would be provided when a child does not show progress in learning new vocabulary words as measured by weekly mastery monitoring assessments during the Tier 2 intervention. This study is supported by a program of research conducted by the Center for Response to Intervention in Early Childhood (CRTIEC) at the University of Kansas. This supplemental study is voluntary. If you do not want to participate in this additional study, children from your classroom can still receive the CRTIEC Tier 2 intervention.

What does this study involve?

Interventions: Based on the set of assessments, as described in the previous teacher consent form of the CRTIEC study, three children who seem likely to benefit from Tier 2 intervention will be identified to participate in Tier 2 intervention. These three children will be dual language learners. During the interventions, we may use video to get a better picture of how children are responding to the stories, but only children whose parents have given permission for video will be videotaped. As indicated in the previous teacher consent form, we will work with you to make decisions about arranging and scheduling the interventions. Our goal is to support your classroom instructional goals for children and to minimize intrusion.

- CRTIEC Tier 2 Intervention – As described in the CRTIEC teacher consent form, the CRTIEC intervention is designed to foster early literacy fundamentals (vocabulary and comprehension) during Story Book Listening Centers. During Listening Centers, children listen to stories on headphones and follow along with picture books especially designed to teach early literacy skills. The Listening Centers take place four days a week in the classroom (20 minutes per day) and will continue for 10-20 weeks. Children receive periodic brief assessments to monitor their progress.
- **Supplemental Instruction for Vocabulary for English Language Learners (SIVELL):** If you sign this consent, children in your classroom may also receive supplemental instruction. When a child does not show progress in gaining new vocabulary words or does not meet a pre-established criterion as measured by weekly mastery monitoring assessments during the Tier 2 intervention, he/she will be given supplemental intervention. The decision of who will receive this supplemental

intervention will be made 4 or 5 weeks after the start of the Tier 2 intervention. During this supplemental intervention, the child will listen to pre-recorded instruction of words taught during the Tier 2 intervention. The instruction will be provided in the child's native language or a language that the child feels comfortable with. The child will listen to the meaning of English words and be encouraged to practice skills. A research staff person will use a puppet and present picture cards to encourage the child to actively engage in this activity. This supplemental intervention will take place 2 or 3 days a week (5-7 minutes per day) and will continue for 5-10 weeks. The intervention will take place right after the Tier 2 intervention is delivered each day.

Are there any risks in this research? We don't believe this study will involve any risks for you or the children. If you have any concerns, you may contact us at any time (see phone numbers at the end of this form). Also, if you would like to withdraw your consent at any time, you have the right to do that.

Is there any payment for participation? There is no additional compensation for this supplemental study.

What are the benefits of being in this study? We believe the learning activities in this study will be helpful for children who may need additional instruction to be ready for learning to read in kindergarten. We will use information from this study to develop strategies to improve preschool education in our community, as well as in other communities.

What information will we ask for? In addition to data collected for the Listening Center study, we will carry out the supplemental instruction for English language learners as described above.

How will we protect your privacy? Everything we learn from you and the children is strictly confidential. Videos will be identified by ID numbers and will not include names of children or teachers. We will not share any information that identifies you with anyone outside our research staff, with one exception. Our study data may be reviewed by officials at the University of Kansas who make sure that research is done in an ethical and legal way, and that participants are treated fairly. When we report the results of this study, you will never be named or identified in any way. By signing this consent form, you give us permission to use and share this information, within the limits described above, at any time in the future.

If you give consent now, can you change your mind later? Yes. You are always free to withdraw your consent, without any type of penalty.

We will be glad to answer any questions you might have now or at any time during the study – even after the study is finished. So, please feel free to call us at 913-321-3143. If you have additional questions about your rights as a research participant or feel you have suffered an injury as a result of your participation in this research, you may contact the coordinator of the University of Kansas Human Subjects Committee, Lawrence, 785-864-7429 or irb@ku.edu

If you agree to participate, please sign below and keep one copy for yourself. Thanks very much for your time and assistance.

Sincerely,

Na Young Kong
Judith Carta

913-321-3143
Juniper Gardens Children's Project
University of Kansas
444 Minnesota Ave., Suite 300, Kansas City, KS 66101

I have read the information in this form and have had a chance to ask questions. I have received answers to any questions I had about information that will be used and shared in this study. I know that the information about me and children in my classroom will be kept private. I agree to participate in this study, knowing that I can withdraw my consent if I decide to. I also agree to the use and sharing of my information as described above. By signing this, I verify that I am at least 18 years of age and have received a copy of this consent form to keep.

Your Name (Please print clearly)

School Name

Signature

Date Signed

Juniper Gardens Children's Project
University of Kansas
Parent Consent Form

Dear Parents:

During this school year, your child's classroom is participating in a research project to find new ways to help children learn skills that will be important to help them learn to read. Several weeks ago, you signed permission for your child to be part of that project, and we are including your child in Story Book Listening Centers in the classroom. In Listening Centers, children listen to stories and follow along with books designed to teach early literacy skills, such as the meaning of words. If you agree, we would like to include your child in additional learning activities that are designed for children who are learning English. This project will give children more opportunities to learn new English words. We are asking your permission again for your child to participate in this additional study. This is voluntary. If you do not sign this permission, your child can still participate in the Story Book Listening Centers without the additional activities.

What does this study involve?

Learning Activities: For this study, we will provide children with an activity in addition to the Storybook Listening Centers. We will work with teachers to make sure these activities contribute to what children are already learning and do not keep them from other important activities in the classroom.

- **Supplemental Activity for Vocabulary for Dual Language Learners** – To improve knowledge of English words, children will be given additional learning opportunities to practice skills taught during Storybook Listening Centers. Children will listen to pre-recorded instruction of words taught during the Listening Centers. This instruction will be provided in a child's native language or a language that a child feels comfortable with. A child will listen to the meaning of English words and be encouraged to practice skills. A research staff person will use a puppet and present picture cards to encourage children to actively engage in this activity. This new activity will take place 2 or 3 days a week (5-7 minutes per day) and will continue for 5-10 weeks. The activity will take place right after the Tier 2 intervention is delivered each day. (This is the new project for which we are asking your permission).

Are there any risks in this research? We don't believe this study will involve any risks for you or your child. If you have any concerns, you may contact us at any time (see phone numbers at the end of this form). Also, if you would like to withdraw your consent at any time, you have the right to do that.

Is there any payment for participation? There will not be any payment for this study.

What are the benefits of being in this study? We believe the learning activities in this project will be helpful for children who may need additional instruction to be ready for learning to read in kindergarten. We also will use information from this study to develop strategies to improve preschool education in our community, as well as in other communities.

What information will we ask for? In addition to data collected for the Listening Center study, we will carry out the supplemental activity as described above. During the supplemental activity, we would like to videotape some of the activities to check whether the activities were carried out consistently across time and for educational purpose, but only children whose parents have given permission for videotaping will be videotaped. Your child will not be identified by name. This video will be stored in a locked file cabinet and will be used only by the primary researcher for educational and research purposes.

How will we protect your privacy? Everything we learn from you and your child is strictly confidential. Videos will be identified by ID numbers, will not include your child's name, and will be stored in locked cabinets. We will not share any information that identifies you or your child with anyone outside our research staff and classroom teachers, with one exception. Our study data may be reviewed by officials at the University of Kansas who make sure that research is done in an ethical and legal way, and that participants are treated fairly. When we report the results of this study, you and your child will never be named or identified in any way. By signing this consent form, you give us permission to use and share this information, within the limits described above, at any time in the future.

If you give consent now, can you change your mind later? Yes. You are always free to withdraw your consent, without any type of penalty.

We will be glad to answer any questions you might have now or at any time during the study – even after the study is finished. So, please feel free to call us at 913-321-3143. If you have additional questions about your rights as a research participant or feel you have suffered an injury as a result of your participation in this research, you may contact the coordinator of the University of Kansas Human Subjects Committee, Lawrence, 785-864-7429 or irb@ku.edu

We hope you will decide to be part of this study, and that it will be a good experience for you and your child. If you would like to participate, please sign below and keep one copy for yourself. Thanks very much for your time and assistance.

Sincerely

Na Young Kong
Judith Carta

913-321-3143
Juniper Gardens Children’s Project
University of Kansas
444 Minnesota Ave., Suite 300, Kansas City, KS 66101

**If you would like to ask a question in Spanish, you can contact Gabriela Guerrero (913-321-3143).*

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I have read the information in this form (or, it has been read to me), and I have had a chance to ask questions. I have received answers to any questions I had about information that will be used and shared in this study. I know that the information about me and my child will be kept private. I give permission for information about my child to be included in this study, knowing that I can withdraw my consent if I decide to. I also agree to the use and sharing of my information as described above. By signing this, I verify that I am at least 18 years of age and have received a copy of this consent form to keep.

Name of Child (Please print clearly)

Child’s Birth Date

Parent's Signature

Date Signed

Additional Video Permission for Educational Purposes (Optional)

We would like to make videos of some Listening Centers and Supplemental Activities for educational purposes. We would use the videos at workshops and meetings to show other teachers, researchers, and parents what the activities are like. If you give permission, your child might appear on one of the videos, but we would not identify your child by name and would not give any other information about your child personally. If you do not check “YES” below, we will not use any videos that include your child in these educational programs.

This additional permission is completely voluntary, and you may change your mind at any time. Your child can still participate in the assessments and learning activities, even if you do not give this additional video permission. There is no compensation for being part of the videos. Thank you for considering this request.

If you agree, please check YES below and sign your name:

_____ YES, I give permission for videos of my child to be shown for educational purposes, as described above.

Parent Signature: _____

Appendix C

Sample of mastery monitoring probe (Spencer et al., in press)

Score

1. Tell me, what does *imagine* mean?

0	1	2
---	---	---

2. Tell me, what does *soar* mean?

0	1	2
---	---	---

Xa. Tell me, what does *gaze* mean?

0	1	2
---	---	---

Appendix D

Tier 2 Story Friends intervention fidelity of implementation checklist (Spencer et al., in press)

Implementation Criteria	Implemented as Described	Implemented Differently	Comments
1. Each child has a book <ul style="list-style-type: none"> Each child has a copy of the appropriate book. 			
2. Each child has headphones <ul style="list-style-type: none"> Each child has functioning headphones. 			
3. Facilitator has headphones <ul style="list-style-type: none"> Facilitator has functioning headphones. 			
4. Correct audio playing and functioning properly. <ul style="list-style-type: none"> If incorrect audio is playing, the facilitator changes to the correct audio within the first pages of the book. Complete audio is played from introduction to the final page. 			
5. Children were reminded of the Listening Center rules. <ul style="list-style-type: none"> Facilitator paraphrased the rules or children provided the rules 			
6. Facilitator provides positive reinforcement. <ul style="list-style-type: none"> Facilitator provides stamps, verbal, or nonverbal encouragement during and after the listening center. 			
7. Facilitator did not provide any additional instruction. <ul style="list-style-type: none"> Facilitator may model appropriate responses but did not repeat instructional language or content during or after the listening center. 			
Total			_____No. of items Implemented _____No. of items not Implemented _____% of fidelity of implementation (No. of items implemented/7) x100)

Appendix E

Tier 2⁺ fidelity of implementation checklist (Kong, 2012)

Implementation Criteria	Implemented as Described	Implemented Differently	Comments
1. Each child has headphones <ul style="list-style-type: none"> • Each child has functioning headphones. 			
2. Facilitator has headphones <ul style="list-style-type: none"> • Facilitator has functioning headphones 			
3. Following audio-file, facilitator provides a game to children.			
4. Facilitator uses a puppet and picture cards.			
5. Facilitator prompts child to engage in activity when child does not respond to the instruction.			
6. Facilitator provides positive feedback to children. <ul style="list-style-type: none"> • Facilitator provides verbal or nonverbal encouragement. 			
Total			_____No. of items implemented _____No. of items not implemented _____% of fidelity of Implementation ((No. of items implemented/6) x100)