ABSTRACT

ASBECK, STEPHANIE ANN. English Language Learners’ Second Language Vocabulary Acquisition: Effectiveness of Bilingual Storybook Reading for Kindergarteners. (Under the direction of Ann Schulte).

This treatment crossover design study examined the effects of language of storybook reading, style of presentation of vocabulary words during storybook reading, initial general vocabulary, and frequency of home reading on children’s English vocabulary acquisition through storybook reading. Twenty-nine native Spanish-speaking, kindergarten students, who were English language learners, participated in the study. There were two 2-week storybook reading periods. Children were randomly assigned by classroom to English-only or bilingual storybook reading in the first time period. In the second time period, children were exposed to the alternate storybook reading treatment. The two storybook reading treatments varied by language: English-only storybook reading or bilingual storybook reading, which consisted of prereading storybooks in the children’s first language followed by additional readings in English. Within each storybook reading treatment, there were two vocabulary word sets that were presented either in an elaborated or implicit fashion.

All storybook reading treatment combinations led to significant gains in vocabulary. The language of storybook reading, style of presentation of vocabulary (elaborated or implicit) during storybook reading, and initial general vocabulary all were predictors of children’s English vocabulary learning through storybook reading. There was a significant interaction between the two treatment conditions. Although elaboration of vocabulary consistently resulted in increased English vocabulary knowledge in children, regardless of whether the storybooks were read in English-only or bilingually, the English-only storybook reading
treatment with word elaborations led to the most English vocabulary acquisition. The second most effective combination was bilingual storybook reading with elaborated presentation of target vocabulary. The failure to find the predicted advantage for bilingual storybook reading in both the elaborated and implicit vocabulary conditions may have been due to the decreased number of times children were exposed to the target vocabulary words in English when the first two readings of the storybook were presented in the children’s first language. Children with higher initial general receptive vocabulary knowledge, assessed both in English and bilingually (English and Spanish combined), gained more from all storybook reading conditions. Study limitations, implications for practice and future research on the use of storybook reading as a vocabulary building strategy for English language learners were discussed in light of these findings.
English Language Learners’ Second Language Vocabulary Acquisition: Effectiveness of Bilingual Storybook Reading for Kindergarteners

by
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DEDICATION

I dedicate this dissertation to my wonderful family. Particularly to my loving mother and father, John and Magdalena Asbeck, who have always been my role-models for hard work, perseverance, optimism, companionship, selflessness, and love. Thank you for teaching me the important lessons in life. I look forward to learning more. I also I dedicate this dissertation to my brother, John Richard Asbeck, sister-in-law, Karen Asbeck, and nephew, Athan, for sharing fun and memorable life moments with me. Last, but not least, I dedicate this to my amazing husband, Juan Marcos González Sepúlveda, who has been proud of my work and incredibly supportive throughout this process. Thank you for being a true partner, for your patience, for making me laugh, and for sharing the challenges and sacrifices of completing this dissertation. I love all of you!
BIOGRAPHY

Stephanie Ann Asbeck was born in San Juan, Puerto Rico. Stephanie graduated from The Baldwin School of Puerto Rico in 1996. In 2000, she graduated magna cum laude from the University of Puerto Rico- Mayaguez Campus with a Bachelor of Arts degree in Psychology. She entered North Carolina State University for graduate study in School Psychology and received her Master of Science degree in August 2006 and her Doctor of Philosophy degree in May 2012.
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CHAPTER 1

Introduction

English Language Learners (ELLs) are one of the fastest growing groups among the school-aged population in the United States (U.S.). ELLs are defined by the U.S. Department of Education as national origin minority students who have limited proficiency in the English language (Francis, Rivera, Lesaux, Kieffer, & Rivera, 2006). In the literature, two terms are often used to refer to students whose native language is not English: English Language Learners and Limited English Proficient (LEP) students. Although ELL and LEP are often used interchangeably, ELL often refers to a more general group of students whose primary language is not English, whereas LEP refers to a subgroup of ELLs that, based on an English proficiency measure, have not attained sufficient proficiency in English to participate in grade-level classes (Francis et al., 2006). LEP is a formal designation and states have specific criteria for designating a student as LEP (Sousa, 2011).

Between 1997 and 2009, the number of ELLs enrolled in the public school system increased from 3.5 million to 5.3 million, a 51% increase; whereas the general student population increased by 7.2% (National Clearinghouse for English Language Acquisition, 2011). Although ELLs may speak over 400 different first languages, 70 percent of these students speak Spanish (Francis et al., 2006). Most of these ELL students immigrated into the U.S. before kindergarten entry or were born in the United States from immigrant parents. It is projected that by 2025, one in every four children in U.S. schools will be an ELL (United Stated Department of Education, 2006).
ELLs, as a group, struggle in various academic areas. One key area of academic difficulty is reading. Although 32 percent of fourth grade native English speakers scored at or above the proficient level on a national assessment of reading comprehension in 2009, within the ELL population only 6 percent scored at this level (National Center for Education Statistics, 2009). The figure is not surprising. Learning to read in one’s native language (L1) entails learning to associate the sounds of a language with their written equivalent, hence developing an understanding of the sound-symbol association (NRP, 2000; Whitehurst & Lonigan, 1998). However, ELLs must simultaneously learn a new language (L2), and the rules of mapping the sounds in this new language onto print (Silverman, 2007). Where the typical native speaker learning to read has had five to six years of exposure to the English language, the ELL may be encountering the second language for the first time as he or she enters school and has a variety of language and literacy-related skills to learn in L2 in order to perform like his or her native-speaking peers (Francis et al., 2006).

As such, finding ways to increase L2 vocabulary in ELLs is a critical issue for increasing these students’ reading skills, as well as increasing their ability to profit from instruction in the second language. This study examined the effectiveness of one strategy to increase ELLs language skills—storybook reading. A large body of previous research has shown that children rapidly acquire vocabulary from storybook reading in their native language (Beck, McKeown, & Kucan, 2002; Collins, 2005; Elley, 1989; Robbins & Ehri, 1994). A more limited body of research suggests that storybook reading in a second language accelerates vocabulary acquisition in that language (Appel, & Vermeer, 1998; Collins 2004; Elley, 1991; Elley & Mangubhai, 1983). This study examined the impact of
combined L1 and L2 storybook reading on ELLs’ L2 vocabulary compared to repeated storybook readings in L2 only.
CHAPTER 2

Literature Review

In this chapter, the research literature relevant to the study will be reviewed. The first sections provide basic background knowledge in two areas that are fundamental to the study: vocabulary knowledge and second language acquisition. After providing this groundwork, a comprehensive review of the research regarding the role of storybook reading in vocabulary acquisition will be provided. Within this comprehensive review, the research regarding storybook reading as a means of acquiring vocabulary in L1 will be discussed first, followed by research regarding the role of storybook reading in acquiring vocabulary in L2.

Literacy and Vocabulary Knowledge

In the past ten years, there has been an intense focus on improving early literacy instruction and understanding the roots of poor reading. The focus can be explained by the growing realization that children who exit third grade as poor readers are likely to remain poor readers through school exit (Cunningham & Stanovich, 1997), and the achievement gap in reading and other areas observed between students who are poor, ethnic minority, or nonnative speakers, and their white, wealthier, native speaking peers.

Along with an increased focus on improving early literacy instruction in the past decade, a better understanding of the skills underlying early reading has emerged. One of the most widely used frameworks for classifying important skills in early reading was developed by the National Reading Panel (NRP). The NRP was a panel formed in response to a 1997 Congressional request to evaluate the available research-based knowledge in the area of reading, its process, and effective teaching strategies. The NRP concluded that five areas were essential components of reading and should be a part of early reading instruction.
These areas are (a) phonemic awareness, (b) an understanding of the alphabetic principle (phonics), (c) accuracy and fluency in word identification, (d) vocabulary, and (e) comprehension (NRP, 2000; Whitehurst & Lonigan, 1998). These skills are components of emergent literacy that develop during the preschool years and are related to subsequent reading achievement (Whitehurst & Lonigan).

Three of these skills, phonemic awareness, phonics, and accuracy and fluency in word identification, involve the ability to hear speech sounds, and then quickly translate speech sounds into print or print to speech. The remaining two skills, vocabulary and reading comprehension, are more concerned with deriving meaning from printed text. Vocabulary, the focus of this review, is defined as the capacity to understand and use words to obtain (receive) and communicate (express) information (NRP, 2000). An extensive and useful vocabulary is a critical part of reading because only when children understand the meaning of the speech equivalent of printed text (e.g., a word) can they assemble the meaning of the text they have just decoded.

Longitudinal studies have demonstrated that the developmental antecedents of reading skills are found well before the onset of formal schooling (Lonigan, 2007). Although many children have limited phonemic awareness and cannot read upon school entry, children’s vocabulary knowledge develops prior to their entry into school. Given vocabulary’s critical role in reading comprehension, it is important to understand how children develop their vocabulary knowledge and how vocabulary acquisition can be influenced for children entering school with limited word knowledge.
Children’s Vocabulary

The relationship between vocabulary knowledge and reading comprehension has been studied extensively in reading research (August, Carlo, Dressler, & Snow, 2005; Lehr et al., 2004; NRP, 2000). The following sections will present information on vocabulary, its importance for reading comprehension, its acquisition, and useful practices to help children develop vocabulary knowledge.

What is vocabulary? As stated earlier, vocabulary is having knowledge of words and word meanings. The definition, however, is very broad and does not convey well the many aspects of vocabulary knowledge. Oral vocabulary refers to words that are recognized and used in speaking or listening, whereas print vocabulary refers to words that are recognized and used in reading and writing. Just like vocabulary words can be differentiated by their use, vocabulary knowledge can also be differentiated by its modes, receptive and expressive. Receptive vocabulary requires that an individual link a specific meaning with a given word. Receptive vocabulary is used to define words that are recognized when heard or seen (Beck & McKeown, 1991). Expressive vocabulary requires that an individual generate a specific word for a particular meaning. Expressive vocabulary is used when speaking and writing (Beck & McKeown, 1991). Typically, a person’s receptive vocabulary is more extensive than their expressive vocabulary. Words in a person’s receptive vocabulary may include words to which the person may assign some meaning, despite not knowing their full definitions and connotations, and may include words that the person may not use to express him or herself in oral or written form (Lehr, Osborne, & Hiebert, 2004). Thus, vocabulary is a broad concept that refers to the kinds of words that people know. Developing vocabulary
knowledge is important, as vocabulary in oral and print contexts becomes more demanding throughout schooling.

**Why is Vocabulary Important for Reading Comprehension?** Past research has demonstrated that vocabulary knowledge has an influence on early reading skills as well as in later reading comprehension (August, Carlo, Dressler, & Snow, 2005; Lehr et al., 2004; Nagy, 1988; NRP, 2000). Vocabulary is strongly related to reading comprehension and overall academic success (August et al.; Lehr; Nagy). The relationship between vocabulary and comprehension makes sense. Messages are ideas that are expressed in words. In order to understand the message or send a message to express oneself, one has to be able to have sufficient knowledge of the words. For students to understand the message read and extract meaning from text, students need to have an extended vocabulary and the ability to establish or infer the meanings of novel words when they encounter them. Skilled readers can encounter a small number of unfamiliar words in a text and still be able to comprehend the message by inferring the meanings of those words from the context. However, if the number of unfamiliar words is too high, comprehension is affected (Carver, 1994; as cited in August et al.). Young readers who encounter difficulties with reading may get frustrated. These students may not be motivated to read. If students do not read, they miss out on the opportunity of encountering novel words and understanding their meanings. Lack of enthusiasm about reading and exposure to new vocabulary may set in motion a cycle known as the “Matthew Effect” (Stanovich, 1986), where good readers read more, become better readers, are exposed to more words and expand their vocabulary; whereas poor readers read less, become poorer readers, are exposed to less novel words, and learn fewer words.
Recent studies have also demonstrated that vocabulary also has an impact on early reading-related skills such as phonological awareness (August et al., 2005). Children who have an extensive oral vocabulary may have a better understanding of the individual sounds that make up the words they know (Lonigan, 2007). In addition, having a word in their oral vocabulary facilitates decoding for children. If students have a word in their oral vocabulary, they can sound out, read, and comprehend what they are reading more quickly and easily. If a word is not part of the student’s oral vocabulary, the student will have more trouble reading the word and comprehending the message in text (NRP, 2000). Vocabulary knowledge is not only important for early readers at the word-level, it is important to all readers in order to comprehend text.

Oral vocabulary is not only important for reading, but also for benefiting from oral instruction. Oral vocabulary is the means which individuals can use to communicate as well as to recognize and comprehend in listening. Most children learn vocabulary implicitly in naturalistic ways, such as through exposure to or interactions with other individuals who are verbal as well as through exposure to verbal media (e.g., television and radio). Thus, oral vocabulary is a means through which children understand and make sense of the words they hear in various settings. One natural way of exposing children to more vocabulary is through storybook read-alouds, where children can listen to a story and use their oral vocabulary skills to comprehend the content of the storybook. The more words they know, the more they understand and can use context clues to decipher what other words mean. In sum, vocabulary knowledge is a key skill that plays a role in the key role in children’s ability to profit from instruction and comprehend the world around them.
What Does “Knowing” a Word Mean? There are various definitions of what “knowledge” of a word means. Vocabulary “knowledge,” can be defined as the number of different words a child knows (e.g., breadth of vocabulary) as well as the detailed knowledge of each word that a child knows (e.g., depth of vocabulary) (Beck & McKeown, 1991). Vocabulary depth can be described as being able to identify subtleties about a word, such as differences in phonetic representation, variations in the word’s meaning due to context, and changes in the grammatical function of a word (Snow, 2000 as cited in Collins, 2004). In order to understand what vocabulary “knowledge” is, one must define what “knowing” a word means. “Knowing” a word falls on a continuum, it is a matter of degree, (Beck & McKeown). The degree to which a child knows a word is reflected in the accuracy with which the word is used, how quickly he/she understands it, and how well he/she understands and uses the words for different purposes and in different modes (expressive or receptive) (Lehr et al., 2004). In addition, knowing a word requires knowing how one word relates to other knowledge.

Vocabulary acquisition. Vocabulary acquisition, as defined by Collins (2004), is “the means by which a child comes to know a word, the means by which the child comes to possess a general understanding of at least one basic meaning of a word, usually in a particular context” (p.20). The process of acquiring vocabulary and developing word knowledge usually requires multiple exposures to the target words through a variety of encounters, such as written contexts, through incidental or implicit exposure in conversations, or through deliberate exposure from teachers, parents, or other methods (e.g. computer programs). It also requires that the meaning of the word be suggested through implicit support of context clues or explicitly through a teacher, parent, or other medium.
Acquiring vocabulary draws on the child’s memory to remember the phonetic representation of the word as well as at least one meaning of the word in any context (Collins, 2005; Nagy, Anderson, & Herman, 1987.) For example, during the initial encounter with a new word, a child stores in memory some information (obtained implicitly or explicitly) on how the word fits into what he/she was reading or listening to. With every exposure to the target word, the information the child has stored in memory is reinforced and based on the context in which the word is encountered, additional information about the target word is obtained. As a result, the child gradually acquires a more in-depth understanding of the meaning of the word due to multiple encounters with the word, across various contexts (Lehr et al., 2004).

Children acquire new vocabulary by being exposed to new words used in contexts, by obtaining explanations of new words, and by internalizing the words (Beck, McKeown, & Kucan, 2002). There are different definitions of word acquisition which makes measuring successful acquisition somewhat complicated. In this proposed study, vocabulary acquisition will be defined as the child’s successful learning of the meaning of target words through storybook experiences, as measured by correctly selecting pictures that represent the meanings of the target words presented orally from an array of alternative pictures (receptive vocabulary) as well as by providing definitions of the target words (expressive vocabulary).

**Vocabulary size.** An important aspect of vocabulary knowledge is vocabulary size, which is strongly correlated with children’s overall school achievement (Wells, 1986, as cited in Robbins & Ehri, 1994). Estimates of vocabulary-learning vary greatly, depending on the procedures used to calculate the estimates. Estimates of word-learning in children ages one through six, vary from 2.2 root words a day (Biemiller & Slonim, 2001) to 9 or 10 words a day (Nagy and Herman, 1987). Biemiller and Slonin, however estimate that low-ability
word learners may only acquire about one word a day from age one to second grade, whereas high-ability word learners may acquire about three new words per day. Despite the variation in estimates, young children acquire a significant amount of vocabulary before schooling begins. These words are learned through explicit instruction or implicitly through exposure in a variety of settings, and they set the stage for children’s acquisition of subsequent academic skills, particularly reading.

Limited vocabulary can have an impact on reading comprehension. The effect of limited vocabulary knowledge on reading comprehension is apparent from third grade on, when the vocabulary in the text exceeds children’s vocabulary knowledge (Biemiller, 2003). However, most differences in vocabulary knowledge are apparent before third grade. In fact, there are large differences in children’s vocabulary knowledge as early as kindergarten and through third grade, where children’s rates of vocabulary acquisition vary greatly between children (Biemiller & Slonim, 2001). For example, studies have found that, on average, African American, Hispanics, and American Indian children enter kindergarten or first grade with lower levels of oral language (including vocabulary) than Caucasian and Asian American children (Farkas, 2003). In addition, ELL students know fewer English vocabulary words than same-age, monolingual native speakers (August et al., 2005). Biemiller noted that that by the end of second grade, students in the highest and lowest vocabulary quartiles had about a 4,000 root word difference in their vocabularies and this difference was prevalent from third grade through sixth grade. Biemiller provides further support for the idea that children who have not acquired certain skills by the end of third grade, have a hard time catching up to their peers (Cunningham & Stanovich, 1997). These gaps in academic skills are prevalent throughout schooling. Thus, helping children acquire
vocabulary knowledge, among other skills, before school entry and continuing to minimize
the vocabulary gap is important in order to develop, maintain, and further their reading skills.

**Acquisition of Second Language and Second Language Vocabulary**

Children’s second language acquisition has been described by most theorists as a
long, fluid learning process (Reed & Railsback, 2003). One simple model of second
language development is Krashen and Terrell’s (1983) Natural Approach model. The
Natural Approach Model segments the complex process of second language acquisition into
four basic stages: Preproduction; Early Production; Speech Emergence; and Intermediate
Fluency. Students in the Preproduction stage, also known as the Receptive/Silent Period,
have been exposed to L2 anywhere from 10 hours to 6 months and are beginning to learn L2.
Children in this stage have a vocabulary of approximately 500 receptive words, which they
may understand, but not feel comfortable using. The Preproduction stage often involves a
“silent period,” during which children may not speak, but can respond to simple questions by
nodding yes or no, pointing to items, and following through on simple commands. During
this stage, children also begin to develop a language used for social communications (Basic
Interpersonal Communication Skills, BICS; Cummins, 1984).

Students in the second stage of L2 development, the Early Production stage, have
been exposed to L2 anywhere from 3 months to a year and have acquired close to 1,000
receptive vocabulary words in L2, with 10 percent of these being part of their expressive
vocabulary as well. During this stage, students can produce one or two word responses in L2
to simple yes/no, either/or, who/what/where questions.

Students in the third stage of L2 development, the Speech Emergence stage, have
been exposed to L2 anywhere from one to three years. During this stage, their L2 increases
exponentially and their receptive vocabulary grows to about 7,000 words. During this stage, they are also able to use phrases and sentences when expressing themselves and can now respond to “how” and “why” questions as well as ask simple questions. Students can understand a large amount and express themselves fairly effectively, though grammatical simplicity and errors can interfere with their communication.

Students in the fourth stage of L2 development, Intermediate Fluency, have been exposed to L2 anywhere from three to four years. In this stage, children have acquired about 12,000 receptive words and begin to develop Cognitive Academic Language Proficiency (CALP; Cummins, 1984) or the understanding and use of L2 for academic purposes. Given the development of CALP, children can begin to engage in extended conversations and answer complex questions that require analysis and synthesis. These language skills provide a means for students to participate in essay writing, complex problem solving, research, critiques, and analysis of literature. Children in this stage still require educational support until their CALP in L2 is fully developed. Given that the development of language is that of a continuum of learning, some theorists have added a fifth stage in the development of L2, the Advanced Language Proficiency stage (Reed & Railsback, 2003). In this stage, which typically requires about five to seven years of exposure to L2, students have developed more cognitive academic language and can participate fully in grade level classroom activities, using vocabulary and grammar comparable to same age, native speaking peers.

Although there are other models of second language acquisition (e.g., Ellis, 2005; MacWhinney, 1997), there is general agreement that about the time frame for second language learning reflected in Krashen and Terrell’s (1983) model. That is, conversational fluency is typically developed within two to five years of exposure to L2, but developing
fluency in more technical and academic language can take, on average, from four to seven years (Reed & Railsback, 2003). Thus, ELL students are at particular risk for difficulties in academic areas that require CALPS, such as reading comprehension. Even if these students can use phonics rules in L2 to translate print into the correct speech sounds, they may not be able to access the meaning of the word, sentence, or passage that has been read due to their limited L2 vocabulary knowledge. Although vocabulary is seen as a key skill underlying reading comprehension for all readers (August et al., 2005; Lehr et al., 2004), it is of particular importance for ELLs (Silverman, 2007). In the next section, a broad overview of research on vocabulary instruction is provided, before focusing on storybook reading, a method of vocabulary instruction that has considerable research to support it (Beck, McKeown, & Kucan, 2002; Blok, 1999; Collins, 2005; Elley, 1989; Elley & Mangubhai, 1983; Karweit & Wasik, 1996; NRP, 2000; Penno et al., 2002; Robbins & Ehri, 1994; Temple & MaKinster, 2005; Ulanoff & Pucci, 1999). Storybook reading research is reviewed in the most detail because its impact on ELL vocabulary knowledge will be examined in the proposed study.

**Vocabulary Instruction**

Over the last twenty years, researchers have studied the effects of various instructional methods used to help children develop vocabulary knowledge. In a comprehensive review, the National Reading Panel (2000) concluded that effective vocabulary instruction required a multi-method approach. Effective vocabulary instruction should help students acquire new words (breadth) and gradually increase the depth of their word knowledge (Beck et al., 2002; Lehr et al., 2004; NRP, 2000). The National Reading Panel identified implicit and explicit word teaching as two main methods used for vocabulary
instruction. During explicit instruction, students are provided with definitions or other elaborations of the target word to be learned. During implicit instruction, students are exposed to words orally or are given opportunity to engage in reading. Through implicit instruction, children learn words indirectly, without the intervention of an interlocutor. The following sections will briefly discuss the acquisition of vocabulary through incidental or implicit learning and through direct or explicit teaching.

**Implicit instruction/ Incidental word learning.** Children’s acquisition of new words occurs primarily through incidental exposure (Elley, 1989; Justice, Meier, & Walpole, 2005). Incidental exposures refer to contexts in which children indirectly, implicitly, and informally are exposed to unknown words. The contexts in which words are learned change as children develop. Early learning occurs through oral contexts, and although these oral experiences play a role in word-learning throughout development, they begin to play a lesser role as children learn to read, when the context for vocabulary learning shifts from oral experiences to written contexts.

Young children begin to acquire vocabulary in naturalistic contexts such as through exposure to television and radio, through social interactions and conversations between adults or peers, or from storybook reading. Young children are able to quickly and effectively acquire vocabulary words through incidental exposure and are able to rapidly apply a label to a known concept (Beck et al., 2002) (e.g. apply the label “ball” to the concept of a round or spherical body used in games.)

As stated earlier, estimates of word acquisition suggest that young children can acquire a reasonable amount of words every day. Thus, the more oral language that young children are exposed to, the more words they can potentially learn. Young children’s
vocabulary can be enriched through multiple exposures to a variety of novel words. Children should be encouraged to use novel words and experiment with language. Young children’s listening and speaking competence can enhance their reading and writing competence in later years. Children who have limited exposure and experiences with language often have trouble with early reading and thus, often remain at risk for reading difficulties (Hart & Risley, 1995; Storch & Whitehurst, 2002).

Young children can incidentally learn new words both at home and in school. As mentioned earlier, studies have shown that there is a word-knowledge gap between groups of children even before entering school, this gap is largely dependent on the vocabulary experiences that children have been exposed to in their homes (Hart & Risley, 1995). Some households may not provide optimal levels of vocabulary and literacy-enhancing experiences for children, due to limited oral interactions between adults or peers and limited or lack of storybook reading (Goldenberg, Reese, & Gallimore, 1992; Flores, Tomany-Korman, Olson, 2005.) Hart and Risley, for example, have shown that there are large differences in the vocabulary of young children of different socioeconomic backgrounds. In their study, three year-old children of higher socioeconomic families had vocabularies as much as five times larger than children in lower socioeconomic families. The children from higher socioeconomic backgrounds were exposed to more extensive, repetitive and interactive oral contexts, where children could listen to and acquire more language. In addition, the function of literacy, the frequency of literacy events, and the styles of literacy interactions are different across cultural and economic groups (Hammer, Miccio, & Wagstaff, 2003).

Although it is important for young children to hear and speak a large variety of words, it is even more important that the language that children are exposed to is
sophisticated and that it resembles the language that children will hear in the schools. Exposure to this language is particularly important for children who do not have an extensive oral language experience, including English Language Learners. In fact, the sophistication of language that children are exposed to, and in which they participate, is a stronger predictor of their later vocabulary knowledge than is the number of words that they listen to and speak (Weizman & Snow, 2000, as cited in Lehr et al., 2004).

Once children enter school, they are exposed to a variety of language that will hopefully promote vocabulary growth. During the preschool years and early grades, it is common for teachers to limit the vocabulary that they use to words that are recognized by the students and to engage in concrete talk with questions that have a specific answer. However, studies have shown that engaging in a more interactive style as well as exposing children to new and rare words aids in their vocabulary growth (Dickinson & Tabors, 2001; Lehr et al., 2004.) Even though oral language is an important context in which children can learn vocabulary, it is does not ensure that children will acquire sufficient vocabulary knowledge to eventually develop good reading comprehension skills and sufficient vocabulary to understand the complex texts that they will encounter in later schooling.

A way to expose young children to infrequent and rare words is through the use of children’s books. Researchers have found that children’s books have twice as many infrequently used words than even adult conversations among college graduates or even popular prime-time adult shows (Hayes & Ahrens, 1988, as cited in Vaughn & Linan-Thompson, 2004.) Storybook reading to young children has been found to be a good medium through which children can pay attention to rich language and acquire new word knowledge (Beck et al., 2002; Blok, 1999; Collins, 2005; Elley, 1989; Elley & Mangubhai,
Once children learn to read, reading independently will also help increase children’s vocabulary knowledge (Beck et al., 2002), but until that time, storybook reading is a powerful and engaging means of acquiring vocabulary. Storybook reading as an intervention to increase children’s acquisition of vocabulary knowledge will be further discussed in a later section.

Young children have the ability and capacity to acquire vocabulary through incidental exposure to words. The more rich words a child is exposed to, the broader the child’s vocabulary knowledge will be, potentially leading to improved reading comprehension once the child learns to read. Conversations, television viewing, or storybook reading are some of the many natural contexts in which young children hear new words and acquire oral vocabulary. The use of explicit instruction, directly teaching a child a new word, is also beneficial when helping children add vocabulary to their repertoire.

**Explicit instruction.** Although children acquire vocabulary knowledge through incidental exposure to words, adults can help children accelerate their word-learning process by using direct, explicit instruction of individual word meanings. Direct instruction refers to a concise, explicit form of word teaching, in which students are provided with definitions, elaborations, or other attributes of the word or are given cues to help them connect the word with its meaning (NRP, 2000). Common techniques that qualify as direct instruction include embedding definitions and elaborations within texts, using key-word or mnemonics, synonym drill, context clues, morphology, sentence production tasks, or the pre-teaching of vocabulary words prior to reading a text (Penno, Wilkinson, & Moore, 2002). By direct teaching, students become familiar with concepts or terms included in texts which may be
learned and become part of their oral language. Direct teaching helps students have a better understanding of the material that is being presented or read and it helps them integrate information between learned concepts and new concepts. For younger students, for example, an adult may read aloud a storybook and elaborate on the meanings of new vocabulary as these are encountered in the text (Penno et al., 2002). Through direct instruction, children are taught specific words in order to help them improve comprehension of what they are reading or what is being read to them (Beck et al., 2002).

Overall, the NRP (2000) and many researchers (e.g., Beck, McKeown, & Kucan, 2002; Lehr, Osborn, & Hiebert, 2004; Temple and MaKinster, 2005), suggest that there are a variety of ways of helping school-age children gain vocabulary. In elementary school, successful vocabulary instruction should emphasize explicit teaching of words that children need to know in order to succeed academically (Beck et al., 2002). Instruction should also foster vocabulary growth through implicit or incidental exposure to words (Beck et al. 2002; Elley, 1989; Justice et al., 2005; Karweit & Wasik, 1996; Lehr et al.; NRP, 2000). Children who know how to read will be implicitly exposed to new words as they read in the school setting or when they read for leisure. However, for younger children who cannot read, incidental exposure to novel words can occur through conversations with or amongst adults or peers, through media in the environment (e.g., radio or television), and by participating in storybook read-alouds.

**Storybook Reading**

Reading aloud has been thought to be one of the most useful and easy things that adults can engage in to support children’s growth in literacy (Temple & MaKinster, 2005). The following section will present information on the benefits of storybook reading as well
as review research conducted on the use of storybook reading as a vocabulary intervention for monolinguals and ELLs.

**The benefits of storybook reading to young children.** In some cultures, storybook reading is common within the household and often integrated into daily routines (Beck et al., 2002). Many benefits have been associated with storybook reading: reading aloud activities help children develop listening comprehension (Brabham & Lynch-Brown, 2002; Feitelson, Goldstein, Iraqi, & Shane, 1993; Reese & Cox, 1999) and print skills (Morrow, O’Conner & Smith, 1990; Reese & Cox, 1999). When listening to stories, children can also begin to develop a variety of skills that are involved in reading comprehension such as perceiving main ideas and supporting details, making inferences and predictions, and using the words to create a mental image of what is being expressed (Temple & MaKinster, 2005). Through adult-child storybook reading that is engaging, children can also perceive the variety of emotions and ideas that can be expressed in writing and become excited and motivated about literacy (Beck et al., 2002). In addition, storybook reading to young children is an avenue to expose children to unknown words and to foster language development and vocabulary acquisition (Beck et al., 2002; Blok, 1999; Chomsky, 1972; Collins, 2005; Elley, 1989; Elley & Mangubhai, 1983; Karweit & Wasik, 1996; Mautte, 1990; Morrow et al., 1990; NRP, 2000; Penno et al., 2002; Robbins & Ehri, 1994; Temple & MaKinster, 2005; Ulanoff & Pucci, 1999). Adult-child storybook reading interactions provide highly contextualized exposures to new words in a manner that is authentic, familiar, and often entertaining and motivating for young children (Beck et al., 2002; Justice, Meier, & Walpole, 2005).

**Review of storybook reading interventions for vocabulary acquisition in monolingual children.** The research on storybook reading has largely focused on its impact
on first language development. This research forms the base of the work on storybook reading for second language acquisition. The following sections contain a review of existing studies on storybook reading to help monolingual children acquire vocabulary. First, a brief summary of existing reviews evaluating the effect of storybook reading as a vocabulary intervention for young children will be presented. These reviews will focus on adult-child storybook reading and more specifically, teacher-child storybook reading. Second, specific components of storybook reading interventions in the school setting will be discussed. Finally, this section will conclude with a summary of the contributions of these studies to our knowledge of vocabulary acquisition in young children via storybook reading in the schools.

Storybook reading between adult and child is commonly believed to be a potential vocabulary building activity for young children (Beck et al., 2002; Blok, 1999; Collins, 2004; Elley, 1989; Elley & Mangubhai, 1983; Karweit & Wasik, 1996; NRP, 2000; Penno et al., 2002; Robbins & Ehri, 1994; Temple & MaKinster, 2005; Ulanoff & Pucci, 1999). The majority of research that focuses on the benefits of adult-child storybook reading on vocabulary knowledge has focused primarily on the use of storybook reading between parent and child. Two recent meta-analyses, Scarborough and Dobrich (1994) and Bus, van Ijzendoorn, and Pellegrini (1995), analyzed the effect of parent-child storybook reading on literacy skills of children, including their oral vocabulary. Both of these meta-analyses shared many of the sources, yet used different methodologies to analyze the data. Although a different methodology was used, both reviews reported a moderate general effect size in the oral language domain (\(d=+.54\) [converted from \(r=.26\)] and \(d=+.67\), respectively). Despite the medium effect size, Scarborough and Dobrich (1994) challenged the idea that storybook reading between parent and child was a robust intervention for vocabulary acquisition and
other literacy skills. Bus et al. (1995) disagreed with Scarborough and Dobrich’s interpretation of the results and indicated that the effects of storybook reading between parent and child were significant and that the intervention had a positive influence on children’s vocabulary, emergent literacy, and reading achievement. Although the results of these studies were interpreted differently, both of these meta-analyses concluded with a call for more research in this area in order to attain a better understanding of the relationship between parent-child storybook reading and various domains of young children’s language and literacy skills.

Research that has focused primarily on the use of storybook reading between parent and child to increase language development has shown that it is beneficial. However, the results of these studies cannot necessarily be generalized to storybook reading in educational settings, such as child development centers, kindergartens, and primary schools. There are considerable differences in the practice of storybook reading to children within the family and in the school setting. The most notable difference is in the attachment between parent and child and between a teacher and a student. In addition, in the home setting, a parent is likely to read to a single child or a small group, whereas in a school setting, a teacher is more likely to read to a larger group of children such as an entire class. Reading to a larger group of children limits the frequency and the nature of the interactions between the reader and the individual child (Morrow & Smith, 1990).

It is presumed that children in most kindergarten classes are read to every school day (Blok, 1999; Karweit & Wasik, 1996), yet the effects of adult-child storybook reading on children’s acquisition of vocabulary in the school setting has not been explored as much as it has in the context of the family. Karweit and Wasik examined the effects of storybook
reading in the schools, reviewing 14 studies and concluding that storybook reading in the school environment benefitted children’s literacy development. They provided some suggestions for teachers such as: (a) reading to students in small groups; (b) providing repeated readings of the same book; (c) using specific techniques when presenting novel words, such as the use of representations, synonym phrases, and role-playing; and (d) limiting the number of questions during readings. These suggestions will be further discussed in the following sections.

Blok (1999) used a more rigorous approach to review the benefits of storybook reading to young children in the school setting. In a meta-analysis, Blok reviewed ten studies and reported that teacher-child storybook reading had a moderate effect \(d=+.63\) on children’s oral language (vocabulary and grammatical skills). Findings also suggested that teacher-child storybook reading had a stronger effect on children’s oral language in studies in which smaller groups of children were read to and in which the children were younger. In addition, there were stronger effects on oral language in studies in which the children’s actual teacher was reading to them. Blok also compared the effect size of storybook reading on oral language when children were read to by parents as opposed to teachers. Results indicated that the effect of parent-child storybook reading was slightly higher than that of teacher-child storybook reading \(d=+.67\) as opposed to \(d=+.63\); Blok; Bus et al., 1995).

Scarborough and Dobrich’s (1994), Bus et al. (1995), Karweit and Wasik’s (1996), and Blok’s (1999) reviews support the premise that storybook reading can aid in the development of children’s vocabulary. Although some professionals may be skeptical of the robustness of adult-child storybook reading as an intervention, reviews seem to suggest that this adult-child activity has potential benefits for oral language acquisition, as well as other
areas. In addition, storybook reading in the school environment seems to be slightly less
effective than in the home setting, but still shows moderate effects. Overall, these reviews all
agree on the need for additional research to fully comprehend the relationship between adult-
child storybook reading and development of language and literacy skills in young children.
A thorough understanding of the conditions under which storybook reading is most beneficial
to children is also warranted. The next section summarizes research concerning the elements
or conditions of teacher-child storybook reading activities that appear to foster vocabulary
acquisition in young children, as well as methodological aspects of storybook reading studies
that appear to affect their results. The section will conclude with a general overview of the
contributions of these studies to our knowledge of vocabulary acquisition through read-aloud
activities in educational settings.

**Important elements of storybook reading.** Research on teacher-child storybook
reading suggests that the way storybook reading is implemented in the school environment
affects the extent to which the practice is associated with vocabulary acquisition in young
children. The following sections present a brief compilation of research on important
elements of storybook reading. Given the variability in studies’ methodology and findings,
at times it is difficult to pinpoint the specific conditions under which storybook reading is
most effective as a medium for vocabulary acquisition. Thus, the goal of this section is to
present a general understanding of the conditions that have appear to maximize children’s
vocabulary gains through teacher-child storybook reading. In addition, this section examines
other factors that can affect storybook reading research results, such as characteristics of the
words targeted, children participating, or way vocabulary is measured.
The criteria for selecting studies for this section included methodological relevance to the proposed study, the setting in which the storybook reading took place (in school), and the age of the participants. In some cases, studies in which the age of the participants varied from that of young children were included in order to provide a more thorough understanding of the nature of storybook reading as a means for vocabulary acquisition. All of the participants in the studies were native English speakers. Studies that examined storybook reading and its impact on children learning a second language are presented in a separate section.

Repeated exposures. Exposing children to new words repeatedly, within the same text, through multiple readings of the same book, or throughout the school day, facilitates children’s learning of novel words (Brett, Rothlein, & Hurley, 1996; Coyne, McCoach, & Kapp, 2007; Eller, Pappas, & Brown, 1988; Elley, 1989; Justice, Meier, & Walpole, 2005; Leung & Pikulski, 1990; NRP, 2000; Penno, Wilkinson, & Moore, 2002; Robbins & Ehri, 1994). Vocabulary development occurs gradually (Coyne et al., 2007; Justice et al., 2005). First, children create an initial representation of a word’s meaning and with further exposure to the word, children develop a more refined, in-depth, and comprehensive understanding of the word (Beck et al., 2002; Coyne et al., 2007.) The methodologies used in studies that evaluate the gains in vocabulary acquisition in young children via storybook reading are varied, using different procedures, number of exposures, ways to assess vocabulary gain, and participants, including children that have average abilities and some that are at-risk for learning difficulties. In order to gain a more thorough understanding of the importance of exposure to novel words, results will be described according to the studies’ characteristics.
Studies have shown that children can demonstrate significant gains in vocabulary knowledge after one exposure to novel words (Brett et al., 1996), two exposures (Robbins & Ehri, 1994), three exposures (Coyne et al., 2007; Elley, 1989), and four exposures (Justice et al., 2005). A closer look at the studies’ methodologies suggest that when children are exposed to the words implicitly, without elaboration or an explanation of its meaning, children show significant gains in vocabulary acquisition after being exposed to the words twice (Robbins & Ehri, 1994). However, Robbins and Ehri (1994) noted that there was a greater probability of children learning new words when they were exposed to it four times as opposed to two. In studies where children were exposed to words that were elaborated upon, children showed a significant increase in vocabulary knowledge after one reading (Brett et al., 1996). These studies did not include children who were at-risk for learning difficulties. In studies where children who are at-risk were taken into account (Coyne et al., 2007; Justice, Meier, & Walpole, 2005), children showed significant gain in vocabulary after three exposures (Coyne et al., 2007) and four exposures (Justice et al.) to elaborated vocabulary. These studies did not show that implicit exposure to novel words led to vocabulary gain in at-risk youth. These two studies used an expressive measure where children had to produce verbal definitions of the words. An expressive measure for assessing children’s knowledge of target vocabulary is more stringent, requires a higher level of understanding of the word as well as more extensive expressive abilities. Using a receptive instrument to measure children’s acquisition of words may have led to different results.

Eller at al. (1988), Leung and Pikulski (1990), and Penno et al. (2002), evaluated whether children’s accuracy in the use of novel words increased after each subsequent exposure to the word in text. These researchers conducted studies in which children were
exposed to target vocabulary in one text across three book readings. Children’s accuracy in the use of novel words and their depth of understanding of the vocabulary increased, progressively, with each subsequent reading. Leung and Pikulski, however, noted that although there was a significant increase in vocabulary gain between the first and second reading and between the first and third reading, there was not a significant gain between the second and third reading.

Despite the variability in findings, results suggest that children are active language learners and are able to learn novel words through implicit and explicit exposure to words during storybook reading. It is difficult to specify the amount of exposure a child needs in order to learn a novel word through storybook reading given the different methodologies used in the studies and the receptive or expressive nature of the tools used to assess gain in vocabulary. Results of these studies indicate that when a novel word is being presented implicitly, children of average ability need at least two exposures to the word in order to show a gain in vocabulary. When a target word is defined or elaborated within the reading, children of average ability require at least one exposure to show a significant increase in vocabulary gain. Findings of these studies imply that multiple exposures to novel words lead to a deeper understanding of the words’ meanings. Children who are at-risk for learning difficulties may benefit much more of an explicit, elaborated, teacher-directed approach to learn the words during the reading and may require up to at least three exposures to the word.

**Elaborated exposures.** A number of studies have demonstrated that the approach used by readers to present unknown words to children seems to influence children’s vocabulary acquisition during storybook reading activities (Brett, Rothlein, & Hurley, 1996; Coyne, McCoach, & Kapp, 2007; Eller, Pappas, & Brown, 1988; Elley, 1989; Justice, Meier,
As mentioned earlier, simple, implicit exposure to novel words over as few as two exposures (Robbins & Ehri) during storybook reading can lead to acquisition of those words. However, studies have demonstrated that when adults elaborate on the novel words, providing explanations embedded into the text during storybook reading, children’s ability to gain an understanding of the words is accelerated (Brabham & Lynch-Brown, 2002; Brett et al., 1996; Coyne et al. 2007; Elley, 1989; Justice et al., 2005; Penno et al., 2002). During read-alouds, readers can elaborate on words by providing simple definitions or synonyms, using modeling or role-play, or pointing to an illustration in the book that depicts the target vocabulary (Elley; Sénéchal, Thomas, & Monker, 1995). Others (Leung & Pikulski; Sénéchal et al.) have elaborated on target vocabulary by asking children to point to the appropriate illustration that depicts the target vocabulary or asking the children to provide the label for the illustration of the target vocabulary that is depicted. If the child responded incorrectly, the reader corrected the child. Some researchers have elaborated on vocabulary as well as other components in the texts, by not only discussing meanings, but also having discussions with children about predictions, inferences, and helping children link the content of the book with their lives (Coyne et al., 2007; Coyne et al., 2005).

Elaborating on target vocabulary during reading has proven to help children significantly increase their vocabulary knowledge (Brabham & Lynch-Brown, 2002; Brett et al., 1996; Coyne et al., 2007; Elley, 1989; Justice et al., 2005; Penno et al., 2002) and to maintain the knowledge across time (Coyne et al; Elley). Elley, for example, compared children’s vocabulary gain under three conditions: no treatment, repeated readings with exposure to novel words without explanation, and repeated readings with exposure to novel
words with elaboration. Children learned an average of three words when the words were not explained during reading, yet learned an average of ten words when the words were elaborated upon. Delayed posttests suggested relatively permanent acquisition of the target vocabulary three months after the last reading. Although children can learn vocabulary through implicit reading, Elley found that children can double their vocabulary gains when explanations of words are provided during read-alouds.

*Teacher reading style.* Studies have shown that the style in which adults read to children affects children’s vocabulary learning during storybook reading activities (Karweit & Wasik, 1996). Some readers opt to present information or have guided discussions at different points in the storybook reading interaction. A number of studies have evaluated the impact that a teacher’s interaction before, after, and during reading, or a combination of these, has on children’s language learning. As noted earlier, Brett et al. (1996), Coyne et al. (2007), Elley (1989), Justice et al. (2005), and Penno et al. (2002), demonstrated that embedding elaborations and explanations of target vocabulary into storybook reading interactions led to significant gains in children’s vocabulary. Other studies have focused on comparing whether children benefit more from instruction and discussion before and after a reading or before, during, and after storybook reading (Brabham & Lynch-Brown, 2002; Coyne et al.; Reese & Cox, 1999).

Reese and Cox (1999) evaluated the effects of three different, naturally occurring, reading styles on children’s literacy skills, specifically overall receptive vocabulary, print skills, and comprehension of the text. In the first style, “describer” style, readers focused on describing and labeling pictures during storybook reading. Labeling pictures is a low demand task for children. In the second reading style, “comprehender” style, readers
interrupted the story to focus on story meaning, and to make inferences and predictions about
the events in the book. In the third reading style, “performance-oriented” style, readers
discussed the story before and after the reading, but read the story uninterrupted. These last
two styles are considered high demand tasks, relative to the “describer” style. Results of this
study demonstrated that children’s receptive vocabulary and print skills benefitted the most
from the “describer” style, which consisted of interruptions during reading to provide basic
descriptive information of pictures and labels for the illustrations. A closer look at the results
suggested that children with lower initial vocabulary skills made the most gains in
vocabulary when the reader used a “describer” style. Children with higher initial vocabulary
skills gained most in vocabulary when the reader used a “performance-oriented” style.
Findings of this study suggest that interrupting readings to provide brief labels or
descriptions of illustrations may be more suitable for advancing vocabulary development in
children with lower vocabulary skills or younger children. A higher demand, but
uninterrupted reading style, may be more appropriate for children with more advanced
vocabulary. These children may be able to gain enough information from context clues to
acquire vocabulary knowledge without needed elaboration.

Brabham and Lynch-Brown (2002) evaluated the benefits of alternative reading styles
on children’s acquisition of target vocabulary. The three reading styles in the study consisted
of somewhat similar reading styles as those of Reese and Cox’s (1999) study. The first
reading style, “just reading,” consisted of reading stories without interruptions or word
elaborations. In the second reading style, “performance,” readers elaborated on vocabulary
and discussed the story before and after the reading. The third style “interactional,” was
similar to the “performance” style, but it also included discussions and elaboration during
storybook readings. Children that were read to in an “interactional” style gained significantly more vocabulary than the children in the “performance” style. These children, in turn, learned significantly more vocabulary than children in the “just reading” group. The results of this study, suggest that children acquire more vocabulary when a story is discussed and when words are elaborated before, during, and after stories are read, despite the interrupted reading.

Results of Coyne et al.’s (2007) study support Brabham and Lynch-Brown’s (2002) findings. Coyne et al. analyzed the benefit of exposing children to readings in which vocabulary was presented implicitly, without explanations; explicitly, with elaborations embedded in the text; and in an “extended” fashion, with novel words being explained before, during, and after storybook reading, as well as in various contexts throughout the day. The “extended” approach to teaching vocabulary was much more comprehensive, including the novel words in various activities throughout the day, something recommended by the National Reading Panel (NRP, 2000). In this study, children who were read to in an “extended” style showed significantly more gains in expressive and receptive vocabulary than children in the other two groups. Similarly, children who were exposed to vocabulary definitions that were embedded in the text had a significantly larger gain in expressive and receptive vocabulary than children who were exposed to novel words, but for whom definitions were not provided.

The research regarding the benefits that each of these different reading styles have on children’s vocabulary acquisition through storybook reading is not conclusive. Overall, research findings suggest that a comprehensive or extended approach to teaching and exposing young children to vocabulary, before, during, and after storybook reading activities
can be beneficial to most children (Brabham & Lynch-Brown, 2002; Coyne et al., 2007). Some children with higher vocabulary knowledge, however, may benefit more from reading styles where there is less interruption during reading (Reese & Cox, 1999). Fewer interruptions during reading allow the child to focus on the content of the story and to use context clues within the story to acquire an understanding of novel words. Children with lower vocabulary skills or younger children may not have a strong enough grasp of vocabulary to understand the stories and attain information from the context. Children with limited vocabulary may benefit from simple definitions of novel words embedded into the text (Reese & Cox). Despite the minimal interruption during the storybook reading activities, elaborating on a word during readings may increase the probability that most children, including those with lower vocabulary skills, will learn new words (Brett et al., 1996; Coyne et al.; Elley, 1989; Justice et al., 2005; Penno et al., 2002).

**Group size.** Studies on storybook reading to young children in the classroom setting have varied by group size, with results suggesting significant gains in vocabulary in one-on-one settings (Eller, Pappas, & Brown, 1988; Leung & Pikulski, 1990; Reese & Cox, 1999; Robbins & Ehri, 1994; Senechal et al., 1995), small groups (Coyne et al., 2007; Coyne et al., 2004; Justice et al., 2005) and large groups or whole classes (Brabham & Lynch-Brown, 2002; Brett et al., 1996; Elley, 1989; Penno et al., 2002). Morrow and Smith (1990) compared the effectiveness of storybook reading on children’s comprehension of story structure and traditional information in groups of varying size. Specifically, Morrow and Smith evaluated whether children’s story comprehension varied depending on whether storybooks were read in one on one, small group, or whole-class contexts. Results of the study suggested that storybook reading in small groups (of three children) had the largest
effect on children’s comprehension and understanding. In addition, one on one storybook reading was more efficient than whole-class instruction. Storybook reading in small groups or one on one, allowed for a greater opportunity to participate in discussions and to focus on meaning. In addition, in small group or one on one storybook reading, teachers used more praise and had to use less behavior management techniques to limit disruptions. It is plausible that in these contexts, children have better visibility of illustrations and the reader. However, as noted earlier, significant effects have also been found in whole-class instruction, with up to 26 children.

**Other considerations.** The previous section provided information regarding aspects of storybook reading style that are associated with enhanced vocabulary acquisition. Characteristics of learners and other study features may also affect research findings regarding the impact of storybook reading on vocabulary acquisition.

**Word features.** There are certain features or characteristics of novel words in texts that make them easier to learn (Beck et al., 2002; Karweit & Wasik, 1996). Elley (1989), for example, indicated that children learned words more readily when they occurred more than once in the story, when they were illustrated in at least one picture, when the words were important to the development of the plot, were more vivid, and when the words pertained to a concept that was familiar to the children in the study. These variables accounted for 53% of the variance in vocabulary gains (Elley, 1989, in study 1). Eller et al. (1988) supported this idea by indicating that the variability in acquisition and depth of vocabulary knowledge could be related to the frequency of exposure to the word, the significance or contribution of that word to the text, and the degree of children's interest in the word.
It is also important to consider the word class of the target vocabulary in the stories. Literature has presented the idea of a “noun-word bias” or noun dominance. The idea of early noun dominance refers to the fact that young English speaking children learn a disproportionate number of nouns before acquiring a balanced number of verbs, adjectives, and prepositions (Gentner & Boroditsky, 2001). Young English speakers use a greater variety of nouns than relational words, but they use each of their relational words more often, on average, than nouns (Gentner & Boroditsky). Despite the fact that verbs are the core of a sentence, these are harder to remember. Although the majority of studies that analyze the effects of storybook reading on vocabulary have not analyzed the class of words that children learn more readily, Elley’s (1989) findings support the noun-word bias. Results of the study indicated that children achieved the highest vocabulary gains on nouns (24%) and smaller gains on adjectives and verbs (6%). Further research on whether children’s acquisition of words through storybook reading varies by class type is warranted.

Expressive versus receptive measures. The studies previously discussed have assessed children’s vocabulary knowledge in a focused, receptive way or in an open, expressive format. From the findings, it was apparent that receptive vocabulary measures may have been more sensitive to children’s gains in novel vocabulary knowledge. Production vocabulary (assessed by expressive vocabulary measures), generally requires a deeper understanding of concepts as well as efficient word retrieval. In the studies reviewed, children were often passive participants during the readings, listening to stories and definitions. Although this may provide sufficient exposure to be able to recognize and have knowledge of a word (evaluated in receptive vocabulary measures), it may not provide sufficient information for a child to produce a definition to a novel word (Senechal, 1997).
Production vocabulary may require active participation of children during storybook reading instead of simply listening to stories (Senechal; Leung & Pikulski, 1990, Justice et al., 2005; Coyne et al., 2007). Using receptive measures of vocabulary to assess children’s gain in novel word knowledge through read-alouds may lead to more noticeable gains in vocabulary, although these gains in receptive vocabulary may not be associated with gains in expressive vocabulary.

*Learners’ vocabulary skills.* As noted earlier, recent studies have implied that children’s ability to learn vocabulary through storybook reading differs depending on their existing level of vocabulary knowledge (Justice et al., 2005). In recent teacher-child storybook reading intervention studies, Coyne et al. (2007), Penno et al. (2002), Robbins and Ehri (1999), and Senechal et al. (1995), have shown that children with higher vocabulary knowledge have made more gains in vocabulary acquisition through implicit or elaborated exposure to novel words than children with lower vocabulary skills. Researchers have theorized that children with higher vocabulary skills may have sufficient knowledge to deduce definitions of implicitly presented novel words in text due to context clues (Reese & Cox, 1999). Others, such as Senechal et al. have implied that children with higher vocabulary knowledge may have more efficient retrieval processes that facilitate the acquisition of new words. These studies, to some extent, lend support to Stanovich’s (1986) “Matthew effect,” where the children who have successfully acquired vocabulary skills will continue to develop their vocabulary efficiently, whereas children who have struggled to acquire certain vocabulary skills will not be as proficient in developing those skills (Penno et al.).
Findings from other studies present conflicting evidence. Elley (1989), Coyne, Simmons, Kame’enui, and Stoolmiller (2004), and Justice et al. (2005) have shown that children with lower initial vocabularies have gained as much or more vocabulary than children with higher initial vocabularies in short-term storybook reading interventions. These vocabulary gains have been the result of both implicit (Elley, 1989) and elaborated (Coyne et al., 2004; Justice et al.) exposures to novel vocabulary. These studies, however, have not included children with significantly poor vocabulary skills. It is possible, however, that regression effects and ceiling effects might have contributed to these findings.

Although the findings of these studies are inconsistent, it is apparent that children’s existing vocabulary knowledge affects their response to storybook reading interventions. Further research needs to be conducted to gain a better understanding of the influence of existing vocabulary knowledge on the acquisition of vocabulary skills.

**Overall findings of storybook reading as a vocabulary intervention for monolinguals.** Storybook reading, a natural, engaging, and frequent activity in many educational settings, can be of benefit in helping young children develop vocabulary knowledge. Extant studies provide information on a variety of components of the storybook reading process that are important in promoting vocabulary growth. Some contrasting findings and different methodologies challenge our ability to pinpoint which specific components, styles, or features of storybook reading provide the most benefits to children’s vocabulary acquisition. On the basis of current literature, the following can be hypothesized: (a) multiple exposures to novel words in one reading or across multiple readings can enhance children’s vocabulary learning (on average, two to four exposures seem to needed for vocabulary acquisition, but greater gains may result from additional exposures); (b)
elaborating on novel words by providing definitions, role-playing, or pointing to illustrations that depict the word accelerates word learning; (c) although teacher’s reading style may have a different impact across children, embedding simple definitions and elaborations during the storybook reading activity appears to be of benefit to most children; (d) storybook reading interventions may be most effective in small groups or in one on one interactions. These key features of effective storybook reading will be incorporated into the storybook reading for ELLs examined in the proposed study.

Not only do key features of the way storybook reading is conducted affect its impact on children, but characteristics of the child and study methodology account for variation in the impact of storybook reading. These considerations must be taken into considered in the design of any storybook reading intervention. Specifically, receptive vocabulary measures are more likely to be sensitive to gains in children’s word knowledge, although it is important to remember that increases in a child’s understanding of a word may not lead to incorporation of that word into the child’s speaking vocabulary. In terms of targeting deficits that may underlie poor reading comprehension in ELLs, receptive vocabulary measures are likely to be most appropriate. In addition, word features are likely to affect the ease with which the words are acquired. Therefore, balancing types of words across conditions or using the same target vocabulary words across conditions in any study of storybook learning is important. Finally, children’s initial vocabulary level appears to play a role in the extent to which children benefit from particular types of storybook reading, such as single or multiple exposures. Therefore, a measure of students’ initial vocabulary level is important in assessing how children respond to variations in storybook reading and may be important in understanding overall results of any storybook intervention study.
Storybook reading as an intervention for vocabulary acquisition in second language learners. The research reviewed in the previous section has provided strong evidence that storybook reading is an effective intervention for vocabulary acquisition in young children. Prior sections of the review have also established that oral vocabulary plays a critical role in reading comprehension (August et al., 2005; Lehr et al., 2004; Nagy, 1988), and that it typically takes several years for ELLs to acquire L2 oral vocabulary knowledge at a level similar to that of native speakers (Krashen & Terrell’s, 1983). Taken together, these findings suggest that early interventions to accelerate L2 vocabulary acquisition are an important need for ELLs, and storybook reading may be a promising means of addressing this need. In the short term, storybook reading interventions may improve ELLs’ oral vocabulary. In the long term, they may have an impact on reading comprehension.

Unfortunately, only a few studies have examined the benefits of storybook reading in helping ELLs acquire L2 language skills. In addition, most of these studies have implemented storybook reading with upper elementary school age children; focused on the intervention’s contribution to overall language skills; and been conducted in home rather than school settings (e.g., Appel & Vermeer, 1998; Elley, 1991; Elley & Mangubhai, 1983; Roberts, 2008; Silverman, 2007). In this section, key studies relevant to classroom storybook reading with ELLs will be summarized.

Second language storybook reading interventions. A number of studies have used storybook reading as part of a broader literacy intervention and then examined the impact of these broad literacy interventions on L2 skills. Although these studies do not focus specifically on the contribution of storybook reading, and are methodologically flawed, they are important because they provide some initial support for the premise that listening to
stories can enhance children’s second language acquisition, and also provide clues to the types of storybook reading strategies that may be most effective.

Elley (Elley, 1991, 2000; Elley & Mangubhai, 1983) has written extensively on the impact of “book floods” on second language acquisition. A book flood is a strategy in which low resource classrooms, typically in developing countries, are provided with an extensive array of high-interest illustrated storybooks to stimulate second language development (Elley, 1991). The books are readily accessible to the children in the classroom. Teachers read selected books multiple times to students. During the multiple read-alouds, teachers explain words, encourage children to predict what will happen and act out stories, and then the children complete follow-up activities (e.g., drawings about the book).

Although most evaluations of the book flood strategy have not used random assignment to control and experimental conditions, children in book flood classrooms have shown gains in listening comprehension, reading comprehension, oral language, and writing compared to children who are learning a second language through drill or formal instruction (Elley, 2000). These results lend support to the idea that high interest storybooks and exposure to storybooks through teachers read-alouds can help second language learners develop language skills in their non-dominant language.

Both Silverman (2007) and Appel and Vermeer (1998) have examined the impact of a comprehensive, multi-component approach to L2 storybook read-alouds on L2 language acquisition. Silverman’s intervention included: (a) an introduction of words through storybook reading; (b) exposure to clear, developmentally appropriate definitions and explanations of target words; (c) questions and prompts to help children think about the meaning of the target vocabulary; (d) examples of how the target vocabulary can be used in
other contexts; (e) when applicable, opportunities for children to engage in dramatic representations of target word definitions; (f) visual depictions of the target vocabulary; (g) encouragement for children to pronounce the target vocabulary; (h) encouragement for children to note the words’ spelling; (i) opportunities for children to compare and contrast target words; and (j) repetition and reinforcement of target vocabulary. She found that when these strategies were implemented three days a week, 35 to 45 minutes per day, for a 14 week period, both monolinguals and ELLs showed gains in English language skills.

Appel and Vermeer (1998) examined the use of a comprehensive, multi-component storybook reading intervention on Dutch vocabulary acquisition in non-Dutch speaking migrant children. They incorporated a variety of vocabulary and language activities, such as storybook reading, audio-taped stories, and language games into the pre-existing curriculum in the schools where the study took place. Vocabulary measures were administered at the beginning and ending of each school year to assess word knowledge in L2. Two additional instruments assessing reading skills were also administered. Results from pre-test to post-test showed that the experimental curriculum helped children acquire overall word knowledge and target vocabulary in a second language. In addition, they found that children’s initial vocabulary knowledge in L2 contributed to better L2 reading skills. These effects were maintained 3 years later. Based on their findings, Appel and Vermeer suggested that interventions of this nature should be implemented: (a) within the context of small groups, (b) include exposure to many vocabulary words; and (c) take place several days a week throughout the early elementary school years.

As a group, the previously mentioned studies (Appel & Vermeer, 1998; Elley, 1991, 2000; Elley & Mangubhai, 1983; Silverman, 2007) provide some support for the idea that
exposing children to storybooks in L2, through simple physical availability or read-alouds, may help children acquire general vocabulary in L2 or target vocabulary in L2. However, the studies failed to use strong experimental designs and did not separate out storybook reading from other literacy strategies.

There is one well-designed study that did examine storybook reading’s impact on L2 vocabulary acquisition in ELLs (Collins, 2004). Collins examined two methods of exposing preschool Portuguese speaking students to English vocabulary words during storybook reading. Several aspects of her methodology will be incorporated into the proposed study; therefore, this study will be described in depth.

Collins’ (2004) study included 70 Portuguese speaking preschool students (4 and 5-yr-olds) who were English language learners. Participants were matched according to age, gender and initial receptive language in English and assigned to one of three groups: a group where target vocabulary words were elaborated upon during storybook reading (n=36), a group where target vocabulary words were presented implicitly (n=34), and a no-story control group (n=10). Within the vocabulary treatment groups, children were also exposed to two different storybook discussion styles: (a) didactic labeling, a low-demand cognitive discussion that required labeling pictures, naming objects, and recalling basic facts from the story, and (b) performance-oriented discussion, a high-demand discussion that required the student to draw inferences from the text, analyze information, and integrate text and illustrations to arrive at conclusions not explicitly stated in the text.

Students in the treatment conditions heard a total of eight commercially available storybooks. Each of these books was read to the students three times each during a three week period. Five to nine rare target vocabulary words were identified or inserted into each
storybook twice, thus students were exposed to each target vocabulary word six times throughout the study. Students were exposed to a total of 53 target vocabulary words across the books. Children in the elaborated vocabulary presentation group were provided with rich explanations of target vocabulary words during the reading. Rich explanations of target vocabulary consisted of: (a) pointing to illustrations, (b) providing a definition, (c) using a synonym (when applicable), (d) using a gesture (when applicable), and (e) providing an example of the use of the target vocabulary word in a different sentence relative to the children’s life. Children in the implicit vocabulary presentation group also heard the storybooks, but were not exposed to rich explanations of the target vocabulary. Children in the control group did not listen to the storybook readings. Children in both vocabulary treatment conditions received both styles of storybook discussion (didactic labeling and performance oriented).

Throughout the intervention, students were administered a researcher-created receptive measure of target vocabulary after the last reading of each storybook. These repeated measures allowed for examination of children’s acquired target vocabulary knowledge as each the reading cycle for each storybook was completed. At the same time, students were also administered a researcher-created expressive measure of reading comprehension that assessed the student’s implicit and explicit comprehension of six storybooks.

Findings of the study demonstrated that ELL students acquired target vocabulary implicitly and through elaborated exposure of vocabulary during storybook reading. Children who were exposed to rich elaborations of the target vocabulary gained significantly more vocabulary than children who heard the stories without elaborations. Similarly,
children who learned vocabulary words implicitly learned significantly more target vocabulary than students who were not involved in storybook read-alouds. Students who were exposed to elaborated target vocabulary learned 50% of the target vocabulary, whereas children who were not exposed to elaborations during storybook reading acquired 33% of the target vocabulary words.

Collins (2004) also examined predictors of children’s target vocabulary acquisition. Elaborations of target vocabulary, initial L2 receptive knowledge, initial L2 expressive knowledge, and the frequency of storybook reading at home made significant independent contributions to student’s target vocabulary acquisition. Initial receptive vocabulary knowledge in L1 did not make a significant contribution. Although initial L2 language skills affected L2 vocabulary acquisition, students at all levels of L2 showed gains in vocabulary from the intervention.

Findings of the study also supported a noun bias in the type of words that students learned. Students in the treatment condition where elaborations were provided learned significantly more nouns than verbs or adjectives. Students in the non-elaborated vocabulary intervention group learned significantly more nouns than adjectives and significantly more verbs than adjectives, but not significantly more nouns than verbs. Findings also suggested that the type of discussion (didactic labeling or performance oriented) affected children’s comprehension. Children who engaged in high-demand, performance oriented discussion of the book demonstrated an understanding of implicit and explicit concepts of the storybooks, as opposed to children who engaged in low-demand, didactic labeling discussions, who demonstrated less comprehension of implicit concepts.
Collins’ (2004) study is an important contribution to the storybook reading research literature for second language learners. Her findings suggest that children who listen to storybooks in L2 multiple times acquire L2 vocabulary implicitly. However, children acquire even more target vocabulary when words are presented with rich elaborations. Both children with high and low initial general vocabulary knowledge in L2 benefited from listening to stories, thus it is not crucial for students to have a certain level of L2 language prior to being able to benefit from storybook reading as a vocabulary intervention. Collins’ findings suggest that storybook reading’s benefits for second language learners are similar to those found for monolinguals.

**Bilingual storybook reading interventions.** The studies reviewed above suggest that storybook reading may be an effective intervention for L2 vocabulary acquisition for ELLs. However, the significant effect of L2 vocabulary skills on vocabulary acquisition found by Collins (2004) suggests that the ELLs most in need of L2 vocabulary skills are also the ones who are less likely to benefit from the intervention. Students’ poor comprehension of L2 may result in difficulty comprehending the storyline, or limited L2 vocabulary knowledge may make it more difficult for ELLs to infer and learn the meaning of the target vocabulary words. If so, reading the story first in L1 might aid in ELLs’ acquisition of L2 vocabulary.

The proposition that bilingual storybook reading may offer a unique benefit to second language learners is consistent with one of the most prominent theories of promoting second language learning and bilingualism. Cummins (1984) has proposed that when children are learning a second language, instruction in their native language can help them develop a set of skills and implicit metalinguistic knowledge that can be drawn upon when learning or using L2. Although L1 and L2 may have distinct features at a “surface” level, there is an
underlying cognitive/academic proficiency that exists across languages. This shared set of skills, referred to as “Common Underlying Language Proficiency (CULP)” can be enhanced by learning in either L1 or L2. Given that ELLs may have concepts and vocabulary in L1 that they do not have in L2, providing a means to promote transfer may accelerate learning.

In keeping with Cummins’ (1984) theory, Roberts (2008) has suggested several reasons why incorporating a bilingual strategy of pre-reading in L1 prior to exposure to storybook reading in L2 may contribute to children’s development of L2 vocabulary and overall language skills. First, pre-reading in L1 may allow children to take advantage of their greater ability to process and obtain meaning from the structures (lexical, syntactic, semantic, and phonological) of their native language. These meanings may then facilitate children’s ability to associate and link new information with previous knowledge. Second, exposure to the text in L1 may help in children’s understanding of the text and thus, facilitate the use of contextual support when learning vocabulary in L2. Third, pre-reading in L1 provides opportunities to expand children’s L1 and increased background knowledge may help in concept learning regardless of whether the concepts are presented in L1 or L2.

Given that there are a number of reasons to predict that a bilingual storybook reading strategy might be beneficial for ELLs, it is surprising that there have been very few studies examining the impact of bilingual storybook reading on children’s second language and vocabulary acquisition. In these final sections of the literature review, the only two studies that have directly examined bilingual storybook reading and its impact on vocabulary acquisition are summarized.

Only one of the two studies located examined bilingual storybook reading exclusively in the classroom setting. Ulanoff and Pucci (1999) compared the gains made in second
language vocabulary with three different approaches to a single reading of one storybook: (a) concurrent translation in L1, (b) preview-review in L1, and (c) English-only read-alouds. In the concurrent translation approach, students were exposed to the storybook in both L1 and L2, used interchangeably or concurrently. Thus, during the read-aloud, the reader used both English and Spanish interchangeably. The preview-review condition consisted of: (a) previewing material in L1, providing a synopsis of the content and elaborating on difficult vocabulary in Spanish in order to build background knowledge in children’s dominant language; (b) storybook reading in L2, and then (c) reviewing the lesson in L1 in order to expand and reinforce what had been taught in L2. The preview-review used both languages separately and, in theory, provided equal time for the use of each language. In the English-only condition, the storybooks were read in English with no elaboration of words or explanation of the story.

The single storybook used in this study had predictable text that facilitated the use of context clues and had repetitions and illustrations of the 20 selected target vocabulary words. Target vocabulary knowledge was assessed at pre-test, post-test and at a one-week delayed post-test. The target vocabulary measure consisted of a 20 item, multiple-choice, receptive measure.

Findings indicated that the preview-review in L1 group made more immediate vocabulary gains and maintained more vocabulary knowledge one week later than children in either the concurrent translation or the English-only groups (who did not differ from one another). Students in the preview-review in L1 group made gains of 57% in vocabulary knowledge from pretest to posttest, compared to mean gains of 12% in the concurrent translation group and 19% for the English only group.
Ulanoff and Pucci (1999) suggested that large gains in vocabulary of students in the preview-review group were due to the fact this approach built background knowledge and provided scaffolding in student’s native language. Despite only one reading of the text, the preview-review method provided repeated exposure to target vocabulary and appeared to provide enough context to allow students to activate existing schemata and aid in the acquisition of new words in L2. Ulanoff and Pucci speculated that the concurrent-translation approach may have led students to tuning out L2 given that they knew that a translation in L1 would also be provided. Tuning out the words in L2 would explain why despite students being exposed to target vocabulary for more time than the English only group, the concurrent translation group made somewhat smaller gains in vocabulary acquisition.

Although the study provides very useful information, it has limitations. First, the study included a small sample size in certain treatment conditions. With a larger sample, it is possible that greater effects may have been found across groups. In addition, students’ initial vocabulary in L1 and L2 was not assessed nor controlled. Previous studies have indicated that student’s initial L2 vocabulary is related to their target vocabulary acquisition. Finally, randomization was done by classroom rather than student and there appeared to be initial differences by classroom in L2 vocabulary knowledge that approached statistical significance (p < .15).

The study provides some initial support for the use of a bilingual approach to storybook reading as a means of vocabulary acquisition in children’s non-dominant language. Exposure to text in L2 with additional support in L1 led to benefits in vocabulary acquisition in L2, but only when there was no direct, concurrent translation. Concurrent translation in storybook reading, although a reasonable idea, may not be an effective strategy. When
children are exposed to a lesson in L1 and L2 interchangeably, learning of L2 may be hindered because of a lack of incentive to pay attention to L2 (Ulanoff & Pucci, 1999).

A second study of storybook reading for ELLs using a bilingual approach was completed by Roberts (2008). However, in this study, parents were asked to read storybooks in either L1 or L2, prior to teachers reading storybooks in L2 at school. The participants were 33 preschoolers from low income families whose native language was Hmong (20 students) or Spanish (13 students). The vocabulary intervention consisted of 12 weeks of storybook reading, divided into two sessions of six weeks each. One group was exposed to home storybook reading in L1 during the first six week session, whereas the second group was exposed to home storybook reading in L2. During the second six week session, children switched treatment language and were exposed to home storybook reading in the alternate language (e.g., children who heard books in L1 during the first session, heard books in L2 during the second session and vice versa). Both of these groups received classroom storybook reading experiences in English after exposure to the books at home. A total of 12 books were read to children, six during the first session and six during the second session (one book per week). Target vocabulary words during the second six-week session were more difficult than those in the first session (indexed by word-frequency norms). Children were randomly assigned to one of the two groups.

Parents received training on home storybook reading. During training, it was emphasized that that storybook reading should consist of: enjoyable moments; close proximity between parent and child during read-alouds; pointing to print; multiple readings of storybook; and encouraging children to talk (naming, labeling, asking questions, responding to child, elaborating and extending). If parents did not know sufficient L2 to read
the storybook in L2 (if the treatment condition warranted), parents were instructed to look at
the book, point to pictures, and tell children the story without necessarily reading it.

Classroom storybook reading experiences in English took place in groups of 10 or 11
students, and were delivered twice a week, for 20 minutes each, after children were exposed
to a week of home read-alouds of the same storybook in either L1 or L2. Instruction on each
book included interactive storybook reading and explicit instruction in target vocabulary by
using elaborations and picture cards and printed words. The readers presented the target
terms and elaborated on these, read the storybook, pointed to text, responded to
questions and included follow-up activities such as acting out, discussion, and pretend
reading.

The outcomes of the L1 and L2 home readings differed depending on which six week
session was considered. For the first six week session, the students who had been read the
book in L1 at home outperformed the students who had been reading the book in L2 at home.
In the second six week session, the two conditions did not differ. All students improved their
L2 vocabulary knowledge from pre- to post-test in both conditions.

Roberts (2008) speculated that several factors may have contributed to the finding
that there was no advantage to pre-reading in L1 during the second six-week session. First,
children may have developed a more effective strategy to learn L2 vocabulary during
classroom storybook reading and vocabulary instruction. A second speculation was that
children’s growing general vocabulary in L2 throughout the course of the study may have
helped children learn storybook vocabulary more easily in the second session due to a better
understanding of context. A third speculation was that higher rate of family participation
may have led to more extensive home support during the second six-week session.
Although the advantage of primary-language storybook reading was only visible in the first six-week session, Roberts’ (2008) findings lend support to the idea that pre-reading in their primary language helped children develop vocabulary and concepts in L1 which were then available in the context of classroom instruction in L2, aiding in the acquisition of English vocabulary. Roberts also found that English oral proficiency and general English vocabulary were significantly related to the acquisition of storybook target vocabulary, but initial knowledge of storybook target vocabulary was more strongly correlated to children’s final storybook target vocabulary acquisition. However, it is important to note that children with varying levels of initial L2 vocabulary successfully acquired new L2 vocabulary with the intervention.

The Roberts (2008) study had a number of limitations. First, despite parent trainings on how to implement the home storybook reading intervention, there was no control of the characteristics of the caregiver-child storybook reading experience or the frequency of these. Parents reported an average of three to five readings of the storybooks each week, yet there was no control over frequency of home storybook exposure. Second, it is not clear how parents who were not fluent in L2 read to students in L2. Finally, the use of repeated tests may have resulted in improvements in vocabulary over time due to testing effects.

Summary of findings concerning storybook reading as a vocabulary intervention for second language learners. Overall, research on storybook reading as a strategy to help monolingual students acquire vocabulary supports the effectiveness of this approach. The research on storybook reading as a strategy to help second language learners acquire new vocabulary is less conclusive. Extant research in this domain has been limited, often methodologically weak, and has failed to look at specific variables of interest in second
language learning acquisition, such as initial vocabulary knowledge and the effect of incorporating bilingual strategies in storybook reading vocabulary interventions.

However, several tentative conclusions can be drawn from the compilation of studies of storybook reading vocabulary interventions for both monolingual students and second language learners: (a) studies have demonstrated that both monolinguals and ELL students can learn new vocabulary through storybook reading; (b) multiple exposures of target vocabulary and repeated readings lead to more vocabulary acquisition than a single exposure to target vocabulary or single readings of texts; (c) elaborations or rich explanations of target vocabulary facilitate vocabulary acquisition; (d) providing elaborations on vocabulary or content before, during, or after storybook reading has proven effective; and (e) students’ initial vocabulary level is related to their response to storybook reading interventions, yet a better understanding of how initial vocabulary level contributes to children’s vocabulary acquisition as a response to storybook reading is warranted. In ELL students, storybook reading vocabulary interventions have often failed to examine whether initial vocabulary in L1 and L2 affects new word learning. One study that examined this domain found that students’ initial vocabulary in L2 contributed to their vocabulary acquisition in L2, whereas initial vocabulary in L1 did not (Collins, 2004).

Further examination of the contribution of repeated readings and elaborations of target vocabulary embedded within the storybooks on ELL students’ vocabulary acquisition is needed in order to build a strong case for the use of these strategies within a storybook reading intervention for second language learners. In addition, the role of initial receptive vocabulary in L1 and L2 needs to be further studied in order to determine whether a relationship between vocabulary level and vocabulary acquisition exists in order to gain more
information on whether some students are more likely to benefit from this intervention than others. Although bilingual strategies where discussion or readings in L1 and readings in L2 have been incorporated into storybook reading interventions, the research base supporting the use of bilingual strategies is small and methodologically flawed. Given the strong theoretical basis for use of bilingual storybook reading strategies, more research examining this approach is merited. The proposed study will address these needs. It will examine monolingual and bilingual storybook reading and their impact on vocabulary acquisition in Spanish speaking ELLs, when presented with elaborated or implicit definitions. The next chapter describes the aims of the study in more depth, and states study hypotheses.
CHAPTER 3

Research Aims

Statement of the Problem

With the passage of the No Child Left Behind Act of 2001, much effort has been directed at assuring that all children are proficient in reading by the time large scale assessments of reading begin, typically in the third grade. In the United States, there is a large gap between Anglo and Hispanic children’s reading comprehension performance on national assessments (Carlo et al., 2004; National Clearinghouse for English Language Acquisition, 2011). One of the main reasons for poor reading comprehension in Hispanic children is limited vocabulary (Carlo et al.). ELL students know fewer English vocabulary words than monolingual English speakers (August et al., 2005). Not surprisingly, lack of vocabulary knowledge impedes comprehension of texts, and failing to understand texts reduces the likelihood of learning new vocabulary through reading (Stanovich, 1986). Aiding second language learners’ acquisition of English vocabulary is one strategy that offers promise for addressing the achievement gap in reading, as well as preparing ELL students to benefit from instruction in English in all subject areas.

Early intervention can facilitate ELL children’s ability to gain a larger breadth and depth of vocabulary in L2 and develop some proficiency in L2 before facing more complex and demanding literacy-related tasks during the school-age years. Focusing on young second language learners’ development of vocabulary in L2 can decrease the gap between second language learners’ and monolinguals’ vocabulary knowledge before reading instruction begins and thus, help ELL children start their educational careers with vocabulary knowledge at a level more comparable to that of native English speakers.
Storybook reading is a natural, enjoyable activity that has been proven to be beneficial to children’s language and literacy skills. Reading aloud to children is an activity that is common among some parents and teachers (Beck et al., 2002). Listening to storybooks provides children with opportunities to develop positive experiences with books, enjoy reading, and observe and engage in book-related behaviors (Beck et al., 2002). Storybook reading has also been associated with language development, listening comprehension, print skills, and vocabulary (Brabham & Lynch-Brown, 2002; Feitelson, Goldstein, Iraqi, & Shane, 1993; Morrow, O’Conner & Smith, 1990; Reese & Cox, 1999).

A number of studies have examined the effect of storybook reading as a vocabulary intervention in monolinguals. These studies have demonstrated that monolingual children can acquire word knowledge through repeated exposure to novel words when they are read in storybooks (Collins, 2004; Robbins & Ehri, 1994; Ulanoff & Pucci, 1999) and that the acquisition of word knowledge in storybook reading is accelerated when novel words are elaborated upon through the provision of definitions, illustrations, and gestures during storybook reading (Appel & Vermeer, 1998; Brabham & Lynch-Brown, 2002; Brett et al., 1996; Collins, 2004; Coyne et al., 2007; Elley, 1989; Elley & Mangubhai, 1983; Justice et al., 2005; & Penno et al., 2002). Some studies have also found that children’s initial vocabulary may contribute to children’s vocabulary acquisition (Collins, 2004; Coyne et al., 2007; Penno et al., 2002; Robbins and Ehri, 1994; Senechal et al., 1995).

Despite a growing interest in second language learners’ vocabulary development, there are limited studies in the use of storybook reading as a vocabulary intervention for this population. The limited studies that do exist suggest that the same variables that contribute to monolinguals’ word learning through storybook reading (Brabham & Lynch-Brown, 2002;
Brett et al., 1996; Elley, 1989; Justice et al., 2005; Karweit & Wasik, 1996; Mautte, 1990; Morrow, O’Conner & Smith, 1990; Penno et al., 2002; Robbins & Ehri, 1994; Temple & MaKinster, 2005) benefit second language learners as well (Appel & Vermeer, 1998; Collins, 2004; Elley, 1991; Elley & Mangubhai, 1983; Roberts, 2008; Silverman, 2007; Ulanoff & Pucci, 1999). In addition, extant research has not thoroughly examined the benefits of using children’s dominant language in storybook reading as a means to aid children’s acquisition of word knowledge. Two published studies (Roberts, 2008; Ulanoff & Pucci, 1999) were found that examined particular comprehensive bilingual strategies of reviewing content and vocabulary in children’s native language before and after exposure to storybook reading in children’s second language or pre-reading storybooks in children’s native language. The findings of these studies suggest that children who are English language learners have an increase in word learning when an appropriate bilingual instructional method is put in place (Roberts, 2008; Ulanoff & Pucci, 1999).

The present study sought to further extend our current knowledge of storybook reading and its role in vocabulary acquisition in native Spanish speakers who are English language learners. Building on Collins’ (2004) study and incorporating several elements of that study, it examined the benefits of incorporating children’s native language into a vocabulary storybook reading intervention. English language learners were exposed to novel words through repeated storybook reading. Students were exposed to two storybook reading interventions: (a) English-only and (b) Bilingual. In the English-only storybook reading treatment condition, students received repeated exposure to novel words in English-only. In the Bilingual storybook reading treatment condition, students heard the story in their native language prior to exposure to the text in English. One group of students first received
repeated exposure to novel words in English-only and then was exposed to the Bilingual intervention, whereas the other group of students was exposed to the Bilingual treatment condition first and then exposed to the English-only intervention. Half of the target vocabulary words in each condition were elaborated upon by the story reader, half were only presented in the context of the story.

The purpose of this study was three-fold: (a) to examine whether incorporating a simple bilingual strategy, a pre-reading component in L1 prior to reading the story in L2, facilitated children’s acquisition of new vocabulary; (b) to gather further information on the benefits of embedding elaborations of target vocabulary within storybook reading; and (c) to examine if there were any interaction effects between those two conditions. Additional analyses examined whether other variables, such as initial general receptive vocabulary in L1, L2 and bilingual, contributed to ELL students’ word acquisition in L2.

The present study is important because of its practical implications. If repeated storybook reading with elaboration of target vocabulary speeds children’s vocabulary acquisition, it suggests a simple intervention that general education teachers can implement in the classroom to improve ELL’s vocabulary. If Spanish prereading with elaboration increases students’ vocabulary acquisition, then it suggests an easy intervention that non-English speaking parents or paraprofessionals can implement to assist young children in vocabulary acquisition. If initial receptive vocabulary in Spanish, English, or bilingual is related to children’s acquisition of vocabulary, then it suggests which children will benefit most from the intervention.

The following research questions and hypotheses were examined.
Research Questions and Hypotheses

**Hypothesis 1: Compared to English-only (EO) storybook reading, Spanish prereading (SP; Bilingual storybook reading) will improve students’ acquisition of English target vocabulary.** Cognitive and literacy skills established in children’s dominant language (L1) will transfer across languages (Cummins, 1981). Exposure to information that builds background knowledge and scaffolding in children’s native language can provide a conceptual knowledge and a framework that can aid in the acquisition of new words in a non-dominant language (Cummins, 1979; Roberts, 2008; Ulanoff & Pucci, 1997). Exposing children to explanations and multiple exposures to target vocabulary and storybook read-alouds in L1, prior to exposure to these in L2, creates opportunities for children to understand the concepts presented in the text in their native language. The readings in English, on the other hand, create repeated opportunities to further comprehend the concepts as well as opportunities to attach a new label in L2 to already existing concepts (Cummins, 1979). A pre-reading in L1 approach to storybook reading may help children understand enough context to activate existing schemata and aid in the acquisition of new words.

**Hypothesis 2: Regardless of Spanish prereading (Bilingual storybook reading), compared to implicit exposure of target vocabulary, elaborated explanations of target vocabulary in English will improve students’ acquisition of English target vocabulary.** Monolinguals or second language learners can acquire new vocabulary through simple, implicit exposure to novel words during adult-child storybook reading (Collins, 2004; Robbins & Ehri, 1994; Ulanoff & Pucci, 1999). However, studies have shown that when adult readers elaborate on vocabulary words by presenting simple definitions or synonyms; using the word in a sentence; modeling, gestures, or role-play; or pointing to an illustration in
the book that depicts the target vocabulary (Collins; Elley, 1989; Senechal, Thomas, & Monker, 1995), children’s ability to gain an understanding of vocabulary words improves (Appel & Vermeer, 1998; Brabham & Lynch-Brown, 2002; Brett et al., 1996; Collins, 2004; Coyne et al., 2007; Elley, 1989; Elley & Mangubhai, 1983; Justice et al., 2005; & Penno et al., 2002).

**Question 1:** Will Spanish prereading (Bilingual storybook reading) interact with the type of vocabulary exposure (elaborated or implicit) such that elaboration and Spanish prereading result in greater acquisition of target vocabulary than either condition alone? Although there is sufficient information that supports the benefits of elaborating on vocabulary in order to improve vocabulary acquisition, there is no concrete, empirical evidence that provides information on the effects of a simple pre-reading intervention in L1 as a means to improve second language vocabulary acquisition. Given the limited information, it is impossible to predict whether there is an interaction between the variables and whether these have an influence on the English vocabulary acquisition of second language learners.
CHAPTER 4  

Method

Participants

A total of 29 kindergarten students participated in the present study. The students were recruited from two sites, four classrooms in a school (n = 26) and one afterschool program (n = 3). Requirements for participation in the study included: (a) placement in a general education kindergarten classroom, (b) identification by the school district or afterschool program staff as children for whom English is a second language, (c) affirmation from parents, afterschool program staff, or school records indicating Spanish is the child’s native language, (d) nomination by the classroom teacher or afterschool program staff as a student who would benefit from a storybook reading intervention, (e) parental consent for student participation, and (f) a standard score of 70 or above on a measure of receptive vocabulary presented in a bilingual format. Table 1 provides the demographic characteristics of the sample.
Table 1.

Demographic Characteristics of the Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>N (%)</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
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<tr>
<td>Gender</td>
<td></td>
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<tr>
<td>Male</td>
<td>18 (62.07%)</td>
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<tr>
<td>Female</td>
<td>11 (37.93%)</td>
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<tr>
<td>Afterschool program</td>
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<td></td>
<td></td>
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<td>Group assigned to treatment combination</td>
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<td></td>
<td></td>
</tr>
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<td></td>
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<tr>
<td>4</td>
<td>7 (24.14%)</td>
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<td></td>
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<tr>
<td>Age (Months)</td>
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<td>Home Reading Questionnaire</td>
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<td>ROWPVT-SBE Spanish (raw score)</td>
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<td>ROWPVT-SBE Bilingual</td>
<td>99.76</td>
<td>10.23</td>
<td>71-120</td>
<td></td>
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<td>PPVT-4 English</td>
<td>74.14</td>
<td>10.16</td>
<td>54-92</td>
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<tr>
<td>STVT-C Pretest</td>
<td>5.41</td>
<td>2.29</td>
<td>0-10</td>
<td></td>
</tr>
</tbody>
</table>

Note. ROWPVT-SBE = Receptive One-Word Picture Vocabulary Test- Spanish Bilingual Edition; PPVT-4 = Peabody Picture Vocabulary Test- Fourth Edition; STVT-C = Storybook Target Vocabulary Test- Composite

Materials

Storybooks. Two commercially published storybooks that were used in Collins’ (2004) study of storybook reading were used in the present study, “Henry’s Happy Birthday” (Keller, 1990) and “Baby Bird’s First Nest” (Asch, 1999). Collins’ criteria for storybook included that the storybooks: (a) were age-appropriate; (b) were similar to storybooks typically read to children in home, school, or various settings; (c) were judged to have a low likelihood of having been seen by the children (e.g., were out of print or not a best seller); and (d) had not been read to the children in the classrooms that participated in the study. For
the present study, Collins’ last criterion was evaluated by asking teachers or afterschool program staff if children had been exposed to either book in either setting and by asking children whether they recognized each book prior to the initial reading.

“Henry’s Happy Birthday” (Keller, 1990) and “Baby Bird’s First Nest” (Asch, 1999) were originally published in English. A Spanish translation was not commercially available for either book; thus, a native Spanish speaker translated each storybook. A second native Spanish speaker reviewed each translation for accuracy.

To help assure that all readers followed a standard procedure, the researcher incorporated into both the Spanish and English texts indications of the appropriate elaborations to be presented to students during storybook reading. Definitions, synonyms, an example of an alternative sentence that incorporated the target vocabulary, a picture or description of gestures, as well as a reminder to point to the illustration were included in order to create “manuals” for each storybook.

**Target vocabulary words.** Ten target vocabulary words appeared in each storybook (Appendix A, Table A1). The target vocabulary words used in the study included some of the same target vocabulary words used in the Collins (2004) study, as well as new target vocabulary words that were either selected or incorporated into the storybook by the researcher to increase the number of target words available per storybook. Collins selected the target words based on the following criteria: (a) words were incorporated or able to be incorporated at least twice within the storyline, (b) depicted within the illustrations upon their occurrence in the storybook, and (c) rare, unfamiliar, and low frequency words in common vernaculars. The researcher used the same criteria to select the additional target words.
In addition to Collins’ (2004) target vocabulary word selection criteria, for the present study, three English as a Second Language (ESL) professionals rated how likely the selected target vocabulary was to be known by kindergarten ELL students whose native language was Spanish. Only words that the three raters classified as “very likely to be unknown” or “unlikely to be known” were selected as target vocabulary.

The ten vocabulary words per book were divided into two word sets, with one word set elaborated upon during storybook reading and one word set implicitly presented (not elaborated). Which word set served as the elaborated versus the implicit word set was counterbalanced across small reading groups. The procedures for implicit and elaborated presentation are described in the Procedures section.

**Measures**

Assessment measures included receptive vocabulary pretests in English and Spanish, an item regarding home literacy practices (*Home Reading Questionnaire*), and two outcome measures assessing the specific vocabulary targeted in the storybook intervention. The two outcome measures were later combined to form a total score that was the primary outcome measure for the study, but are described separately here. The following subsections describe the measures that were used in the study.

**Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4).** The *Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4; Dunn & Dunn, 2007)* provides a measure of an individual’s receptive vocabulary for spoken words in English. The *PPVT-4* measure contains 228 items. Each of these items consists of four colored pictures depicting objects, actions, and concepts.
The *PPVT-4* administration usually takes about 10 to 15 minutes. The administration of the *PPVT-4* consists of the examiner stating a vocabulary word and the examinee responding by selecting the specific picture that depicts the target vocabulary word stated by the examiner. The items increase in difficulty. The *PPVT-4* measure is individually administered and designed for individuals between the ages of 2 years, 6 months and 90 years or older.

The *PPVT-4’s* (Dunn & Dunn, 2007) psychometric properties were obtained from the *PPVT-4* Publication Summary Form (AGS Assessments- Pearson Assessments, 2006). The normative sample included 3,540 individuals that resembled the English proficient population of the United States (U.S.) and closely matched the demographic characteristics of the 2004 Census data.

Reliability studies of the *PPVT-4* included an evaluation of the internal consistency reliability as well as alternate-form reliability and test-retest reliability. The internal consistency reliability assessed using split-half reliability coefficients ranged from .94 to .95. The alternate-form reliability was .89 and the test-retest reliability was .93.

The validity studies of the *PPVT-4* included an evaluation of content validity as well as construct validity. Dunn and Dunn (2007) addressed the issues of content validity during the development of the measure by selecting stimulus words based on a review of over 12 published reference works and choosing words that represented 20 different content areas and different parts of speech. The convergent validity of the *PPVT-4* was demonstrated by moderate to high correlations (ranging from .41 to .84) between the *PPVT-4* and the *Expressive Vocabulary Test, Second Edition (EVT-2)*; *Comprehensive Assessment of Spoken Language (CASL)*; *Clinical Evaluation of Language Fundamentals, Third Edition (CELF-4)*;
Group Reading Assessment and Diagnostic Evaluation (GRADE), and the Peabody Picture Vocabulary Test, Third Edition (PPVT-III). Overall, the PPVT-4 has acceptable psychometric properties. The PPVT-4 has a uniform content, is stable over time, and can be used consistently by different examiners. In addition the PPVT-4’s test items are a good measure of receptive vocabulary and have a moderate to high correlation with other measures assessing similar domains. It is important to note that the items on the PPVT-4 were also evaluated for fairness and bias according to sex, race/ethnicity, socioeconomic status, and geographic region by the test authors.

Receptive One Word Picture Vocabulary Test- Spanish Bilingual Edition (ROWPVT-SBE). The ROWPVT-SBE (Brownell, 2001) provides a measure of an individual’s bilingual receptive vocabulary. The ROWPVT-SBE measure assesses individuals’ combined English-Spanish receptive vocabulary by giving credit to responses in either English or Spanish.

The ROWPVT-SBE is an individually administered measure that usually takes about 15-20 minutes to administer. The ROWPVT-SBE was designed for children between the ages of 4 years- 0 months and 12 years-11 months, and contains a set of 170 items in which four colored pictures depicting possible vocabulary answers are presented. In this measure, test-takers are asked to point to colored illustrations of specific objects, actions, and concepts that depict vocabulary words of increasing difficulty. Given the bilingual nature of this measure, items are presented in children’s dominant language, as determined by a brief questionnaire at the beginning of the test. If a child responds incorrectly to an item, the item is presented again in the non-dominant language. Children receive full credit for correct responses in either language in order to not underestimate overall language skills.
The \textit{ROWPVT-SBE}'s psychometric properties were obtained from the test manual (Brownell, 2001) and the \textit{Sixteenth Mental Measurements Yearbook} (Krach & Medina Diaz, 2005). The normative sample for the test included 1,050 bilingual children from 17 states in the U.S. The sample was described as a close approximation of the demographics in the U.S., despite an overrepresentation of Mexican-American children and children living in the western part of the U.S.

Reliability studies included an evaluation of the internal consistency of the measure as well as its temporal stability. The internal consistency reliabilities, based on the correlation between scores on odd-numbered and even-numbered items ranged from .96 to .98. Test-retest reliability, assessed over approximately 20 days, ranged from .80 to .92.

Brownell (2001) addressed content, criterion-related, and construct validity in the manual. Content validity was addressed by selecting items considered to be unbiased during the development of the measure. Criterion-related validity was evaluated using concurrent validity showing low to moderate correlations between the \textit{ROWPVT-SBE} and the \textit{Expressive One Word Picture Vocabulary Test- Spanish Bilingual Edition} (.43 correlation; \textit{EOWPVT-SBE}) and with the \textit{Stanford Achievement Test, Ninth Edition} (.38 correlation; \textit{SAT-9}). The construct validity of the \textit{ROWPVT-SBE} was investigated with several other factors (such as chronological age, \textit{SAT-9} reading and language scores, and the scores of low-cognitive ability examinees) ranged from .44 to .70.

In this study, given students’ native language, items on the \textit{ROWPVT-SBE} were first presented in Spanish and subsequently presented in English, if needed. Children’s Spanish Raw Score was used as a measure of children’s initial general Spanish receptive vocabulary
knowledge. Children’s ROWPVT-SBE standard score was used as a measure of students’ initial general bilingual receptive vocabulary knowledge.

**Home Reading Questionnaire.** One item from Collins (2004) home literacy questionnaire was employed in the present study. This study examined the frequency of storybook reading in the home by asking parents, “In a given week, how often does someone in your home read to your child?” A Likert scale was used to obtain information on home literacy. The item was translated into Spanish by a native Spanish speaker and a second Spanish native speaker reviewed the Spanish translation to ensure accuracy. The item was administered through written or interview format (See Appendix B).

**Storybook Target Vocabulary Tests.** Two measures were administered to assess children’s receptive and expressive knowledge of target vocabulary in English. These two measures were then combined to create a composite scaled score that represented children’s overall knowledge of the target vocabulary words. Below are descriptions of the measures and the composite scaled score.

**Storybook Target Vocabulary Test- Picture (STVT-P).** A Storybook Target Vocabulary Test- Picture (STVT-P) was developed to assess children’s receptive knowledge of the target vocabulary words presented during treatment. Designed to be similar to the PPVT-4 (Dunn & Dunn, 2007), the STVT-P measure consisted of a stimulus book with a number of pages on which six black and white illustrations depicting nouns, adjectives, or verbs were presented per page. On items in which the target vocabulary word depicted a color, six colored squares were depicted per page. Of these six illustrations, one represented the target vocabulary and the five remaining illustrations depicted alternative options. The location of the illustration depicting the target vocabulary varied page by page. Written
instructions (to be read aloud) oriented the child to the task, and three practice items were included to confirm that the child had an understanding of the task. The instructions asked children to show or point at the picture that illustrated the target vocabulary in English that the researcher would state aloud (e.g., “Show me the picture that shows spectacles”). The items were scored as correct or incorrect. (See sample item in Appendix C.)

The STVT-P was piloted prior to its use in the proposed study. In the piloting of this measure, the test was administered to non-native English speaking students that had some English language proficiency and attended third and fourth grade. The accuracy of children in identifying the illustrations that depicted the target vocabulary was noted. Based on the results of the pilot study, illustrations that were confusing or that resulted in few correct responses were eliminated and changed for different illustrations. Items that resulted in a 94.70% to 100% correct response rate were incorporated in the study.

**Storybook Target Vocabulary Test- Definition (STVT-D).** A second measure was developed to assess children’s expressive vocabulary knowledge of target vocabulary words presented during treatment. The Storybook Target Vocabulary Test- Definition (STVT-D) was constructed as an expressive picture vocabulary test, designed to be similar to published expressive vocabulary tests or subtests. This test assessed children’s ability to provide a definition of the target vocabulary taught during the intervention. Children were asked to define a word (e.g., “What does ____ mean?”) and the responses were recorded verbatim. The responses could be scored zero to two points, depending on the accuracy and depth of the definition. (See sample item in Appendix D).

Given that second language learners can experience “silent periods” where they do not readily provide answers to questions in their second language (Francis et al., 2006;
Sousa, 2011), students were given credit for definitions provided in either English or Spanish. The STVT-D assessed expressive knowledge of the concept, regardless of the language in which the child provided a response.

**Storybook Target Vocabulary Test- Composite Scaled Score (STVT-C).** The scores received on the STVT-P and STVT-D were combined to form a Storybook Target Vocabulary Test-Composite scaled score (STVT-C). The scoring method used to generate the STVT-C scaled score parallels the natural learning process of second language acquisition, where children generally first develop recognition of a vocabulary concept (receptive knowledge) and then develop a verbal understanding or definition of the word (expressive knowledge) (Francis et al., 2006; Gass & Selinker, 2001; Krashen & Terrell’s, 1983; Sousa, 2011). Generally, children who are learning a second language master receptive knowledge of vocabulary in L2 before expressive knowledge of the word in L2 (Francis et al., 2006; Sousa, 2011).

The composite scaled score for each item ranged from zero to three points. Children received one point for receptive vocabulary knowledge of the word (a one-point score equivalent on the STVT-P); two points for partial expressive vocabulary knowledge of the word (a one-point score equivalent on the STVT-D, regardless of any receptive knowledge); and three points for more accurate and in-depth expressive vocabulary knowledge (a two-point score equivalent on the STVT-D, regardless of any receptive vocabulary knowledge.) STVT-C scaled scores were used as pretest and posttest measures of target vocabulary knowledge.
Procedure

Recruitment of schools/afterschool programs. After being granted approval by the Institutional Review Board (IRB), the researcher was granted approval by one school district in a primarily rural setting and one afterschool organization in an urban setting to recruit sites for the study. Administrators at both organizations helped the researcher identify specific sites with a high population of second language learners who were native Spanish speakers. The researcher then approached one school principal and one Boys and Girls Club director in person and via email in order to provide a brief summary of the study, its purpose, and the potential benefits of participating in the study. Once the principal agreed to the school’s participation, the general education kindergarten teachers were approached and asked to participate as well. All four general education teachers in the school agreed to allow eligible children to participate in the study. Likewise, once the director at the Boys and Girls Club agreed to the Club’s participation, the staff was approached and asked to participate as well. All staff agreed.

Recruitment of children. Once entry was gained at the school and Boys and Girls Club, teachers or afterschool staff nominated Spanish speaking, general education, kindergarten second language learners who would benefit from a storybook reading intervention. In the school, school records were then used to verify that the children were identified by the school district as English Language Learners. In the afterschool program, staff and parents verified that the children were identified by the school district as English Language Learners. Parental consent forms in Spanish and English were sent home with the children or were provided to the parents at the participating sites.
available in person or via phone and email to answer parents’ questions. About 70% of parents provided consent for their children to participate in the study.

Following parental consent, children’s initial receptive vocabulary was assessed on the *ROWPVT-SBE*. Children who scored below 70 did not meet the criteria to participate in the study. All children who scored above 70 on the *ROWPVT-SBE* were eligible to participate in the study.

**Storybook reader/examiner training.** Throughout the study, a total of three storybook readers/examiners, including the researcher and two undergraduate psychology students were responsible for implementing the storybook reading intervention procedures (described later in the chapter) and assessing children’s target vocabulary knowledge in English (described later in the chapter). These undergraduate psychology students were enrolled in an individual study course designed to integrate knowledge and research experience related to the present study. Two readers/examiners were assigned to each research site.

Readers/examiners were trained on the vocabulary intervention procedures, target vocabulary assessment procedures, and general vocabulary assessment procedures prior to beginning the study. The researcher held several meetings with the readers/examiners to provide a brief description of the study, demonstrate the storybooks with the “manualized” specifications, describe the procedures to be followed during the intervention implementation and during the assessment of children, and model the procedures.

Readers/examiners were asked to practice storybook reading and administering the *STVT-P, STVT-D, ROWPVT-SBE*, and *PPVT-4*. During subsequent meetings, questions regarding the implementation of the study were answered and readers/examiners
demonstrated mastery of the procedures to follow during storybook reading and during the
*STVT-P, STVT-D, ROWPVT-SBE*, and *PPVT-4* administration by doing a mock reading
session (reading one of the selected storybooks in the study) and the corresponding portion of
the *STVT-P* and *STVT-D*, as well as the general vocabulary measures. The researcher used
checklists to ensure that the readers/examiners followed the specific procedures to be
followed during storybook reading and the administration of the assessment measures (see
Appendix E). Readers/examiners were considered qualified to implement the intervention
and assess students when no errors were made during the mock trials. The researcher was
available for one-on-one meetings with any readers/examiners that made any errors during
the mock session in order to discuss and model appropriate procedures until the
readers/examiners could follow-through on the procedures without errors. The researcher
was also available through email or phone to answer any questions. Readers/examiners’
storybook reading and intervention procedures were monitored throughout the study. Further
information on treatment integrity will be discussed later in this chapter.

**Administration of pretest measures.** Prior to the beginning of the vocabulary
treatments, the parents of children were presented with a one-item questionnaire *(Home
Reading Questionnaire)* regarding children’s home storybook reading experiences and were
asked to return the completed form to their children’s teacher or the after-school program
director. Completing the item through an interview format or in person was available for
parents who had difficulty reading. The teachers, after-school program’s staff, or the
researcher collected the questionnaires.

Before the storybook reading intervention began, children participating in the study
were individually administered the *PPVT-4* and the *ROWPVT-SBE* in order to assess their
receptive vocabulary in English, Spanish, and bilingually. Children were also administered the *STVT-P* in English and a modified pretest version of the *STVT-D*. The *STVT-P* and a modified pretest version of the *STVT-D* were administered in English to assess children’s initial receptive and expressive knowledge of the target vocabulary that would be presented during the interventions.

The *STVT-D* was to be administered as a pretest, with the examiner asking the child to define each of the words to be included in the storybooks prior to exposure. However, because virtually all of the words were unknown to the children, a modified version of the *STVT-D* was presented to children during pretesting after initial testing revealed children were uncomfortable when they could not provide definitions to multiple words with the examiner. The modified version was designed to be less stressful, but still elicit children's knowledge of the target words. In the modified pretest version of the *STVT-D*, children were asked to listen to the list of target vocabulary words and state if they had previously heard the words. If a child stated that he/she had previously heard a target vocabulary word, the examiner followed-up and prompted the child to state what he/she thought the word meant. If a child provided a definition, it was scored according to the scoring criteria of the *STVT-D*.

The modified version of the *STVT-D* was administered before the *STVT-P*. A *STVT-C* scaled pretest score was generated from the *STVT-P* and the modified version of the *STVT-D* pretest scores obtained.

**Student assignment to treatment conditions.** Following administration of the pretests, participants were assigned to one of four small groups. Consistent with the crossover design used in the study, participants completed both treatment conditions of interest: English-only storybook reading and Bilingual storybook reading. Thus, the only
differences between the small groups were: (a) the time period in which they were exposed to the treatment condition (which is confounded with the storybook that the children were exposed to); (b) the sequence in which the language of the storybook reading treatments was presented (i.e., English first and Bilingual second or Bilingual first and English second); and (c) the sequence in the presentation treatment of words. The sequence of the presentation treatments helps distinguish which vocabulary word set within each book (period) was presented implicitly or elaborated (e.g., in storybook one, word set “A” was elaborated and “B” was implicit or word set “A” was implicit and word set “B” was elaborated). Each storybook had 10 target vocabulary words, of which half were elaborated on and half were presented implicitly during book readings. The elaborated and implicit word sets were counterbalanced within each treatment condition and across the four small groups. Table 2 provides a visual representation of the design study and the crossover conditions in the study. Appendix F provides a more detailed visual representation of the study’s design.
Table 2  
Study Design, Including Sequence of Language Treatment, Sequence of Presentation Treatment, Group, Period, Language, and Presentation

<table>
<thead>
<tr>
<th>Sequence of Language Treatment</th>
<th>Sequence of Presentation Treatment</th>
<th>Group</th>
<th>Period 1</th>
<th>Period 2</th>
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<td></td>
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<td>Elaborated</td>
<td>Implicit</td>
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<td>1</td>
<td>1</td>
<td>2 (n=6)</td>
<td>Word Set A</td>
<td>Word Set B</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>3 (n=7)</td>
<td>Word Set B</td>
<td>Word Set A</td>
</tr>
<tr>
<td>2</td>
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<td>2</td>
<td>4 (n=7)</td>
<td>Word Set B</td>
<td>Word Set A</td>
</tr>
</tbody>
</table>

Blues = English-only treatment condition, Reds = Bilingual treatment condition

Note. Sequence of language treatment = order in which the storybook treatment conditions were presented; Sequence of presentation treatment = distinguishes which word set, within each book, was presented implicitly or elaborated. Each book had five words that were elaborated and five words that were presented implicitly in each storybook reading. Period = time period in which the treatment condition was presented in. This is confounded with storybook [i.e., Period 1 = Storybook, “Henry’s Happy Birthday,” (Keller, 1990); Period 2 = Storybook 2, “Baby Bird’s First Nest,” (Asch, 1999)]

Children selected to participate in the study were randomly assigned either by student (afterschool care site) or by classroom (school site) to two conditions that varied in terms of which treatment was presented first: English-only storybook reading or Bilingual storybook reading. In the school site, children from two classrooms received the English-only intervention for the first book (“Henry’s Happy Birthday;” Keller, 1990) followed by the Bilingual intervention for the second book (“Baby Bird’s First Nest;” Asch, 1999). Children from two other classrooms received the Bilingual intervention for the first book, “Henry’s Happy Birthday” (Keller, 1990), followed by the English-only intervention for the second book, “Baby Bird’s First Nest,” (Asch, 1999). The order in which books were presented did not vary [i.e., regardless of which language it was presented in, the first book was always “Henry’s Happy Birthday” (Keller, 1990)].

Within each book, there were 10 target vocabulary words. All four intervention groups were exposed to target vocabulary the same number of times. In the English-only
condition, students were exposed to target vocabulary eight times in English, whereas in the Bilingual condition, students were exposed to the target vocabulary four times in Spanish, followed by immediate exposure to the target vocabulary in English four times.

Within each site, the English-only and Bilingual storybook reading interventions were implemented during the same weeks; however, the scheduling of the treatments varied by site. That is, the storybook reading interventions were implemented in March & April at the afterschool program and in April and May at the elementary school.

**Intervention procedures.** All children participating in the study were exposed to two storybook reading interventions: (a) “English-only,” where children were read a storybook in English multiple times, and (b) “Bilingual,” where children were preread a storybook in Spanish (exposed to a repeated storybook in Spanish) and then read the same storybook in English. In each condition, children were read to in small groups of three to eight in a quiet room or space.

In order to facilitate the explanation of the administration of the vocabulary interventions, the procedures to be followed are divided into two phases in the following description: (a) the English Reading Phase and (b) the Spanish Prereading Phase. While children were in the English-only treatment condition, they received the intervention procedures as described in the English Reading Phase. When children were in the Bilingual treatment condition, the children first received the intervention procedures described in the Spanish Prereading Phase and then received the intervention procedures described in the English Reading Phase (Bilingual= Spanish Reading Phase + English Reading Phase). The only difference in the English Reading phase in the two conditions was that instead of four readings of the story in English in the Bilingual condition, the children received only two
readings in English, after they had heard the story twice in Spanish (for a total of four readings).

**English reading phase.** During the English-only phase of the storybook reading for both the Bilingual and English-only treatment conditions, the researcher/reader read one book two (in EO phase of Bilingual treatment) to four (English-only storybook reading) times over a span of one (EO phase of Bilingual treatment) to two weeks (English-only) with groups of three to eight children. As the books were read to the students, the researcher elaborated on half of the selected target vocabulary words by doing some of the following: (a) pointing to the depiction of the target vocabulary word in the story-book; (b) providing a general, developmentally appropriate definition of the target vocabulary word in English, as defined by the “Merriam-Webster's Word Central” website (Merriam-Webster Incorporated, 2008) and modified for appropriateness; (c) when applicable, using the word in a different context; (d) when applicable, making a gesture of the word; and (e) when applicable, using a synonym of the word. These elaboration strategies were used with each selected word when possible. In order to prevent further elaboration, additional discussion about the words or the story was minimized. Implicit exposure to target vocabulary consisted of the researcher reading the text and target vocabulary without utilizing any of the previously mentioned elaboration strategies.

**Spanish prereading phase.** The procedures that were followed in the Spanish Prereading phase were exclusive to the Bilingual storybook reading treatment. The researcher/reader read the Spanish translation twice over a span of one week while the children were in groups of three to eight children. After exposure to each book in Spanish,
students were immediately exposed to the English-only version of the same storybook twice. That is, the sequence was: Spanish Prereading Phase + English Reading Phase).

During the storybook readings in Spanish, the reader elaborated in Spanish on each of the translated selected target vocabulary words. Readers elaborated by using some of the following strategies: (a) pointing to the depiction of the target vocabulary word in the storybook; (b) providing a general, developmentally appropriate definition of the target vocabulary word in Spanish, as defined by the “VOX Diccionario de la Lengua Española” (Vox, 2008) and modified for appropriateness; (c) when applicable, using the word in a different context; (d) when applicable, making a gesture of the word; and (e) when applicable, using a synonym of the word. After the second exposure to the book in Spanish, the children in the Bilingual treatment condition moved onto the English Reading phase of the treatment. Spanish vocabulary acquisition was not assessed. The Bilingual storybook reading vocabulary intervention consisted of both the Spanish Prereading phase followed by the English Reading phase, and was conducted for a total of two weeks.

**Post-intervention assessment.** The *Storybook Target Vocabulary Test- Picture (STVT-P)* and *Storybook Target Vocabulary Test- Definition (STVT-D)* items relevant to a particular story were administered to individual children immediately after the last reading of each of the storybooks in English. The order in which children were administered the post-tests was randomized within the small groups in order to minimize effects due to the testing order.

**Treatment integrity monitoring.** During the study, the readers’ implementation integrity of the reading sessions was monitored 25% of the time via videotaped sessions reviewed by a third-party, bilingual (English and Spanish) observer using procedural
checklists (Appendix E1 and Appendix E2). Readers followed the manual-like storybooks and implemented the storybook reading interventions with 97% accuracy.
CHAPTER 5

Results

This chapter presents the data analysis procedures and results for the hypotheses and the research question discussed in Chapter 3. As a brief review, the present study employed a two-factor design with repeated measures on both factors to assess children’s second language vocabulary acquisition during storybook reading. The first factor was Language, and contrasted storybook reading in a child’s second language only (English) with Bilingual presentation (Spanish, then English). The second factor was Presentation, and contrasted Elaborated and Implicit presentation of vocabulary words during the storybook reading. As the experiment involved a repeated measures design, all children were exposed to four treatment combinations that represented a complete crossing of the two factors to create four conditions: (a) English/Elaborated, (b) English/Implicit, (c) Bilingual/Elaborated, and (d) Bilingual/Implicit. Across participants, the order of participation in the English or Bilingual storybook reading and which words in each storybook were in the Elaborated or Implicit conditions were both counterbalanced.

Data analysis was carried out in three stages. First, descriptive statistics such as means, standard deviations, and correlations were computed to obtain general information about the variables considered in the analyses and to determine if the data obtained were appropriate for the statistical analyses planned. Second, the analyses to address the primary hypotheses were conducted. Third, post hoc analyses were performed to further examine potentially interesting patterns in the data. The procedures and results of these three stages of data analyses are described below.
Results of Descriptive Analyses

Score distributions and outliers. Basic descriptive statistics and graphic depictions of each score distribution were generated and then reviewed using the procedures outlined in Tabachnick and Fidell (2007). These procedures were repeated for the target vocabulary \textit{STVT-C} Pretest and Posttest scores; for children’s \textit{Home Reading Questionnaire}; and general vocabulary pretest scores in English (L2, \textit{PPVT-4}), Spanish (L1, \textit{ROWPVT-SBE} raw score), and Bilingual receptive vocabulary (\textit{ROWPVT-SBE} standard score). Table 3 provides a summary of the descriptive statistics. Normal quantile plots, and expected and detrended normal probability plots of each variable were also generated and examined.

Review of the descriptive statistics and graphs indicated that the distributions for \textit{Home Reading Questionnaire}, \textit{PPVT-4} standard score, \textit{ROWPVT-SBE} Spanish raw score, \textit{ROWPVT-SBE} bilingual standard score, and \textit{STVT-C} Pretest and Posttest scores displayed satisfactory approximations of the normal distribution. Outliers, defined as data points falling more than 1.5 interquartile range units from the closest value in the interquartile range for the variables (Sall, Lehman, & Creighton, 2001), were not observed.
Table 3

General Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum Score</th>
<th>Maximum Score</th>
<th>Possible Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Home Reading Questionnaire</em></td>
<td>2.47</td>
<td>1.81</td>
<td>0</td>
<td>6</td>
<td>0-2</td>
<td>0.71</td>
<td>-0.74</td>
</tr>
<tr>
<td><em>ROWPVT-SBE</em> Spanish (raw score)</td>
<td>49.79</td>
<td>8.93</td>
<td>31</td>
<td>74</td>
<td>0-150</td>
<td>0.35</td>
<td>0.75</td>
</tr>
<tr>
<td><em>ROWPVT-SBE</em> Bilingual</td>
<td>99.76</td>
<td>10.23</td>
<td>71</td>
<td>120</td>
<td>0-&gt;145</td>
<td>-0.30</td>
<td>1.36</td>
</tr>
<tr>
<td><em>PPVT-4</em> English</td>
<td>74.14</td>
<td>10.16</td>
<td>54</td>
<td>92</td>
<td>0-160</td>
<td>-0.31</td>
<td>-0.57</td>
</tr>
<tr>
<td><em>STVT-C</em> Pretest</td>
<td>5.41</td>
<td>2.29</td>
<td>0</td>
<td>10</td>
<td>0-60</td>
<td>-0.24</td>
<td>-0.10</td>
</tr>
<tr>
<td><em>STVT-C</em> Posttest</td>
<td>15.41</td>
<td>8.05</td>
<td>2</td>
<td>32</td>
<td>0-60</td>
<td>0.20</td>
<td>-0.80</td>
</tr>
</tbody>
</table>

*Note.* *ROWPVT-SBE* = Receptive One-Word Picture Vocabulary Test- Spanish Bilingual Edition; *PPVT-4* = Peabody Picture Vocabulary Test- Fourth Edition; *STVT-C* = Storybook Target Vocabulary Test- Composite

*a* No ceiling on this measure.

As previously mentioned, this study followed a two by two factorial design, where all children were exposed to four treatment conditions. This design led to four treatment combinations and therefore, four response scores on the *STVT-C* Pretest and Posttest. After evaluating the pretest and posttest target vocabulary measures (*STVT-C* Pretest and *STVT-C* Posttest) across all conditions, similar review procedures were used to evaluate students’ scores for the four treatment combinations separately. Table 4 provides the summary statistics of these partial scores.
The distributions of three of the four STVT-C Posttest vocabulary measures separated by main treatment condition (English, Bilingual, and Elaborated) and treatment combinations (English/Elaborated, Bilingual/Elaborated, and Bilingual/Implicit), displayed satisfactory approximations of the normal distribution. The distributions for the remaining STVT-C Posttest partial scores, for the Implicit treatment and the English/Implicit treatment combination, were positively skewed. However, the normal quantile plots indicated that the majority of data points stayed within the confidence interval for a normal distribution.

Further examination of the distributions demonstrated that the distribution for the English/Implicit STVT-C Posttest score had one outlier, falling 1.5 interquartile range units above the next closest value, indicating that one child gained much more vocabulary knowledge from the treatment combination than the remainder of the children. In addition, examination of the Bilingual/Implicit STVT-C Posttest distribution indicated that there were four children with extreme scores defined as outliers. Three of the four outliers represented posttest scores of zero, falling below 1.5 interquartile range units from the closest value in

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum Score</th>
<th>Maximum Score</th>
<th>Possible Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>9.38</td>
<td>6.50</td>
<td>1</td>
<td>24</td>
<td>0-30</td>
<td>0.58</td>
<td>-0.12</td>
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<tr>
<td>Bilingual</td>
<td>6.03</td>
<td>3.54</td>
<td>0</td>
<td>13</td>
<td>0-30</td>
<td>0.06</td>
<td>-0.80</td>
</tr>
<tr>
<td>Elaborated</td>
<td>10.69</td>
<td>5.97</td>
<td>1</td>
<td>20</td>
<td>0-30</td>
<td>-0.02</td>
<td>-1.30</td>
</tr>
<tr>
<td>Implicit</td>
<td>4.72</td>
<td>3.12</td>
<td>1</td>
<td>12</td>
<td>0-30</td>
<td>0.94*</td>
<td>0.36</td>
</tr>
<tr>
<td>English/Elaborated</td>
<td>6.86</td>
<td>4.55</td>
<td>1</td>
<td>15</td>
<td>0-15</td>
<td>0.15</td>
<td>-1.03</td>
</tr>
<tr>
<td>English/Implicit</td>
<td>2.52</td>
<td>2.52</td>
<td>0</td>
<td>9</td>
<td>0-15</td>
<td>1.85*</td>
<td>0.59</td>
</tr>
<tr>
<td>Bilingual/Elaborated</td>
<td>3.83</td>
<td>2.85</td>
<td>0</td>
<td>10</td>
<td>0-15</td>
<td>0.44</td>
<td>-0.78</td>
</tr>
<tr>
<td>Bilingual/Implicit</td>
<td>2.21</td>
<td>1.26</td>
<td>0</td>
<td>5</td>
<td>0-15</td>
<td>0.15</td>
<td>-0.17</td>
</tr>
</tbody>
</table>

* Statistically significant at $p< .05$. 

the interquartile range for the variable, whereas one of the outliers fell at the maximum range of obtained scores, with a score of five. Deleting these scores because of their extreme values was considered. However, Tabachnick and Fidell (2007) stated that when outliers are a part of the expected distribution for a variable, caution should be used in deleting them. These scores were included in the data set because the primary interest of the study was to examine gain in target vocabulary knowledge and including extreme data points, suggestive of vocabulary acquisition or lack thereof, was viewed as crucial to this study.

**Demographic differences.** Except for three individual participants from the afterschool program, children were assigned to treatment conditions by classroom. Classrooms were randomly assigned to one of four treatment groups (which varied in terms of the order in which the treatments were presented, not the treatment themselves). Similarly, the three participants from the afterschool program were randomly assigned to one of the four treatment groups. Given the within-subjects design used in this study, systematic differences between the treatment groups were unlikely to have an impact on the primary comparisons planned in the study. However, to explore the need for control variables in the planned analyses, one-way analyses of variance were used to test for differences by treatment group in each of the control variables (*Home Reading Questionnaire, PPVT-4* standard score, *ROWPVT-SBE* Spanish raw score, *ROWPVT-SBE* bilingual standard score, and *STVT-C* Pretest), age, and gender. A criterion alpha level of 0.10 was set for these preliminary analyses to assure that differences would be detected if they were present.

No significant mean differences between treatment groups were found. All four treatment groups were relatively similar prior to the commencement of the intervention and this suggests that any differential gains in target vocabulary knowledge observed are likely
due to the effect of the treatment combinations on vocabulary acquisition, as opposed to sample differences.

**Correlations among primary variables.** A correlation matrix of the primary variables of interest was constructed (see Table 5) in order to determine whether it was necessary to include the planned control variables in the primary analysis (i.e., *Home Reading Questionnaire*, general vocabulary pretest measures in English, Spanish, and bilingual). As is evident from the table entries, the *Home Reading Questionnaire* was weakly related to other pretest measures and did not correlate beyond chance levels with the outcome measure (*STVT-C Posttest*). Although the failure to find a significant correlation between *Home Reading Questionnaire* and the treatment outcome was inconsistent with findings reported in similar studies (Collins, 2004, Senechal et al., 1995), it did eliminate the need to control for home reading experience (*Home Reading Questionnaire*) in the primary analysis.

Moderate correlations (.55 to .66) were observed between children’s acquired target vocabulary knowledge (*STVT-C Posttest*) and the general vocabulary pretest measures of receptive vocabulary knowledge in English, Spanish, or both languages considered together (bilingual). This pattern of results confirmed the need to include general vocabulary knowledge as a predictor in the primary analysis. However, given the high intercorrelations among the three general vocabulary pretest measures, there was limited ability to determine whether Spanish, English, or bilingual vocabulary knowledge had differential relationships to the four storybook conditions examined. Based on this initial finding and the fact that *ROWPVT-SBE* Spanish raw score formed part of the bilingual receptive measure and was a raw score rather than an age-adjusted standard score, the *ROWPVT-SBE* Spanish raw score was dropped as a control variable from the primary analysis (Post-hoc 1).
Table 5

<table>
<thead>
<tr>
<th>Measures</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Home Reading Questionnaire</td>
<td></td>
<td>.24*</td>
<td>.23*</td>
<td>.29**</td>
<td>.31</td>
<td>.14</td>
</tr>
<tr>
<td>2 ROWPVT-SBE Spanish Raw Scores</td>
<td></td>
<td></td>
<td>.73**</td>
<td>.35</td>
<td>.2</td>
<td>.66**</td>
</tr>
<tr>
<td>3 ROWPVT-SBE Bilingual Standard Score</td>
<td></td>
<td></td>
<td></td>
<td>.39*</td>
<td>.33</td>
<td>.55**</td>
</tr>
<tr>
<td>4 PPVT-4 English Standard Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.3</td>
<td>.63**</td>
</tr>
<tr>
<td>5 STVT-C Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.11</td>
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<tr>
<td>6 STVT-C Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* (p<.05), two tailed test
** (p<.01), two tailed test

Results of Primary Analysis

This section will present the analysis testing for the main treatment effects and their interaction, with a brief overview of the statistical model employed and a rationale for using it. The second section is a description of the primary analysis and its results.

Generalized linear model. The testing of the main treatment effects and their interaction was done using a generalized linear model (GLM), of which the more familiar general linear model is a special case, for both the primary and post hoc analyses. The GLM is a regression model that relates a dependent variable to a function comprised of independent variables, covariates, and parameter estimates (Nelder and Wedderburn, 1972). Estimates represent the contribution of the independent variables and covariates to the prediction of the dependent variable, and are determined in the regression model. The type of function used to relate the independent variables, covariates, and parameter estimates to the dependent variable is known as the link function. A researcher can choose a link function from a variety of alternatives that include identity, logarithmic, and power functions.
Once the estimates from a regression model are obtained, the link function is used to predict the value of a dependent variable given a combination of covariates and independent variables. In addition to selecting a link function, GLM requires making a distributional assumption about the error structure in the regression. That is, GLM requires that you assume a distribution for the difference between the actual values of the dependent variable and the predicted values derived from the model (Lindsey, 1997). Members of the family of linear exponential functions can be selected for this purpose. Members of the linear exponential family of distributions include Gaussian (normal), Log normal, Poisson, and Negative Binomial. Parameter estimates obtained using any one of the linear exponential family of distributions are unbiased, as long as the specification of the independent variables and covariates is correct (Gourieroux, Monfort, & Trognon, 1984).

Skewness in the distribution of the Implicit and English/Implicit partial STVT-C Posttest scores and the inclusion of outliers in the data, limits the ability to use general linear models (i.e. ANOVA) to test for treatment effects. On the other hand, GLM does not require normality in any of the dependent variables, independent variables, or covariates in the model (Lindsey, 1997). It does, however, require that the regression error follow the distribution specified in the GLM.

With GLM it is also possible to relax the assumption of equality or constancy of variances (homoscedasticity) that is necessary for hypothesis testing in general linear models. Having this flexibility is important when a researcher has reasons to believe that the regression variance across observations is not constant, as may be the case when multiple observations are collected by subject such as in experimental designs using repeated measures.
To estimate GLM, the \textit{STVT-C} Posttest partial score for each treatment combination was stacked for each student in the sample. That is, students in the sample were set to have four rows of data, each with the partial score obtained after each of the four treatment combinations. Several things are worth noting about data setup for the estimation of GLM. First, the setup “explodes” the amount of rows in the dataset by four because each student now has a row for each treatment combination. The explosion in the number of rows increases the number of observations analyzed with the GLM from 29 (with one observation per student) to 116 (with four observations per student). The new data setup also assumes that the primary differences across the posttest scores for each child are caused by the treatment combinations linked to each of the \textit{STVT-C} posttest scores. Quadrupling the size of the dataset can narrow the variance of the dependent variable, such that it approximates a normal distribution. Second, a regression model that uses multiple responses by student may not have a homoscedastic variance, as the errors in a regression are likely not independent across the set of four observations recorded for each student.

**Main and interaction effects for the basic model.** For the primary analysis, a GLM model was estimated via a maximum likelihood method assuming a Gaussian normal distribution and an identity link function. To account for the multiple observations for each child, potential non-independence across these observations, and heteroscedasticity; a robust (BHHH) variance/covariance matrix was estimated to determine the significance of the parameters in the regression (Liang & Zeger, 1986).

The dependent variable was set to be the \textit{STVT-C} Posttest score. The explanatory variables included the two main treatment factors (Language and Presentation) and their interaction. The explanatory variables in the model also included the \textit{STVT-C} Pretest score,
three control variables used to characterize the study design, and a constant term meant to capture anything that influenced vocabulary acquisition but that was not accounted for in the regression model. The first control variable, “Language Sequence,” was added to capture any influence that the sequence of the Language treatments may have had on vocabulary. The second control variable, “Presentation Sequence,” was incorporated to capture any influence that the presentation of selected target vocabulary word sets may have had on vocabulary acquisition. A third control variable, used to characterize the study design, was incorporated to capture the “Period” (order) in which the STVT-C score was recorded. In this study, storybooks were not counterbalanced across periods. Thus, any storybook-specific effects on posttest scores was confounded with the treatment period. Nevertheless, given that all conditions were counterbalanced across storybooks, the confounding between storybook and treatment period affects only the ability to tease out their separate effects on children’s posttest scores, not the estimated effect of treatment combinations on posttest scores (Table 2).

The general specification considered in the GLM regression can be characterized as follows: \( STVT-C \) Posttest score = \( \beta_{constant} + (\beta_{pretest} \times STVT-C \ Pretest \ Score) + (\beta_{languageSequence} \times \text{Language Sequence Effect}) + (\beta_{presentationSequence} \times \text{Presentation Sequence Effect}) + (\beta_{period} \times \text{Period Effect}) + (\beta_{language} \times \text{Language}) + (\beta_{presentation} \times \text{Presentation}) + \left[ \beta_{interaction} \times (\text{Language} \times \text{Presentation}) \right] \). In the equation above, \( \beta_{constant}, \beta_{pretest}, \beta_{sequence}, \beta_{period}, \beta_{language}, \beta_{presentation}, \) and \( \beta_{interaction} \) are parameters to be estimated by the regression model, and represent the effect that each one of the explanatory variables has on the \( STVT-C \) Posttest score.

As the levels of each treatment factor (Language and Presentation) are dichotomous, effects coding was used to identify the levels in each factor variable. Effects coding is a way
to code dichotomous variables such that the two levels in a variable are set to assume a value of 1 and -1, respectively (Lindsey, 1997). The most important advantage of using effects coding is that it allows for the estimation of a separate effect for all levels in the factor variables, and no baseline scenario has to be selected as in the case of dummy coding. With effects coding, the levels under each treatment factor were set to assume the following values: Language = “1” for the English-only treatment and “-1” for the Bilingual treatment; Presentation = “1” for the Elaborated treatment and “-1” for the Implicit treatment.

With effects coding, the model will produce one parameter estimate per factor, but the single parameter estimate can be used to recover the effect that each level has on the acquisition of target vocabulary. The total effect of the Language and Presentation factors on children’s vocabulary acquisition as measured by the STVT-C Posttest can be formulated as follows:

\[ \beta_{\text{grand constant}} + \beta_{\text{language}} = \text{Predicted effect of English-only treatment} \]

\[ \beta_{\text{grand constant}} - \beta_{\text{language}} = \text{Predicted effect of Bilingual treatment} \]

\[ \beta_{\text{grand constant}} + \beta_{\text{presentation}} = \text{Predicted effect of Elaborated treatment} \]

\[ \beta_{\text{grand constant}} - \beta_{\text{presentation}} = \text{Predicted effect of Implicit treatment} \]

Where \( \beta_{\text{grand constant}} \) represents the sum product of all the covariate parameter estimates and the mean value for the covariates in the regression; \( \beta_{\text{grand constant}} = \beta_{\text{constant}} + \beta_{\text{pretest}} \times \text{average(STVT-C Pretest Score)} + \beta_{\text{languageSequence}} \times \text{average(Language Sequence Effect)} + \beta_{\text{presentationSequence}} \times \text{average(Presentation Sequence Effect)} + \beta_{\text{period}} \times \text{average(Period Effect)}.\)
Predicted effects of each treatment are also the main effects of treatments on children’s STVT-C Posttest scores. The difference between the main effects within factors (English-only − Bilingual and Elaborate - Implicit) results in:

\[ \text{English-only} - \text{Bilingual} = \beta_{\text{grand constant}} + \beta_{\text{language}} - (\beta_{\text{grand constant}} - \beta_{\text{language}}) = 2(\beta_{\text{language}}) \]

\[ \text{Elaborated} - \text{Implicit} = \beta_{\text{grand constant}} + \beta_{\text{presentation}} - (\beta_{\text{grand constant}} - \beta_{\text{presentation}}) = 0(\beta_{\text{presentation}}) \]

It is important to note that the main effects defined above represent the mean impact of each treatment on STVT-C Posttest scores. That is, they do not take into account the interaction effect included in the model. Including the interaction effect between treatments would increase or decrease the main effects of treatments depending on how the treatments are combined. As the interaction term in the regression model is included as the product of two effects-coded variables (Language and Presentation), the impact of the interaction is driven by the product of the values assumed for each effects-coded variable. From the general specification of the GLM regression, the sign of the interaction effect for each treatment combination can be represented using the information below.

**English/Elaborated:** \( \beta_{\text{interaction}} \times (\text{English} \times \text{Elaborated}) = \beta_{\text{interaction}} \times (1 \times 1) = \beta_{\text{interaction}} \)

**English/Implicit:** \( \beta_{\text{interaction}} \times (\text{English} \times \text{Implicit}) = \beta_{\text{interaction}} \times (1 \times -1) = -\beta_{\text{interaction}} \)

**Bilingual/Elaborated:** \( \beta_{\text{interaction}} \times (\text{Bilingual} \times \text{Elaborated}) = \beta_{\text{interaction}} \times (-1 \times 1) = -\beta_{\text{interaction}} \)

**Bilingual/Implicit:** \( \beta_{\text{interaction}} \times (\text{Bilingual} \times \text{Implicit}) = \beta_{\text{interaction}} \times (-1 \times -1) = \beta_{\text{interaction}} \)

With this information, one can expand the formulas used to predict the effect of each treatment independently (main effects) and incorporate the effect of an interaction between treatments. Prediction of the effect of each of the four treatment combinations can then be represented as follows:
\[ \beta_{\text{grand constant}} + \beta_{\text{language}} + \beta_{\text{presentation}} + \beta_{\text{interaction}} = \text{Predicted effect of English/Elaborated treatment combination} \]

\[ \beta_{\text{grand constant}} - \beta_{\text{language}} + \beta_{\text{presentation}} - \beta_{\text{interaction}} = \text{Predicted effect of Bilingual/Elaborated treatment combination} \]

\[ \beta_{\text{grand constant}} + \beta_{\text{language}} - \beta_{\text{presentation}} - \beta_{\text{interaction}} = \text{Predicted effect of English/Implicit treatment combination} \]

\[ \beta_{\text{grand constant}} - \beta_{\text{language}} - \beta_{\text{presentation}} + \beta_{\text{interaction}} = \text{Predicted effect of Bilingual/Implicit treatment combination} \]

Table 6 shows the estimates and significance for the effects of the Language and Presentation factors over vocabulary acquisition, as well as the interaction effect of these factors. As presented above, these parameter estimates allow the prediction of children’s STVT-C Posttest scores after controlling for the factors included in the regression model that are associated with the study design (STVT-C Pretest scores, language sequence, presentation sequence and period). To estimate vocabulary gains after each treatment or treatment combination, one simply needs to subtract the average Pretest score for the regression from the predicted Posttest scores. Parameter estimates and effects for all parameters included in the regression model are presented in Appendix G (Table G1).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter estimates</th>
<th>Standard Error</th>
<th>z</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta_{\text{constant}} )</td>
<td>3.61</td>
<td>0.43</td>
<td>8.44</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>( \beta_{\text{language}} )</td>
<td>1.00</td>
<td>0.24</td>
<td>4.24</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>( \beta_{\text{presentation}} )</td>
<td>1.51</td>
<td>0.24</td>
<td>6.31</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>( \beta_{\text{interaction}} )</td>
<td>0.66</td>
<td>0.18</td>
<td>3.74</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
**Main effects.** While controlling for the STVT-C Pretest scores, sequence effects, and period effects; the GLM results permit examining the difference in the main effects of Language, $2(\beta_{language}) = 2*(1.00)$, $z = 4.24$, $p < .01$, and Presentation, $2(\beta_{presentation}) = 2*(1.51)$, $z = 6.31$, $p < .01$ on the STVT-C Posttest scores. These results suggest that the impact of the English-only storybook reading intervention on children’s acquisition of vocabulary in English was significantly different from the effect of the Bilingual intervention on vocabulary acquisition. Similarly, the effect of Elaborating on words during storybook reading on children’s vocabulary learning was significantly different from the effect of Implicit presentation of vocabulary words on children’s vocabulary acquisition.

Using the parameter estimates obtained through the Basic regression model (Table 6), one can understand the impact that each treatment had on children’s acquisition of target vocabulary knowledge. Based on predicted STVT-C Posttest scores and the implied gains in vocabulary, it is apparent that children acquired target vocabulary knowledge with all treatments (Figure 1). The average gain in vocabulary was predicted to be statistically different from zero after children received the English (Predicted English effect – average pretest score = 3.54, $z = 6.56$, $P < 0.01$), Bilingual (Predicted Bilingual effect – average pretest score = 1.54, $z = 5.49$, $P < 0.01$), Elaborated (Predicted Elaborated effect – average pretest score = 4.05, $z = 7.54$, $P < 0.01$), and Implicit (Predicted Implicit main effect – average pretest score = 1.03, $z = 3.53$, $P < 0.01$) treatments.

Furthermore, from the parameter estimates, it is apparent that children acquired more target vocabulary knowledge in English when participating in the English-only storybook reading intervention than the Bilingual storybook reading intervention, a finding contrary to that predicted in Hypothesis One. In addition, children acquired more target vocabulary
knowledge from Elaborated presentations rather than Implicit presentations of vocabulary words, a finding that supports Hypothesis Two.

Based on the regression model and parameter estimates previously discussed, the following figure presents children’s predicted gain in English target vocabulary knowledge ($STVT-C$ Posttest – Pretest score) as a function of Language and Presentation (Figure 1). The differences between each pair of means in the figure are significant, as indicated by the two significant main effects.

![Figure 1. Predicted Gain in STVT-C Scores as a Function of Language and Presentation, Based on the Parameter Estimates of the Basic Regression Model. Note. STVT-C = Storybook Target Vocabulary Test-Composite.](image)

** Estimated gain with a $p < .01$

**Interaction effects.** In addition to the significant main effects, the results of the GLM basic model showed a statistically significant interaction effect between the two factors in the design, Language and Presentation ($\beta_{interaction} = 0.66, z = 3.74, p < .01$, see Table 6). This
interaction was the effect of interest in Research Question One. Although all four treatments led independently to a significant increase in target vocabulary knowledge, predicted gain in \textit{STVT-C} scores for treatment combinations highlight the variation in the main effect of treatments when the factors in the study are considered jointly. Figure 2 plots the predicted effects that treatment combinations had on children’s vocabulary learning. All children learned a significant amount of vocabulary as a result of each of the treatment combinations (Figure 2). For example, when children received the English/Elaborated treatment combination, they attained the highest predicted gain in \textit{STVT-C} score, whereas when children received the Bilingual/Implicit treatment combination they attained the lowest predicted gain in \textit{STVT-C} score.

\begin{figure}
  \centering
  \includegraphics[width=\textwidth]{figure2.png}
  \caption{Predicted Gain in \textit{STVT-C} Scores as a Function of Treatment Combinations, Based on the Parameter Estimates of the Basic Regression Model. \textit{Note}. \textit{STVT-C} = Storybook Target Vocabulary Test- Composite.}
  \begin{itemize}
    \item * Estimated gain with a $p<.05$
    \item ** Estimated gain with a $p<.01$
  \end{itemize}
\end{figure}
Differences between all treatment combinations were examined by testing the statistical significance of the difference in the predicted effect of each treatment combination (Table 7). The results suggest that although elaborating on words leads to greater acquisition of vocabulary knowledge, there is a greater advantage in elaborating when stories are read in English-only than bilingually. In addition, when words were elaborated, the difference in vocabulary acquisition between the English-only and Bilingual treatments was greater than when target vocabulary words were presented implicitly. The test of differences in the predicted effect of treatment combinations also demonstrated that the gain in vocabulary acquisition due to the Bilingual/Elaborated treatment did not differ significantly from that of the English/Implicit treatment. Given the interaction effect between Language and Presentation, one cannot assert that the English-only storybook reading vocabulary intervention always led to a greater gain in target vocabulary acquisition than the Bilingual storybook reading vocabulary intervention. It is important to always consider the impact that the treatments have jointly on children’s target vocabulary acquisition. That is, as opposed to considering the impact of the Language (English-only and Bilingual) and Presentation (Elaborated and Implicit) treatments independent from each other, it is crucial to consider the impact of the treatment combinations on children’s target vocabulary acquisition in L2.
### Table 7

**Test of Differences in the Predicted Effect of Treatment Combinations**

<table>
<thead>
<tr>
<th>Treatment Pairs</th>
<th>Difference in Predicted gain in (STVT-C) Score ((M_1-M_2))</th>
<th>Standard Error</th>
<th>(z)</th>
<th>(p) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>English/Elaborated – English/Implicit</td>
<td>4.35</td>
<td>0.64</td>
<td>6.82</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>English/Elaborated – Bilingual/Elaborated</td>
<td>3.33</td>
<td>0.71</td>
<td>4.70</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>English/Elaborated – Bilingual/Implicit</td>
<td>5.02</td>
<td>0.79</td>
<td>6.38</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Bilingual/Elaborated – English/Implicit</td>
<td>1.02</td>
<td>0.53</td>
<td>1.92</td>
<td>0.06(^b)</td>
</tr>
<tr>
<td>English/Implicit – Bilingual/Implicit</td>
<td>0.67</td>
<td>0.44</td>
<td>1.51</td>
<td>0.13</td>
</tr>
<tr>
<td>Bilingual/Elaborated- Bilingual/Implicit</td>
<td>1.70</td>
<td>0.55</td>
<td>3.07</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

\(STVT-C\)= **Storybook Target Vocabulary Test- Composite**

\(^a\)Treatment combination with the highest predicted gain \(STVT-C\) score is presented as the first treatment combination in each treatment pair comparison.

\(^b\) Estimated \(p\) value; \(p= 0.055\)

In sum, of the two hypotheses posed prior to this study, one was disconfirmed and one was confirmed: the Bilingual storybook reading treatment was not more effective than the English-only treatment, disconfirming Hypothesis One; and Elaborating on target vocabulary during storybook reading was a more effective strategy than presenting words Implicitly, confirming Hypothesis Two. In addition, a significant interaction effect between Language and Presentation was found, indicating that the main effects of Language (English and Bilingual) and Presentation (Elaborated and Implicit) should not be considered independently. The following section presents the results of post-hoc analyses, where children’s initial general vocabulary knowledge (measured by general vocabulary pretest measures) were included in the analyses in order to further understand the impact of the storybook reading intervention when children’s level of overall Bilingual (Spanish and English combined) and English vocabulary development is considered.
**Results of Post-Hoc Analyses: Controlling for Children’s Individual Characteristics**

In the preliminary analyses, children’s initial, non-treatment related, general receptive vocabulary in English, Spanish, and Bilingual (English and Spanish) were moderately correlated with children’s STVT-C Posttest scores (Table 5). Although the experimental design employed in this study possesses an inherent control for children’s personal characteristics, post-hoc analyses were performed to examine whether the main treatment effects of Language and Presentation, as well as the interaction effects of these two factors were similar after controlling for children’s initial receptive vocabulary. Two different sets of analyses were performed in order to further examine the treatment effects. First, a GLM was run to examine treatment effects while controlling for children’s initial general bilingual and English receptive vocabulary, as assessed by general vocabulary pretest measures (PPVT-4 and ROWPVT-SBE). Then, the previous model was reexamined to condition the effects of the treatments on children’s initial English receptive vocabulary. More specifically, the treatment effects were reexamined to determine whether the interaction and main effects varied by children with high and low initial general English vocabulary (as measured by the PPVT-4).

In these analyses, children’s initial general bilingual (English and Spanish) receptive vocabulary, as measured by the standard score on the ROWPVT-SBE, and children’s initial general English receptive vocabulary, as measured by the standard score on the PPVT-4, were included in the Basic model as controls. Initial English receptive vocabulary was included in the model because it is a measure of children’s English knowledge, whereas children’s initial bilingual receptive vocabulary (ROWPVT-SBE standard score) is a measure of general vocabulary knowledge. As mentioned earlier, children’s initial general Spanish
receptive vocabulary (as measured by the raw score on the *ROWPVT-SBE*) was not included in the analysis because, as a raw score, it does not adjust for age and because the measure of Spanish vocabulary was confounded in the initial bilingual receptive vocabulary score.

**Post-hoc analysis 1: Controlling for initial general bilingual and English receptive vocabulary- Main effects and interaction effects.** To examine whether the main effects of Language and Presentation and their interaction were significant after controlling for children’s initial general bilingual receptive vocabulary and non-book related, initial general English receptive vocabulary, a similar model to the Basic GLM model previously described was employed. In this analysis, the same dependent and control variables as those in the before mentioned Basic model were included in the GLM model. However, two additional variables were included as control variables: initial general bilingual receptive vocabulary (as measured by the *ROWPVT-SBE* standard score) and initial general English receptive vocabulary (as measured by the *PPVT-4* standard score). Table 8 shows the estimates and significance for the effects of the Language and Presentation factors over vocabulary acquisition, as well as the interaction effect of these factors, after controlling for the effect of initial bilingual and English receptive vocabulary. Parameter estimates and effects for all parameters included in the regression model are presented in Appendix G (Table G2).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter estimates</th>
<th>Standard Error</th>
<th>z</th>
<th>p value</th>
</tr>
</thead>
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<tr>
<td>$\beta_{\text{constant}}$</td>
<td>-9.86</td>
<td>2.18</td>
<td>-4.52</td>
<td>&lt;0.01</td>
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<tr>
<td>$\beta_{\text{language}}$</td>
<td>0.94</td>
<td>0.24</td>
<td>3.97</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\beta_{\text{presentation}}$</td>
<td>1.49</td>
<td>0.24</td>
<td>6.10</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\beta_{\text{interaction}}$</td>
<td>0.69</td>
<td>0.18</td>
<td>3.85</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
It is noteworthy to mention that both initial general bilingual receptive vocabulary (ROWPVT-SBE) and initial general English receptive vocabulary (PPVT-4) have a significant effect on children’s STVT-C Posttest scores ($\beta_{PPVT-4} = 0.10$, $z= 3.82$, $p< .01$ and $\beta_{ROWPVT-SBE} = 0.07$, $z= 2.21$, $p=0.03$, respectively. These results suggest that the more proficient children were in English and Spanish the more they benefitted from the overall treatments.

**Main effects.** While controlling for the STVT-C Pretest scores, sequence of language effects, sequence of presentation effects, period effects, initial bilingual receptive vocabulary, and initial English receptive vocabulary; the GLM results permit examining the difference in the main effects of Language, $2(\beta_{language}) = 2*(0.94)$, $z = 3.97$, $p< .01$, and Presentation, $2(\beta_{presentation}) = 2*(1.49)$, $z= 6.10$, $p< .01$ on the STVT-C Posttest scores. These results, jointly, were not significantly different from those derived from the Basic model; $\chi^2 (3)= 2.98$, $p= 0.40$.

Using the parameter estimates obtained through the regression model (Table 8), one can predict children’s STVT-C Posttest scores, controlling for the factors associated with the study design (STVT-C Pretest scores, sequence, and period) and children’s initial general vocabulary (ROWPVT-SBE and PPVT-4). Based on the regression model and parameter estimates previously discussed, Figure 3 presents the predicted gain in English target vocabulary knowledge as a function of Language and Presentation, after accounting for the factors associated with the study design and the effect of children’s initial bilingual and English receptive vocabulary scores on the STVT-C Posttest scores. The results of this model suggest that children acquired target vocabulary knowledge, regardless of which treatment they were exposed to (Figure 3).
Interaction effects. After controlling for the effects of initial general bilingual and English receptive vocabulary on children’s STVT-C Posttest scores, the interaction of Language and Presentation had a significant impact on children’s STVT-C Posttest scores, $\beta_{interaction} = 0.69$, $z = 3.85$, $p < .01$ (Table 8). These results were similar to those of the Basic model, where the four treatment combinations led to a significant increase in target vocabulary knowledge (Figure 4). When predicted gain in STVT-C scores are plotted (Figure 4), it can be observed that the treatment combinations had different impacts on children’s vocabulary acquisition in English. Figure 4 presents the predicted gain in scores by treatment combination after controlling for general initial bilingual and English receptive vocabulary. Differences by treatment combination in predicted gain in STVT-C scores and their significance are presented in Table 9.
Figure 4. Predicted Gain in STVT-C Scores as a Function of Treatment Combinations, Based on the Parameter Estimates of the Regression Model, Controlling for Initial General Bilingual and English Receptive Vocabulary. Note. STVT-C = Storybook Target Vocabulary Test-Composite.

* Estimated gain with a $p<.05$

** Estimated gain with a $p<.01$
### Differences in the predicted effect of treatment combinations were examined (Table 9). Most of the paired differences results were qualitatively similar to those of the Basic model. However, one difference is worth noting. When controlling for initial general bilingual and English vocabulary, the advantage of elaborating during Bilingual storybook reading appears to be significantly higher than presenting words implicitly during English storybook reading, $\beta_{\text{Bilingual/Elaborated–English/Implicit}} = 1.10, z= 1.97, p= 0.049$. This suggests that, regardless of the Language in which the treatment was presented, elaborating on words had a big impact on children’s vocabulary acquisition in L2. This finding is different from that of the Basic model, in which, although close to statistical significance, no significant difference between predicted treatment combination mean differences were found between the Bilingual/Elaborated and English/Implicit combinations, $\beta_{\text{Bilingual/Elaborated–English/Implicit}} = 1.02, z= 1.92, p= 0.055$. In contrast with the results of the Basic model, the results of the post-hoc
analysis suggest that elaborating on target vocabulary always led to greater vocabulary gains in L2 than presenting words implicitly, regardless of the language (English-only or Bilingual) in which the storybooks were read.

To further explore the differences in the treatment effects due to initial Bilingual and English receptive vocabulary knowledge, a second post-hoc analysis was performed. In this analysis, the same set of controls were included in the GLM model (including initial general bilingual and English receptive vocabulary), but the effect of the factors was conditioned on initial general English receptive vocabulary (high initial general English receptive vocabulary and low initial general English receptive vocabulary, as measured by the PPVT-4). The following section will present the results.

**Post-hoc analysis 2: Conditioning the effect of the factors on initial general English receptive vocabulary- Main effects and interaction effects.** The model used in the Post-hoc analysis 1 was revisited to examine the effect of the treatments and treatment combinations on children with different levels of initial general English proficiency. The new model not only controls for the effect of initial general English proficiency (Post-hoc analysis 1), but also reveals whether the effect of the treatment factors changed among children with high and low initial general English receptive vocabulary. The model achieves this by conditioning the effect of Language and Presentation on children’s initial general English vocabulary scores (PPVT-4). Post-hoc analysis 1 estimated a single treatment effect for all children in the sample; this analysis estimated one treatment effect for children with high initial general English proficiency, and a separate effect for children with low initial general English proficiency.
In addition to the variables in the Post-hoc analysis 1, two dichotomous variables were generated to signal whether a child’s initial general English receptive vocabulary (PPVT-4) was above or below the median score for the sample. One variable (high) assumed a value of “1,” whenever a child’s initial general English receptive vocabulary score was above the sample median (PPVT-4 standard score of 76), and “0” otherwise. The second variable (low) assumed a value of “1” when a child’s initial general English receptive vocabulary score was at or below the sample median score (PPVT-4 standard score of 76), and “0” otherwise. Each one of the dichotomous variables was interacted with the factor variables (Language, Presentation, and the interaction of Language and Presentation). The resulting interactions provide estimates of the impact of the factors on children’s STVT-C Posttest scores by high and low initial English receptive vocabulary (Table 10). Parameter estimates and effects for all parameters included in the regression model are presented in Appendix G (Table G3).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Estimates</th>
<th>Standard Error</th>
<th>z</th>
<th>p value</th>
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<tr>
<td>$\beta_{\text{constant}}$</td>
<td>-9.76</td>
<td>2.22</td>
<td>-4.40</td>
<td>&lt;0.01</td>
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<tr>
<td>$\beta_{\text{language}}$</td>
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<td>1.47</td>
<td>0.44</td>
<td>3.34</td>
<td>&lt;0.01</td>
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<td>Low</td>
<td>0.61</td>
<td>0.24</td>
<td>2.56</td>
<td>0.01</td>
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<td>$\beta_{\text{presentation}}$</td>
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</tr>
<tr>
<td>High</td>
<td>2.19</td>
<td>0.40</td>
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<td>Low</td>
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<td>0.23</td>
<td>4.34</td>
<td>&lt;0.01</td>
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<tr>
<td>$\beta_{\text{interaction}}$</td>
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<tr>
<td>High</td>
<td>1.06</td>
<td>0.27</td>
<td>3.89</td>
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<tr>
<td>Low</td>
<td>0.41</td>
<td>0.20</td>
<td>2.05</td>
<td>0.04</td>
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</table>
Main effects. The conditioned main effects of Language and Presentation by initial English receptive vocabulary were examined. After controlling for the STVT-C Pretest scores, sequence of Language effects, sequence of Presentation period effects, initial general bilingual receptive vocabulary and initial general English receptive vocabulary, and conditioning the effect of the factors on children’s general initial English vocabulary (PPVT-4 score), the GLM results allowed separate examination of the difference in the main effects of Language and Presentation on the predicted STVT-C Posttest scores for children with high and low initial general English receptive vocabulary (Table 10).

Results show that, regardless of the amount of initial general English receptive vocabulary, there was a statistically significant main effect for Language on STVT-C posttest scores, \[ 2(\beta_{\text{language, high}}) = 2^* (1.47), z = 3.34, p < .01; 2(\beta_{\text{language, low}}) = 2^* (0.61), z = 2.56, p = 0.01. \] Similarly, there was a statistically significant main effect for Presentation on STVT-C posttest scores for children with high initial general English vocabulary, \[ 2(\beta_{\text{presentation, high}}) = 2^* (2.19), z = 5.45, p < .01, \] and low initial general English vocabulary, \[ 2(\beta_{\text{presentation, low}}) = 2^* (1.00), z = 4.34, p < .01. \] Although main effects were significant in children with high and low initial general English vocabulary, the magnitude of the main effects was larger for children who had high initial general English vocabulary than for those who had low initial general English vocabulary. Findings are consistent with those in the previously described models.

Figure 5 presents the predicted vocabulary knowledge acquired in L2 of children with high and low initial general English receptive vocabulary as a function of Language and Presentation for children’s initial bilingual and English receptive vocabulary scores. Thus, it appears that although all children benefitted from the treatments, children with higher initial
English vocabulary scores benefitted more than those with lower initial English vocabulary scores.

<table>
<thead>
<tr>
<th>Gain in STVT-C Score</th>
<th>English</th>
<th>Bilingual</th>
<th>Elaborated</th>
<th>Implicit</th>
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<tr>
<td>High</td>
<td>4.90**</td>
<td>2.57**</td>
<td>5.62**</td>
<td>1.24**</td>
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<tr>
<td>Low</td>
<td>1.97**</td>
<td>1.34***</td>
<td>2.96**</td>
<td>0.95**</td>
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</table>

** Figure 5
Predicted gain in STVT-C Score as a Function of Language and Presentation, by High and Low Initial English Vocabulary, After Controlling for Initial Bilingual and English Receptive Vocabulary. Note. STVT-C = Storybook Target Vocabulary Test- Composite.

** Estimated gain with a p < .01

** Interaction effects.** The conditional interaction effect of Language and Presentation by initial general English receptive vocabulary was also examined. As demonstrated in Table 10, after controlling for the effects of initial general bilingual and initial general English receptive vocabulary, the effect of the Language-Presentation interaction on STVT-C Posttest scores was significant for children with high initial general English receptive vocabulary (β_{interaction, high} = 1.06, z = 3.89, p < .01) and those with low initial general English receptive vocabulary (β_{interaction, low} = 0.41, z = 2.05, p = 0.04).
Although the interaction of Language and Presentation on average had a different impact on gain in $STVT-C$ scores, depending on children’s initial general English proficiency, the four treatment combinations led to a significant increase in target vocabulary knowledge (Figure 6). Children with high initial general English receptive vocabulary seemed to benefit more on each of the four treatment combinations than children with low initial general English receptive vocabulary. Figure 6 presents the predicted scores by treatment combination and by the level of initial English receptive vocabulary, after controlling for initial general bilingual and English receptive vocabulary ($ROWPVT-SBE$ and $PPVT-4$). Differences by treatment combination in predicted gain in $STVT-C$ scores and their significance are presented in Table 11.
Figure 6. Predicted Gain in STVT-C Scores as a Function of Treatment Combinations by Initial General English Vocabulary Proficiency, Controlling for Initial General Bilingual and English Receptive Vocabulary. Note. STVT-C = Storybook Target Vocabulary Test- Composite.

* Estimated gain with a $p<.05$

** Estimated gain with a $p<.01$
Table 11

*Test of Differences in the Predicted Effect of Treatment*, by Initial General English Receptive Vocabulary, Controlling for Initial Bilingual and English Receptive Vocabulary

<table>
<thead>
<tr>
<th>Treatment Pairs&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Difference in Predicted Gain in STVT-C Score (&lt;sup&gt;M1-M2&lt;/sup&gt;)</th>
<th>Standard Error</th>
<th>z</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>English/Elaborated – English/Implicit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>6.51</td>
<td>0.77</td>
<td>8.40</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Low</td>
<td>2.82</td>
<td>0.74</td>
<td>3.78</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>English/Elaborated – Bilingual/Elaborated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>5.06</td>
<td>1.23</td>
<td>4.13</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Low</td>
<td>2.04</td>
<td>0.71</td>
<td>2.85</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>English/Elaborated – Bilingual/Implicit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
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<td>2.75</td>
<td>&lt;0.01</td>
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</table>

*Note*. STVT-C = *Storybook Target Vocabulary Test- Composite*

<sup>a</sup>Treatment combination with the highest predicted STVT-C Posttest score is presented as the first treatment combination in each treatment pair comparison.

<sup>b</sup>Significance value was rounded (<i>p</i> = 0.047)

Paired differencing (Table 10) allowed examining differences in predicted gains in STVT-C scores between treatment combinations, by initial English receptive vocabulary.

Paired differencing results were qualitatively similar to those of the Basic model; hence, slightly different from the results of the model in which initial general bilingual and English vocabulary scores were controlled for (Post-hoc analysis 2).
The amount of target vocabulary that children gained by treatment combination was also compared between children with high and low initial general English receptive vocabulary skills. Differences in the predicted \textit{STVT-C} Posttest score using the Post-hoc 2 estimates demonstrated that children with high initial general English vocabulary benefitted significantly more from the English/Elaborated treatment combination than children with low initial general English vocabulary skills, $\beta_{\text{English/Elaborated-High}} - \beta_{\text{English/Elaborated-Low}} = 4.18$, $z= 4.09$, $p<0.01$. No other significant differences in \textit{STVT-C} gain by treatment combinations were found between children with high and low initial general English receptive vocabulary skills.

Due to the limited sample size of the subgroups available to make comparisons between children with high and low English proficiency, detecting some differences in \textit{STVT-C} gain by treatment combination may have been challenging.

In sum, in this chapter, a series of analyses were examined in order to determine the main effects of Language and Presentation on children’s English target vocabulary acquisition as well as the effect of the interaction of Language and Presentation on children’s \textit{STVT-C} Posttest score. In addition, analyses were examined to verify whether the main effects and the interaction effect were affected by children’s initial level of general bilingual and English receptive vocabulary. Overall, results of the Basic model and several post-hoc analyses demonstrated that, independent of Presentation, on average, English-only storybook reading was significantly more effective than Bilingual storybook reading at helping children learn English target vocabulary. Similarly, independent of Language, on average, Elaborating on words during storybook reading was significantly more effective in aiding children’s acquisition of vocabulary in L2 than presenting words implicitly. Results also demonstrated that there was an interaction effect such that the effect of Language and
Presentation worked together to enhance or dampen children’s vocabulary acquisition in L2. The following chapter will discuss the study’s findings and the limitations of the study, as well as the implications for practice, and recommendations for future research. The discussion will be based on the results obtained from the Post-hoc 1 analysis given that it is the model that includes all needed controls and has single-factor estimates for the full sample.
CHAPTER 6

Discussion

Although research has been conducted to investigate storybook reading as a vocabulary intervention for young monolingual children (Beck, McKeown, & Kucan, 2002; Collins, 2005; Elley, 1989; Robbins & Ehri, 1994), few studies have focused on evaluating the effectiveness of storybook reading as a vocabulary intervention for young children acquiring a second language (Appel & Vermeer, 1998; Collins 2004; Elley, 1991; Elley & Mangubhai, 1983). Even less research is available where storybook reading has been implemented in both children’s native and second language (Lugo-Neris, Jackson, & Goldstein, 2010; Roberts, 2008; Ulanoff & Pucci, 1999). Given that storybook reading is an easily implemented, widely used practice that makes strong contributions to children’s vocabulary development (Bus et al., 1995; Scarborough & Dobrich, 1994), research in this area has much potential for informing the development of home, school, and jointly implemented interventions that accelerate children’s acquisition of vocabulary in a second language. With the difficulties second language learners face in areas of schooling strongly dependent on vocabulary development, such as reading comprehension in the second language and comprehension of instruction (August et al., 2005), increased knowledge of how to accelerate second language vocabulary development is a critical area of research.

The purpose of the present study was to examine the effectiveness of a bilingual storybook reading intervention on children's acquisition of vocabulary knowledge in a second language. It was hypothesized that bilingual storybook reading would be more effective than English-only storybook reading (Hypothesis One). The basis of this prediction was that the presentation of the story in the child's first language would likely increase the child's
understanding of the story context in which the vocabulary was presented as well as the meaning of the word itself (Roberts, 2008). The study also compared the effect of using elaborated and implicit exposure to vocabulary words in storybook reading as a vocabulary building strategy. Based on findings in the extant literature (Brabham & Lynch-Brown, 2002; Brett et al., 1996; Collins, 2004; Coyne et al., 2007; Elley, 1989; Justice et al., 2005; Penno et al., 2002; Roberts, 2008; Senechal et al., 1995), it was predicted that elaborating on words during storybook reading would be a better vocabulary building strategy than simply presenting them implicitly (Hypothesis Two). The lack of previous research where these two conditions, the language in which the storybook reading was read (bilingual or English-only) and how vocabulary words were presented (elaborated or implicit), provided no basis for predicting whether these two conditions would interact. Therefore, the planned analyses included a test for the interaction of the two factors (Research Question One), but not a directional hypothesis.

The obtained results did not support Hypothesis One. Averaged across the presentation conditions (implicit and explicit), English-only storybook reading was superior to bilingual storybook reading in terms of vocabulary acquisition. The results supported Hypothesis Two. Averaged across the English-only and bilingual storybook reading interventions, an elaborated presentation style for vocabulary words resulted in more vocabulary knowledge.

However, the significant interaction between these two factors means that these two main effects should not be interpreted independently. When looking at the extent of vocabulary learning in the four conditions that represented the crossing of the two factors examined in the study, bilingual storybook reading was superior to English-only storybook
reading only when it was combined with an elaborated presentation of vocabulary words (Bilingual/Elaborated), and when the English-only condition was combined with implicit presentation of target vocabulary (English/Implicit). The storybook reading condition that produced the greatest amount of vocabulary acquisition was English-only storybook reading combined with an elaborated presentation of vocabulary words (English/Elaborated). This chapter will begin with a section discussing study findings. Its first subsection will discuss the key study findings, and the second subsection will discuss study findings related to predictors of children’s vocabulary acquisition and select post hoc analyses. This section will be followed by a section elaborating on the limitations of the present study. The last two sections provide implications for practice and directions for future research.

**Key Findings**

The significant interaction between language of storybook reading and vocabulary presentation obtained in the present study indicates that the overall impact of each factor tested in the storybook reading intervention depended on its pairing with the second factor. However, given that the two tests of main effects constituted the primary hypotheses tested in the study, and one of these was disconfirmed, the fit of these results with the extant literature and reasons for the study's failure to confirm one of its major hypotheses will be addressed before the findings relating to the combination of treatment factors and their impact on vocabulary acquisition are discussed.

**Language of storybook reading intervention: English-only and bilingual.** The effectiveness of second language storybook reading as a vocabulary building intervention for second language learners has been supported in previous studies (Appel & Vermeer, 1998; Collins, 2004; Elley, 1991; Elley & Mangubhai, 1983; Lugo-Neris, Jackson, & Goldstein,
2010; Roberts, 2008; Silverman, 2007; Ulanoff & Pucci, 1999). However, few studies have incorporated children’s first and second languages into these storybook reading vocabulary interventions and these have had mixed results. In some of the studies, storybook reading interventions that incorporated L1 were more effective than the English-only storybook readings, but the advantage of incorporating L1 was only found in one time period of the study, but not the other (Roberts, 2008); or only detected when comparing vastly different treatments. For example, Ulanoff and Pucci (1999) found that a bilingual treatment consisting of discussion and elaboration of target vocabulary and content in L1 before and after English-only storybook reading was superior to English-only storybook reading, but the English-only storybook reading condition had only implicit exposure to target vocabulary.

The presence of some positive effects in the literature for bilingual storybook reading, and the research pointing to the importance of scaffolding in language comprehension (Francis et al., 2006; Gass & Selinker, 2001; Roberts, 2008; Ulanoff & Pucci, 1999), led to the prediction that bilingual storybook reading would be superior to English-only storybook reading. However, English-only storybook reading was superior to bilingual storybook reading (although this effect was only significant when the storybook reader elaborated target words). Why might storybook reading only in L2 be superior to a bilingual presentation, at least under some conditions?

One possible reason may be that the number of exposures to the target vocabulary in L2 is an important factor in remembering the word and linking the spoken word with its definition. The number of times a word was presented in L2 (i.e., English) in the present study was cut in half in the Bilingual condition compared to the English-only condition. Specifically, the English-only intervention included eight exposures of elaborated or implicit
target vocabulary in English, whereas the bilingual intervention consisted of four exposures of elaborated or implicit target vocabulary in Spanish (during Spanish prereading), followed by four exposures of elaborated or implicit vocabulary in English. It is possible that four exposures to target vocabulary in L2 may not have led to children’s comprehension of the concepts and labels in L2 to link knowledge between languages (Gass & Selinker, 2001). In this study, the number of exposures to target vocabulary was constant across conditions, but the number of exposures to target vocabulary in English-only was not. Including an additional condition that equalized the amount of exposure to the target vocabulary in L2, but also incorporated the Spanish-prereading phase, would have allowed examining the impact of Spanish-prereading on children’s acquisition of vocabulary in L2, after controlling for equal exposure to vocabulary in L2.

A second possibility is that the particular strategy to help children bridge or link knowledge between L1 and L2 used in this study was too indirect to provide the maximum benefit to the student (especially when it had to be powerful enough to counteract the reduced number of exposures to the word in English in the Bilingual condition). Cummins' (1984) theory of a “Common Underlying Language Proficiency,” posits that people can transfer knowledge or concepts from L1 to L2 if there is an underlying foundation of knowledge. However, being able to link the information from L1 to L2 may depend on how well the word (label and concept) is learned in L1 and how well the children can link the label and concept that they learned in L1, or other previous contextual information, with the label in L2. Perhaps, a certain threshold of knowledge about a construct and its label (the target vocabulary word) is necessary before the underlying knowledge can be accessed when
the words are presented and elaborated in L2 (Gass & Selinker, 2001; Lugo-Neris, Jackson, & Goldstein, 2010).

It is possible that children may have benefitted more from a bilingual storybook reading intervention if it created a more direct and explicit link between the target vocabulary labels and concepts in both languages. If the strategy that bridges the knowledge in L1 with new knowledge in L2 is not successful or is too cognitively demanding, then it is possible that children would accrue more benefit from an intervention that is more direct and explicit in L2, such as exposing children multiple times to the target word in L2, particularly with elaboration (Sousa, 2011).

A recent study by Lugo-Neris, Jackson, and Goldstein (2010), incorporated an elaborating strategy in L1 during storybook reading in L2 that seemed to create a more direct and explicit link between both languages, facilitating the bridging of knowledge. These authors compared two storybook reading vocabulary interventions for native Spanish-speaking, 4 to 6 year olds, who were learning English as a second language. All children were exposed to both interventions. The first intervention consisted of English-only storybook reading, with elaborated exposures to target vocabulary words in English. The second intervention consisted of bilingual storybook reading, in which storybooks were read in English, but elaborations for target vocabulary words were presented in Spanish. Each of the target vocabulary words was presented nine times over the course of the read-alouds.

In Lugo-Neris et al.’s study (2010), the elaborating technique used was very unique. Different semantic features of the words were presented with each exposure, so concepts and definitions were expanded with each additional exposure to the target vocabulary. Children were also asked to repeat the target vocabulary word in English when it was presented the
first time. This also held true to the bilingual storybook reading condition. The only
difference between the English-only and bilingual storybook reading interventions was the
language in which the elaborations were presented.

Lugo-Neris et al. (2010) assessed target vocabulary knowledge by using receptive and
expressive measures. Target vocabulary acquisition was measured receptively, through a
picture test, and expressively, through a naming task and a definition test. Results of the
study indicated that children learned target vocabulary through both the bilingual and
English-only conditions, but the bilingual intervention led to significantly greater vocabulary
gains on the expressive definitions test. The Spanish bridging was thought to have provided
expansions in a way that were more comprehensible to the children. The study also noted
that children with stronger vocabulary proficiency in at least one language (L1 or L2) showed
greater responsiveness to the interventions.

Lugo-Neris et al.’s findings (2010), support the idea that a bilingual storybook
reading vocabulary intervention that elaborates on target vocabulary and incorporates
strategies that create an explicit, more direct link between concepts in L1 and labels in L2,
can be as effective or more effective than an English-only storybook reading vocabulary
intervention with elaborations. In the present study, failure to find similar results to those of
Lugo-Neris et al. (2010) may be due to the use of a more indirect approach of incorporating
L1 into the storybook reading intervention. In the present study, children had to acquire
contextual information of the storybook as well as labels and concepts of words in L1, before
listening to the storybooks in L2. Once the children were exposed to storybooks in L2, they
had to draw on previously acquired information in L1 to draw links between labels and
concepts in both languages. The bilingual approach for facilitating the transfer of knowledge
between languages may have been too indirect for the young English language learners to fully benefit from it.

**Presentation of vocabulary words: Elaborated and implicit.** Children were exposed eight times to implicit and explicit (elaborated) target vocabulary through four repeated storybook readings presented in two different language conditions. Regardless of the language in which the storybooks were read (English or bilingual), eight exposures to elaborated and implicit target vocabulary led to target vocabulary acquisition.

This finding is consistent with a general trend in the literature where elaborated presentation of words is more effective than implicit presentation of words as a vocabulary building strategy in the context of storybook read-alouds (Brabham & Lynch-Brown, 2002; Brett et al., 1996; Collins, 2004; Coyne et al., 2007; Elley, 1989; Justice et al., 2005; Penno et al., 2002; Roberts, 2008; Senechal et al., 1995). In this study, elaborations included pointing to the pictures corresponding to the vocabulary words as the word was being read, providing developmentally appropriate definitions, using words in a different context, using gestures, and/or providing synonyms. Although not all elaborating strategies were used for each elaborated word, most explanations included three to five strategies.

Other studies have shown similar results using similar strategies (Collins, 2004), less strategies (Elley, 1989, Penno et al., 2002; Senechal et al., 1995) or different teaching approaches, in which the storybook and the target vocabulary were discussed extensively before, during, and/or after the read-aloud (Brabham et al., 2002; Coyne et al., 2007; Reese et al., 1999; Ulanoff & Pucci, 1999). Despite elaborated presentation being a more effective vocabulary learning strategy, many studies have also demonstrated that children can acquire novel vocabulary through implicit presentation of words during storybook read-alouds.
(Brabham & Lynch-Brown, 2002; Collins, 2004; Eller et al., 1988, Elley, 1989; Penno et al., 2002; Robbins & Ehri, 1994; Ulanoff & Pucci, 1999). Although the percentage gains in this study cannot be compared directly to those in other studies, due to the nature of the STVT-C scale used to measure target vocabulary acquisition, results from this study show that children acquired four times more knowledge of novel words that were elaborated than of novel words presented implicitly when the storybooks were read in English-only and three times more when the storybooks were read bilingually.

**Interaction between Language and Presentation conditions.** As stated earlier, there was an interaction effect between language of storybook reading (English or bilingual) and presentation of target vocabulary (elaborated or implicit), meaning that it was crucial to consider the impact of the treatment combinations on children’s target vocabulary acquisition in English.

One way to understand this interaction is to use children’s pretest and posttest scores on the researcher-created target vocabulary word measure (STVT-C) to examine the amount of growth in vocabulary knowledge seen in each of the conditions compared to the others, as well as the rank order of the treatment combinations. Looking at the predicted gains on the STVT-C based on the parameter estimates obtained in the Post-hoc 1 analyses (Table 6), all storybook reading conditions produced gains in English vocabulary knowledge. However, each of the four treatment combinations led to different amounts of gain in target vocabulary knowledge (Figure 4).

English-only storybook reading with elaborated presentations of target vocabulary (English/Elaborated) led to the highest predicted growth in target vocabulary knowledge, with a mean percentage increase of 41% of the maximum gain possible (5.63 points out of a
possible 13.65 point gain on the STVT-C, after subtracting the mean pretest score). Bilingual storybook reading with elaborated presentations of target vocabulary was the second most effective strategy. However, this treatment combination only produced a mean percentage increase of 18% of the maximum gain possible, much less than the English/Elaborated treatment combination. The two treatment combinations that only included the implicit vocabulary conditions produced considerably smaller (but significant) gains than the two top ranked treatments.

What might explain this marked difference? It may be that there are two components to effective storybook reading, hearing the words multiple times in L2 and an elaborated presentation by the reader that helps children take advantage of context to understand the word’s meaning. The English/Elaborated treatment may have provided children with both treatment components because both the storybook pictures and gestures by the readers supported children’s grasp of context and word meaning, and children had eight opportunities to hear the word in English. In contrast, the Bilingual/Elaborated storybook reading provided children with one of the key treatment components, increased context, but reduced the second key treatment component, opportunities to hear the target words in English, by half.

Following the same idea, the Bilingual/Elaborated and EnglishImplicit storybook reading treatments each contained only one key treatment component, either increased context or increased word repetitions in English. When these two treatment combinations were compared, the Bilingual/Elaborated condition led to greater gains in English vocabulary knowledge. These results are in line with the idea that although both key treatment components are important for vocabulary acquisition in L2 through storybook reading, it
appears that providing increased context in the bilingual treatment, even if the number of exposures to target vocabulary words is reduced, is a more effective vocabulary building strategy than exposing children to words in L2 multiple times, if strong contextual support is not provided.

Other Findings

**Initial general vocabulary: English and bilingual.** Results of the present study demonstrated moderate correlations between children’s acquired target vocabulary knowledge and children’s initial general English, Spanish, and bilingual (English and Spanish) receptive vocabulary (Table 5). These results suggested that children with higher levels of vocabulary proficiency in English, Spanish, or bilingual (English and Spanish) attained more target vocabulary knowledge than children with lower levels of vocabulary proficiency. These results are similar to those in other studies that have demonstrated a positive relationship between general initial vocabulary of monolingual students and acquired target vocabulary knowledge (Penno et al., 2002; Robbins & Ehri, 1994; Senechal et al., 1995). For second language learners, stronger proficiency in general initial vocabulary in a second language (Collins, 2004; Lugo-Neris et al., 2010; Roberts, 2008), native language (Lugo-Neris et al., 2010), or bilingual (L1 and L2 combined; Lugo-Neris et al., 2010) also were related to higher acquired target vocabulary in the context of storybook reading interventions.

In the present study, statistical analyses also showed significant effects of children’s initial general English and bilingual vocabulary on children’s acquired target vocabulary knowledge (Post hoc 1, Table 8). These results suggest that prior general vocabulary knowledge in English (Collins, 2004; Roberts, 2008), or English and Spanish combined
(bilingual; Neris et al., 2010), had a significant impact on children’s vocabulary learning from the storybook reading interventions. Children with more proficiency in the English language, or English and Spanish combined, may have been more skilled in comprehending the storybook, understanding the verbally presented vocabulary elaborations, deducing definitions of implicitly presented target vocabulary in the storybooks (Reese & Cox, 1999; Robbins & Ehri, 1994), or may have had a more efficient retrieval process which could facilitate the acquisition of novel vocabulary (Senechal et al., 1995). In addition, children with higher levels of proficiency in English, and English and Spanish combined, may have had an advantage at bridging concepts learned in L1 with concepts in L2 (Lugo-Neris et al., 2010). Although children with higher initial receptive vocabulary knowledge in L2, or L1 and L2 combined, acquired more target vocabulary knowledge, it is important to note that all children learned a significant amount of target vocabulary within each treatment combination. Because of high intercorrelations between initial general vocabulary in Spanish with initial general vocabulary in English and bilingual, the effect of L1 on target vocabulary acquisition could not be examined.

**Home storybook reading frequency.** In this study, a small, but statistically significant correlation was found between the frequency with which children were read to in the home environment (*Home Reading Questionnaire*) and children’s initial general receptive vocabulary in English (*PPVT-4*), Spanish (*ROWPVT-SBE* raw score), and Bilingual (*ROWPVT-SBE*). The frequency with which an adult read storybooks to children in the home environment, however, was not statistically correlated with children’s acquired target vocabulary knowledge (*STVT-C Posttest*). This finding was surprising, given that other studies have found that the frequency of parental home storybook reading contributes to
children’s target word learning through storybook reading interventions (Collins, 2004; Senechal et al., 1995).

Collins (2004) examined the use of storybook reading as a vocabulary intervention for second language learners in preschool. She speculated that children who are read to in the home environment have experience learning words from the pictures and the texts that they are exposed to. In addition, Collins hypothesized that children who have frequent experience with storybook reading in the home, develop common expectations about the process of listening to storybooks. For example, children know that storybooks present information; that they have a general framework that all stories follow, and that stories have topics that can be discussed, such as new vocabulary (Collins, 2004).

It is possible that in this study, no significant relationship was found between frequency of parental home storybook reading and target vocabulary knowledge because children’s experiences with storybook reading in the school setting compensated for any lack of experiences in the home setting. Children that participated in the study had been enrolled in kindergarten for more than six months. During this time, as is typically done in the early grades, children were exposed to frequent storybook reading experiences in the classroom environment. It is possible that, regardless of the frequency of storybook reading in the home environment, children may have had enough exposure to storybook read-alouds in the classroom to develop the storybook reading-related expectations previously discussed. That is, children who were never read to in the home setting, as well as children who were read to everyday, may have received enough storybook reading exposure in the classroom setting to understand the purpose of reading, the framework followed in most storybooks, and the use of discussions and elaborations to emphasize important points and activate learning, etc.
Number of exposures to target vocabulary words. In this study, regardless of the treatment conditions, children were exposed to all target vocabulary words eight times.

Previous studies on monolingual children have demonstrated significant gains in vocabulary knowledge after one to four exposures to novel words (Brett et al., 1996; Coyne et al., 2007; Elley, 1989; Justice et al., 2005; Robbins & Ehri, 1994). Other studies have shown that second language learners have demonstrated significant gains in vocabulary knowledge after one exposure to novel words (Ulanoff & Pucci, 1999), six exposures (Collins, 2004), nine exposures (Lugo-Neris et al., 2010), or an unequal number of exposures (Appel & Vermeer, 1998; Elley, 1991, 2000; Elley & Mangubhai, 1983; Roberts, 2008, Silverman, 2007). The results of this study demonstrated that English Language Learners learned low-frequency novel vocabulary through implicit and elaborated exposures of novel vocabulary in L2, in the context of bilingual and English-only storybook read-alouds. Children demonstrated receptive and/or expressive knowledge of the target vocabulary words after only eight exposures to the words. Although neither eight elaborated or implicit exposures were sufficient for children to learn the maximum target vocabulary knowledge possible, suggesting additional exposure to target vocabulary within storybook reading should be done with caution. Each storybook contained 10 target vocabulary words that were presented twice per book reading. Incorporating an additional exposure to each target vocabulary in each book or adding an additional book reading would extend the length of time it would take to either read the book or implement the entire intervention. More exposures would be impractical if storybook reading was implemented in the schools and would also require that young children be on-task and interested in the storybook across multiple readings or extended periods of time.
Target vocabulary word features. A total of 20 target vocabulary words were used in this study (10 in each book; Appendix A). English as a Second Language (ESL) teachers classified the target vocabulary words as “very likely to be unknown” or “unlikely to be known” by English language learners in kindergarten. Six of the target vocabulary words that were included in the study were also included in Collins’ (2004) study. The other 14 words were selected by the researcher, following similar criteria to that of Collins. Target vocabulary words were classified as nouns, adjectives, and verbs, and similarly distributed by word class in each of the two books. In addition, following the criteria of Collins’ (2004) study, the words incorporated in the study were rare, unfamiliar, low-frequency words, that were “equally unessential” (Collins, 2004, p.169) to understanding the meaning of the story or the plot itself.

Elley (1989) suggested that amongst various word characteristics, children were more likely to learn novel vocabulary words when they appeared more than once in the story, when they were depicted in pictures at least once, when the words were more vivid, when the words were related to a concept that was familiar to the children, and when the words were important to development of the plot. Additionally, Eller et al. (1988), suggested that the number of exposures to the target vocabulary, the degree of children’s interest in the word, and the contribution of the word in the storybook, could affect children’s acquisition and depth of vocabulary knowledge. Similar to the results of Collins (2004), results of this study demonstrated that second language learners can learn a significant amount of new target vocabulary even when some of the before-mentioned criteria are not met. That is, second language learners can acquire target vocabulary that is secondary to the understanding of the story, even when the target vocabulary is not elaborated during storybook reading and when
there are not strong contextual cues surrounding it. However, it is possible that vocabulary words that are more important to the development of the plot, that contribute more to the story, and that are surrounded by strong context clues, would be more readily acquired by second language learners through storybook read-alouds.

Assessing target vocabulary acquisition through a receptive and expressive measure. Some studies have suggested the use of receptive measures as a means to assess young second language learners’ acquisition of novel vocabulary knowledge (Collins, 2004; Robbins & Ehri, 1994). The use of receptive measures when assessing young second language learners’ vocabulary acquisition is supported by the idea that children learning a second language may be experiencing a “silent period” or may not have sufficient second language proficiency to provide an expressive response (Francis et al., 2006; Gass & Selinker, 2001; Krashen & Terrell’s, 1983). Hence, receptive measures tend to be more sensitive to second language learners’ gains in novel vocabulary knowledge. However, a higher performance score on a receptive measure could also be influenced by a higher likelihood of children guessing the correct response (Lugo-Neris et al., 2010).

Although there is strong support for the use of receptive measures when assessing second language learners vocabulary knowledge, concern with the possibility of children obtaining high performance scores due to chance, led the researcher to create a measure that included a receptive and expressive component. In this study, a scaled composite score (STVT-C) was used to represent children’s target vocabulary knowledge. The STVT-C measured receptive and expressive vocabulary knowledge by the use of a receptive picture test and an expressive definitions test. Scores on both tasks were then combined in a way that paralleled the natural learning process of second language acquisition, where children
generally first develop receptive knowledge of a vocabulary concept and then develop a verbal understanding or definition of the word (expressive knowledge; Bates et al., 1988, Francis et al., 2006; Gass & Selinker, 2001; Krashen & Terrell’s, 1983). When developing the measure, there was also concern that the second language learners would be at a disadvantage due to limited proficiency in L2 or due to experiencing a “silent period” (Krashen & Terrell’s, 1983). In order to offset the disadvantage of using an expressive measure on second language learners’, children were given credit for definitions expressed in either L1, L2, or with common gestures that were used as elaborations during storybook reading. Ultimately, the purpose of the task was to assess whether children had an understanding of the target vocabulary concept, not whether they could provide a definition in L2.

Despite concerns with the STVT-C’s sensitivity to gain in target vocabulary knowledge, it proved to be effective in capturing second language learners’ overall knowledge of the target vocabulary. Children in the study acquired a significant amount of target vocabulary words, as measured by the STVT-C. When evaluating gain in receptive and expressive measures separately, STVT-P and STVT-D, children showed a 14% gain in receptive vocabulary knowledge (mean gain of 2.87 out of a maximum score of 20 on the STVT-P) and a 17% gain in expressive vocabulary knowledge (mean gain 6.69 out of a maximum score of 40 on the STVT-D). Other similar studies that have incorporated expressive vocabulary tasks (Appel & Vermeer, 1998; Lugo-Neris et al., 2010; Silverman, 2007) have also been able to successfully show sensitivity to gain in second language learners’ novel vocabulary knowledge.
Study Limitations

A major limitation to this study is that target vocabulary knowledge was only assessed before and after the treatment conditions. It would have been interesting to assess how much target vocabulary knowledge, in either L1 or L2 (depending on the treatment condition), children acquired at the midpoint of each treatment condition. That is, if the STVT-C measure would have been implemented after two readings (four exposures of the target vocabulary), and then again after the final reading of each storybook (after the eight exposures), then it would have facilitated examining the following: (a) whether four exposures to novel words were sufficient for children to learn target vocabulary, (b) the gain in vocabulary acquisition between four exposures and eight exposures, and (c) whether children in the bilingual condition were able to acquire the concepts of the target vocabulary in L1 in order to then rely on this knowledge and bridge the knowledge in L1 to the knowledge in L2. Without assessing knowledge of the target vocabulary concept in Spanish, after the Spanish-prereading phase of the bilingual storybook reading treatment, it is impossible to determine whether children in the bilingual condition had sufficient knowledge of the vocabulary concepts. If children in the bilingual condition did not have or acquire the concepts of the target vocabulary in L1, bridging knowledge between L1 and L2 would be limited and children would have to rely on the additional exposures in English to learn the target vocabulary knowledge. Based on other studies (Brett et al., 1996; Coyne et al., 2007; Elley, 1989; Justice et al., 2005; Robbins & Ehri, 1994), it was assumed that children would acquire concepts in their native language after only four exposures to the novel words, but there is no certainty that learning took place after the initial four exposures in L1. Although assessing vocabulary learning at midpoint would have provided important information, there
was concern that testing at the midpoint of each condition and retesting after the final reading may have directed children’s attention to the target vocabulary which could have affected their learning.

A second limitation of this study was that target vocabulary maintenance was not assessed. Administering a delayed posttest would have provided information regarding second language learners’ ability to recall novel vocabulary in a second language, and hence, provide important information on whether storybook reading interventions, specifically whether any of the treatment combinations, led to maintenance of novel vocabulary in L2. Some studies on monolingual students have demonstrated that novel word learning is maintained after one-week post intervention (Elley, 1989; Coyne et al., 2007; Senechal et al., 1995). One study that implemented storybook reading bilingually also supported the permanence of new word learning in a second language at one week after the intervention (Ulanoff & Pucci, 1999). Future research is needed to further investigate the long-term maintenance of novel words in L2, comparing bilingual and L2 storybook reading vocabulary interventions. Findings may support the use of one particular treatment combination (English/Elaborated, Bilingual/Elaborated, English/Implicit, or Bilingual/Implicit) over others to enhance children’s maintenance of novel word learning.

The analyses used in this study controlled for characteristics associated with the design of the study, sequence of language treatments, sequence of presentation (confounded with group), and period (confounded with storybook), among other controls. A third limitation of this study is that, although all treatment conditions were counterbalanced across period and sequence of language, storybooks were not counterbalanced. That is, “Henry’s Happy Birthday” (Keller, 1990) was always read first and “Baby Bird’s First Nest” (Asch,
1999) was always read second. Results of the GLM analysis (Post-hoc 1, Table 8) demonstrate that storybooks (“period”) had an effect on children’s $STVT-C$ Posttest scores, which suggests that the impact of the intervention variables on the $STVT-C$ may vary somewhat by storybook or by time period. Unfortunately, exploring the storybook (“period”) effect was not possible because of the small number of words that could be compared across books and the confounding of storybook and time period. It may be possible that some characteristics of the storybooks, or the target vocabulary presented within each book moderated the impact of the two factors (Language and Presentation) examined in this study. Although storybook (“period”) was controlled for in the analyses in the study, counterbalancing the storybook across period and sequence of language would have created a truly counterbalanced design.

A fourth limitation of this study is that there was no bilingual treatment condition that incorporated Spanish prereading (four exposures to target vocabulary in Spanish), but equalized the number of presentations of target vocabulary in English-only (eight exposures to target vocabulary in English) to that of the English-only storybook reading condition (with eight exposures to target vocabulary in English). Although this would generate a lengthy intervention condition with a total of six readings of the storybook and 12 exposures to the target vocabulary, it would allow examining whether Spanish pre-reading provides any benefit, above and beyond, the benefits gained from the English-only storybook reading condition. More specifically, it would allow to investigate whether the Bilingual/Elaborated condition led to less gain in target vocabulary knowledge than the English/Elaborated condition because Spanish pre-reading was not a very effective strategy in linking knowledge
in L1 and L2, or whether more elaborations and exposure of target vocabulary in English was required to benefit from the bilingual intervention.

A fifth limitation of this study is that there was no comparison group that did not receive any of the treatment conditions. The main focus of the study was to compare the effect that the language in which the storybook reading was implemented had on children’s ability to learn second language vocabulary. The effect of bilingual storybook reading on children’s novel word learning was compared to that of English-only storybook reading. English-only storybook reading was used to some extent, as a “treatment as usual” comparison condition. Although a no-treatment control group would have provided information on how much target vocabulary children would have learned without any intervention, it is very unlikely that children would have learned any of the rare, low-frequency target vocabulary on their own. In addition, it is also unlikely that teachers or parents would have exposed the children to the storybooks presented in the study given that they were out of print and not best sellers when they were in print.

The sixth limitation is the small sample size. A larger sample of children would have increased the power of the analyses and perhaps allowed to detect systematic differences between treatment conditions in subgroups within the sample [i.e., differences in predicted effect of treatment across children with different initial general English proficiency, differences in treatment effects across storybooks (“period”; Cohen, 1988)] . Obtaining access to children that could participate in the study and that met the study criteria was challenging.

Given the intervention conditions, the effects of this study should only be generalized to young children who are native Spanish-speakers. One of the main rationales in
incorporating children’s L1 to help them learn L2 is because of the linguistic interdependence between languages and the ability to transfer literacy skills from L1 into L2 (August & Shanahan, 2006; Cummins, 1979; Francis et al., 2006; Sousa, 2011). Children that are learning a second language, for example, already have vocabulary in their native language. If L1 and L2 share words with common roots, it becomes easier to associate a word in L2 with a word in L1 (August & Shanahan, 2006; Cummins, 1979; Francis et al., 2006; Sousa, 2011). Some words in English and Spanish, for example, share common roots in Greek and Latin (Sousa, 2011); thus, Spanish and English share a large number of cognates which can help children develop associations between word concepts and labels in L1 and L2. In this study, the Spanish-speaking students may have benefited from the use of cognates when listening to storybooks in L2 (Francis et al., 2006; Sousa, 2011). Children may have benefitted from associating target vocabulary words in English with their cognates in Spanish and, more so, by associating Spanish words with English cognates throughout the storybooks in order to develop a better understanding of the storybook plot and gather contextual information. Given the similarities in common root words and linguistic characteristics between English and Spanish, the findings in this study may not be generalized to children whose native language is not Spanish, as the meta-linguistic transfer between their L1 and L2 may be different. Further research on second language learners of diverse language backgrounds should be sought in order to examine whether the effects found in this study can be generalized to children who are not native Spanish speakers.

In sum, certain limitations in the design of the study may have affected the results of the analyses and the conclusions that could be derived from these. Minor changes in the design, the addition of a posttest at mid-point, or adding a third storybook intervention
condition may have led to a better ability to understand whether vocabulary knowledge is transferred between dominant and secondary languages. The following sections will discuss the study’s implications for practice and future directions for research.

**Implications for Practice**

There are three implications of this study. First, results of this study provide further support for the use of simple, repeated storybook reading as a vocabulary building intervention for second language learners. Although presenting vocabulary words implicitly during storybook reading has proven to lead to word learning, using rich elaborations of words during read-alouds can be much more effective. Elaborating on words during storybook reading facilitates children’s acquisition of novel vocabulary in their second language. Some elaborating strategies that proved to be effective during repeated storybook reading included pointing to the pictures that depicted the vocabulary words, providing developmentally appropriate definitions, using words in a different context, using gestures, and providing synonyms. Adults reading to second language learners should focus on providing elaborations in order to help children acquire vocabulary concepts. Readers should provide multiple exposures to the storybook and the vocabulary words. Elaborating on words during storybook reading may be a simple strategy that adults (parents, teachers, and paraprofessionals) may consider implementing in the home-setting or classroom to support English language learners’ acquisition of vocabulary in L2 (Collins, 2004; Elley, 1991, 2000; Elley & Mangubhai, 1983; Lugo-Neris et al., 2010; Roberts, 2008; Ulanoff & Pucci, 1996).

Second, although repeated storybook reading in English with elaborations was more effective than the bilingual elaborated strategy, pre-reading in children’s native language also proved to be effective. Incorporating storybook prereading with elaborations in children’s
native language, before they were exposed to the storybook in their second language, was useful in aiding children’s acquisition of novel words in L2 and proved to be the second most effective storybook reading treatment combination. The findings of this study suggest that repeated storybook reading that incorporates children’s native and second languages and provides elaborations of novel words in both languages may help children learn target vocabulary in L2. By providing a means for children to learn vocabulary concepts, acquire knowledge, and comprehend the text in L1, children were able to draw upon this knowledge in L1 when learning the labels in L2 or expanding on the vocabulary concepts in L2 (Cummins, 1984; Gass & Selinker, 2001; Roberts, 2008; Sousa, 2011). Storybook prereading in children’s native language is something that non-English speaking parents or paraprofessionals can implement to assist young children in vocabulary acquisition, when reading in English with vocabulary elaborations cannot be provided.

Finally, children’s initial general receptive vocabulary in English, Spanish, and bilingual was related to children’s acquisition of vocabulary. Results in this study demonstrated that children with a higher receptive vocabulary proficiency in L1, or L1 and L2 combined, obtained higher scores on the target vocabulary task. Findings also suggest that children with stronger English receptive vocabulary skills seemed to benefit more from English-only storybook reading with word elaborations than children with initial lower English receptive vocabulary skills. However, findings also suggest that both children with high and low receptive English vocabulary benefit from all of the different storybook reading treatment combinations. This finding suggests that although children that are more proficient in English, or English and Spanish combined, may benefit more from a particular
intervention, all second language learners, regardless of their initial English proficiency can benefit from storybook reading as a vocabulary building intervention in L2.

In sum, findings of this study provide additional evidence that repeated storybook reading, particularly with vocabulary elaborations in children’s second language or in conjunction with prereading in their first language, represents an effective vocabulary building strategy for children learning a second language. This study also supports the idea that there is a “Common Underlying Language Proficiency” that can facilitate the acquisition of vocabulary in L2 if a child can bridge the knowledge and concepts in their native language with the second language. Future research should examine strategies to help ease the transfer of knowledge between L1 and L2 in order to help children associate new knowledge in L1 with prior knowledge in L2.

**Future Directions for Research**

Several changes in the design of this study could be implemented for future research. First, a larger sample size may aid in generating more conclusive results (Cohen, 1988). Second, incorporating a measure to assess children’s delayed target vocabulary knowledge would provide insight on the effect of storybook reading vocabulary interventions as a means to develop long-term maintenance of word knowledge. Third, assessing children’s target vocabulary learning at midpoint (in L1 or L2, consistent with the language of the first readings), would provide the necessary information to measure whether children acquired new concepts after only four exposures. Measuring target word knowledge at the midpoint is particularly important in the bilingual storybook reading intervention because if children do not know or do not acquire the novel concept for the word in L1, the benefit of using a prereading strategy in L1 to facilitate concept transfer to L2 is reduced. Without assessing
target concept knowledge in L1, one can only speculate whether children bridged knowledge between L1 and L2 or relied exclusively on the English-only reading phase of the intervention to learn vocabulary. Fourth, counterbalancing the storybooks used across time periods and sequence of language would increase the design-related, internal controls of the study and lead to a full cross-over design. Fifth, adding an additional, expanded, bilingual storybook reading condition, in which children would be exposed to Spanish pre-reading and an expanded English-only storybook reading phase, would equalize the number of exposures to target vocabulary in L2 between this suggested condition and the English-only storybook reading condition. The expanded bilingual storybook reading condition would allow to examine whether, on average, the benefits of English storybook reading over the bilingual storybook reading were due to the additional exposure to the target vocabulary in L2, or whether the Spanish prereading component of the bilingual intervention was not as beneficial in linking knowledge between L1 and L2 as it was hypothesized.

In the present study, analyses indicated that the bilingual storybook reading intervention was not as effective as the English-only storybook reading intervention. There are several possible reasons for this, including children’s difficulty in developing a link between concepts in L1 and concepts in L2 that would facilitate the transfer of information across languages with ease. Future research should focus on developing and examining effective strategies that can enhance linking or bridging knowledge between L1 and L2. Once these strategies are identified, it would be interesting to revisit this study and compare a bilingual and English-only storybook reading intervention to determine the effect that language of intervention has on children’s acquired word knowledge when maximally effective bridging strategies are used.
Future studies should examine the benefits of home-school storybook reading vocabulary interventions for second language learners. That is, it would be interesting to gain more information on the effectiveness of storybook reading interventions that incorporate prereading in L1 in the home setting and reading in L2 in the school setting. At home, non-English speaking parents may be able implement the prereading phase of the bilingual storybook reading intervention in their native language and teachers or paraprofessionals could implement the second phase of the intervention (English-only storybook reading) in the school setting. It would be recommended that parents receive training on storybook reading in order to increase the probability that all parents implement the intervention in a similar fashion and that they develop effective elaborating strategies. Home-school collaboration could decrease the workload of the teachers in the school, by sharing the responsibility with parents. On the other hand, parents could help their children develop vocabulary in L2, by integrating a simple book reading strategy that may already be part of their daily routine.

Conclusion

Storybook reading is a simple practice that can be easily implemented in the home and school setting. Storybook reading as a vocabulary intervention has been widely studied in monolingual children and has proven to be an effective vocabulary building strategy (Bus et al., 1995; Scarborough & Dobrich, 1994). Studies on the use of storybook reading as a vocabulary intervention for young second language learners, however, are limited (Appel & Vermeer, 1998; Collins 2004; Elley, 1991; Elley & Mangubhai, 1983). Even less research is available on storybook reading interventions for second language learners that incorporate children’s native and second language (Lugo-Neris et al., 2010; Roberts, 2008; Ulanoff &
Pucci, 1999). Although available research on the effectiveness of storybook reading vocabulary interventions that incorporate children’s native and second language is limited, findings are promising, yet inconclusive. The goal of the present study was to expand on past research and develop a better understanding on the use of bilingual storybook reading (Spanish prereading followed by English-only storybook reading) as a vocabulary building intervention for young English language learners.

Overall, the results of this study contribute to current research in the field. First, the results of this study demonstrate that storybook reading is an effective vocabulary building intervention for English language learners. With the academic challenges that second language learners face due to limited vocabulary in their second language, it is encouraging to find simple and practical interventions that can aid in young children’s vocabulary development in L2. Accelerating second language acquisition in early schooling can support language development and potentially decrease the vocabulary gap between English language learners and non-English language learners and promote similar academic achievement between native and non-native English speakers.

Second, unlike in previous research studies (Lugo-Neris et al., 2010; Ulanoff & Pucci, 1999), this study’s crossover design allows one to examine whether there was an interaction effect between language and presentation. Results demonstrated that there was an interaction effect, such that the interaction of language of storybook reading and presentation of words modified the effect of the individual treatments on children’s vocabulary gain. That being said, it is important to note that all treatment combinations (English/Elaborated, English/Implicit, Bilingual/Elaborated, and Bilingual/Implicit) proved to be effective
vocabulary interventions, although each treatment combination led to different amounts of English vocabulary acquisition.

Third, this study also evaluated the impact of initial general English receptive vocabulary and initial general Bilingual receptive vocabulary (English and Spanish) on overall learning of English target vocabulary. Results of the present study demonstrated that both initial general receptive English and Bilingual (English and Spanish) proficiency affected vocabulary acquisition through storybook reading. Similar to other studies (Collins, 2004; Lugo-Neris et al., 2010; Penno et al., 2002; Roberts, 2008; Robbins & Ehri, 1994; Senechal et al., 1995), results suggested that the more proficient children were in English, or English and Spanish combined, the more they seemed to benefit from storybook reading. Children with higher English proficiency seemed to benefit much more from English reading with elaborated presentations than children with low English. However, it is important to note that children with varying degrees of initial general English proficiency benefitted from all treatment combinations. This finding is promising, as it suggests that storybook reading as a vocabulary intervention for second language learners can also benefit children with lower proficiency in English.

Based on these findings, it is apparent that storybook reading is a valuable tool that can be implemented to help English language learners acquire target vocabulary in English. Both parents and educators should be mindful of the potential benefits of storybook reading in children who are learning English as a second language. In addition, they should also be conscientious of incorporating storybook reading strategies that have been proven to be effective or useful strategies when reading to children. Incorporating such a simple and
familiar vocabulary building practice can increase second language learners’ English vocabulary and, subsequently, accelerate second language vocabulary development.
REFERENCES


sixteenth mental measurements yearbook. Lincoln, NE: Buros Institute of Mental Measurements.


http://cehd.umn.edu/nceo/LEP/default.htm


APPENDICES
Appendix A

Table A1. *Descriptive Information and Descriptive Statistics on Target Vocabulary Words*
**Table A1**

*Descriptive Information and Descriptive Statistics on Target Vocabulary Words*

<table>
<thead>
<tr>
<th>Storybook</th>
<th>Number of Pages</th>
<th>Target Vocabulary Word</th>
<th>Word Class</th>
<th>Mean gain in STVT-C</th>
<th>Standard Deviation</th>
<th>Range in STVT-C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“Henry’s Happy Birthday”</strong></td>
<td>28</td>
<td>bounded</td>
<td>verb</td>
<td>1.34</td>
<td>1.17</td>
<td>0-3</td>
</tr>
<tr>
<td>(Keller, 1990)</td>
<td></td>
<td>coiled</td>
<td>verb</td>
<td>0.41</td>
<td>1.05</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>crimson(^b)</td>
<td>adjective</td>
<td>0.45</td>
<td>1.09</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>donned(^a)</td>
<td>verb</td>
<td>0.38</td>
<td>0.90</td>
<td>-1-3</td>
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<tr>
<td></td>
<td></td>
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<td>adjective</td>
<td>0.69</td>
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<td></td>
<td></td>
<td>glaze(^b)</td>
<td>noun</td>
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<td></td>
<td></td>
<td>pantofles(^b)</td>
<td>noun</td>
<td>1.48</td>
<td>1.24</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>scowled</td>
<td>noun</td>
<td>0.66</td>
<td>1.20</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spectacles(^b)</td>
<td>noun</td>
<td>1.14</td>
<td>1.53</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>tartan(^b)</td>
<td>adjective</td>
<td>0</td>
<td>0.96</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>foliage(^b)</td>
<td>noun</td>
<td>0.24</td>
<td>0.51</td>
<td>0-2</td>
</tr>
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<td></td>
<td>fulgent(^b)</td>
<td>adjective</td>
<td>-0.03</td>
<td>0.68</td>
<td>-1-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mahogany</td>
<td>adjective</td>
<td>0.66</td>
<td>1.37</td>
<td>-1-3</td>
</tr>
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<td></td>
<td></td>
<td>mauve(^a,b)</td>
<td>adjective</td>
<td>0.72</td>
<td>1.33</td>
<td>-1-3</td>
</tr>
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<td></td>
<td></td>
<td>perched(^a,b)</td>
<td>verb</td>
<td>0.10</td>
<td>0.77</td>
<td>-1-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>plunged</td>
<td>verb</td>
<td>0.52</td>
<td>1.09</td>
<td>-1-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prostrated(^b)</td>
<td>adjective</td>
<td>0.38</td>
<td>1.15</td>
<td>-1-3</td>
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<td></td>
<td></td>
<td>seized</td>
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<td>slumber(^a)</td>
<td>noun</td>
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<td>1.18</td>
<td>-1-3</td>
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<tr>
<td></td>
<td></td>
<td>tuft(^a)</td>
<td>noun</td>
<td>0.17</td>
<td>0.93</td>
<td>-1-3</td>
</tr>
</tbody>
</table>

**Note.** \(^a\) Target vocabulary words in Collins’ (2004) study; \(^b\) Target vocabulary words with Spanish cognates; cognates not necessarily used in Spanish translation of storybooks.
Appendix B

*Home Reading Questionnaire*

English version:

If you agreed to allow your child to participate, please answer the following question:

**In a typical week, how often does someone in your home read to your child?**

*never   once   2  3  4  5  6  7  if more, please write in: ___*

---

Spanish version:

Si usted da permiso para que su hijo(a) participe en el estudio, por favor conteste la siguiente pregunta:

“**¿En una semana normal, con qué frecuencia alguien en su casa lee cuentos a su hijo(a)?**”

* nunca   una vez   2  3  4  5  6  7  si más de 7 veces, indique cuántas veces: ___*
Appendix C

Sample Item from the Storybook Target Vocabulary Test- Picture (STVT-P)

**Item:** (See next page for picture test.) “Show me the picture that shows spectacles.” or “Show me spectacles.” “Put your finger on spectacles.”

Correct answer: E
Appendix D

Sample item from the Storybook Target Vocabulary Test- Definition (STVT-D)

**Item:** “What do spectacles mean?”/ “What are spectacles?”

Examples of responses & corresponding scores:

- **2 point examples (comprehensive response):**
  - Eyeglasses; Glasses / Espejuelos; Lentes
  - Something you put on your face (over the nose) to help you see better / Algo que te pones en la cara (sobre la nariz) que te ayuda a ver mejor

- **1 point examples (related response):**
  - Something you wear (Q*) / Algo que te pones (Q*)

- **0 point examples (un-related response):**
  - To see (Q*) / Para ver (Q*)

Child’s response (recorded verbatim):  
SCORE: _______
Appendix E

Checklists Used to Ensure Appropriate Administration of the Storybook Reading Interventions and Assessment Measures

Appendix E1. Checklists for “Henry’s Happy Birthday” (Keller, 1990) reading

Appendix E2. Checklists for “Baby Bird’s First Nest” (Asch, 1999) reading

Appendix E3. Checklist for the STVT-D and STVT-P Administration

Appendix E3. Checklist for the PPVT-4 Administration

Appendix E4. Checklist for the ROWPVT-SBE Administration
Appendix E1

Checklists for “Henry’s Happy Birthday” (Keller, 1990) reading

*Henry's Happy Birthday (Keller, 1990)*  
*Word set A: Elaborated; B: Implicit*

<table>
<thead>
<tr>
<th>Word</th>
<th>Pointed to Picture</th>
<th>Provided Definition</th>
<th>Used word in Different Context*</th>
<th>Used Gesture*</th>
<th>Provided Synonym*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tartan</td>
<td>Cuadros</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spectacles</td>
<td>Espejuelos</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bounded</td>
<td>Botó</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Pantofles</td>
<td>Zapatillas</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Elated</td>
<td>Eufórico</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glaze</td>
<td>Betún</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Glaze</td>
<td>Betún</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scowled</td>
<td>Frunció el ceño</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pantofles</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Donned</td>
<td>Aderezó</td>
<td>X</td>
<td>X</td>
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</tr>
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<td>Aderezó</td>
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<td>X</td>
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<td>Carmési</td>
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<td>X</td>
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</tr>
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<td>X</td>
<td>X</td>
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</tr>
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Total observations: 46

*= only when applicable

X= Observed behavior for target vocabulary words

O= Circle Language Word Was Presented In
### Apendix E1

Checklists for “Henry’s Happy Birthday” (Keller, 1990) reading (Continued)

#### Henry's Happy Birthday (Keller, 1990)
**Word set B: Elaborated; A: Implicit**

<table>
<thead>
<tr>
<th>Word</th>
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Total observations: 48

*= only when applicable

X= Observed behavior for target vocabulary words

O= Circle Language Word Was Presented In
Checklists for “Baby Bird’s First Nest” (Asch, 1999) reading

**Baby Bird's First Nest (Asch, 1999)**

**Word set C: Elaborated; D: Implicit**

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<th>Word</th>
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<th>Pointed to Picture</th>
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Total observations: 48

* = only when applicable

X = Observed Behavior

O = Circle Language Word Was Presented In

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*Appendix E2*
### Appenlix E2

Checklists for “Baby Bird's First Nest” (Asch, 1999) reading (Continued)

**Baby Bird's First Nest (Asch, 1999)**  
**Word set D: Elaborated; C: Implicit**

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<th>Word</th>
<th>Did NOT Elaborate</th>
<th>Pointed to Picture</th>
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<th>Used word in Different Context*</th>
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</table>

Total observations: 41  
*= only when applicable  
X= Observed Behavior  
O= Circle Language Word Was Presented In
Appendix E3

Checklist for the PPVT-4 Administration (Dunn & Dunn, 2007)

Arrangement of material:
- Corner seating
- Hold record form out of the sight of the child
- Establish rapport (present task as a game)

Record identifying information:
- Confirm date of birth with list provided by researcher
- Calculate chronological age

Administering the test

Introducing the test and using the training items
- Show appropriate training page (training items)
- Follow training item directions: (to pass training items, examinee must respond to at least TWO training items; i.e., if A1 and A2 are correct then go to start item; if incorrect, administer all training items.)
  *(It is okay to practice more extensively with training items to make sure that the examinee understands test.)

Presenting the stimulus word for each item:
- Say “Put your finger on___”; “Show me __.”, “Point to __.”, “Where is ___?”
- Child can point to response or state the picture number as the response.
  *You can repeat a stimulus word when you think it is appropriate or when the child asks for a repetition.

Recording responses:
- Circle the child’s response in the booklet.
- If response is incorrect, also draw a slash through the “E”.
- If child says “I don’t know,” write “DK” on answer sheet and draw a dash through the “E”.
- When you finish administering an item set, record the number of errors per set

Other important considerations:
*Do NOT coach students
*Give children 10 seconds to respond to an item. At 10 seconds say “Try one. Point to the one you think it might be.” If examinee does not respond, score as incorrect.
* If child is responding too quickly, ask them to slow down and look at all pictures before saying their answer.

* Let children guess. If examinee is having a hard time choosing, say: “That was a difficult one. Let’s try another one.”

* Do not omit test items.

* You can redirect attention by saying “Listen carefully”.

* If examinee always points to the same quadrant, ask him to look at all pictures carefully and point to all pics.

* You can say: “good!”; “You are doing well.”; “That’s fine.” As you administer the test.

* Do NOT let the examinee know whether their answer was correct or incorrect. If need be, just say: “That was a good answer”.

**Item sets, start points, and critical range**

- Items administered in sets of 12. Administer all 12 items in the set order.
- Select appropriate Start Item as indicated on easel.
- Establishing basal set: when one or zero errors occur in a set. If children make more than one mistake, continue administering items in that set and drop back to the previous set and administer all 12 items in a row. Do this until one or zero errors occur in one set.
- Establishing the ceiling: After establishing the basal set, continue administering items until a child makes 8 or more errors per set. Discontinue testing when the ceiling has been reached.

**Calculating the raw score**

- Calculate the total number of errors and write them in the protocol (pg.2). Calculate the raw score.
- Convert raw score to standard score
- Calculate percentile (pg. 181- manual)
Appendix E4

Checklist for the Administration of ROWPV T-SBE (Brownell, 2001)

Arrangement of material:
- Corner seating
- Hold record form out of the sight of the child
- Establish rapport (present task as a game)

Recording identifying information:
- Confirm date of birth with list provided by researcher
- Calculate chronological age (subtract day, month, years….right to left)

Administering the test

Introducing the test and using the training items
- Establish language dominance (assume Spanish for pretest administration), but provide instructions, cues, prompts in the non-dominant language whenever it seems helpful.
- Always present items in the child’s dominant language. If the child gets the item incorrect, present the item in the non-dominant language. (Assume Spanish for pretest administration).
- Provide examinee instructions and examples. (pg.22 manual) Show appropriate Sample items (A through D). Child does not have to get all example items correct in order to proceed with test. During the presentation of examples, the examiner should provide guidance to make sure that the child understands the task.

Presenting the stimulus word for each item:
- Say “Point to the picture that shows _____”; “Which picture shows _____?” (In Spanish.)
  * Child can point to the response, or state the number associated with the picture, as the response.
  * You can repeat a stimulus word when you think it is appropriate or when the child ask for a repetition.
- If child does NOT know the answer in the dominant language (Spanish); repeat the item in the non-dominant language (English).

Recording responses:
- Write down the child’s response in the booklet.
- If response is incorrect, draw a slash through the item number.
- If the child says “I don’t know” and, despite encouragement, does not choose an answer, write “DK” on answer sheet and mark as incorrect.
- If child provides a correct response in Spanish, draw a slash through the letter “S”. If the child gives a correct response in English, draw a slash through the letter “E”.

**Other important considerations:**

*Do NOT coach students

*Give children a while to respond to an item. After several seconds or if a child says “I don’t know,” encourage the child to guess by saying “Take your best guess.” If examinee does not respond, score as incorrect.

*If child is responding too quickly, ask them to slow down and look at all pictures before saying their answer.

*Let children guess. If examinee is having a hard time choosing, say “That was a difficult one. Let’s try another one.”

*Do not omit test items that must be administered.

*You can redirect attention by saying “Listen carefully”.

*You can say “good!”; “You are doing well.”; “That’s fine.” As you administer the test.

*Do NOT let the examinee know whether their answer was correct or incorrect… just say “that was a good answer”.

***Some test items are not administered in the ROWPVT-SBE. Remember to skip the test plates when skipping those items.

**Item sets, start points, and critical range**

- Select appropriate Start Item as indicated on protocol.

- Establishing basal set: Begin administering items at the testing point indicated in the testing form. A basal is established when a child gets 8 consecutive correct responses. If child does not get 8 items correct, return to the first item administered and move backward until the child establishes a basal. Then continue presenting the items in forward direction, beginning with the item that indicated the necessity to work backward.

- Establishing the ceiling: After establishing the basal set, continue administering items until a child makes 4 incorrect responses out of 6 consecutive items. Discontinue testing when the ceiling is reached.
If the child makes two or more ceilings (As a result of going backward to establish a basal), the lowest ceiling is used in computing the raw score. If the child establishes two or more basals, the one closest to the ceiling is used in computing the raw score.

Calculating the raw score

- Calculate the raw score: The number of correct responses (up to the last item in the ceiling) total number of errors in the protocol (pg.2) and calculate the raw score. (Use pg 3 protocol to figure out Raw Score: Write down the last item -sixth item of the ceiling- and subtract all the errors including and below this item, except for errors occurring below the basal).
- Convert raw score to standard score
- Calculate percentile (pg. 90- manual)
Table F1
Study Design, Including Sequence of Language Treatment, Sequence of Presentation Treatment, Group, Period, and Target Vocabulary Words

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<td>Elated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coiled</td>
<td>Spectacles</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2 (n=7)</td>
<td>Tartan</td>
<td>Crimson</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Scowled</td>
<td>Pantofles</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Glaze</td>
<td>Bounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Elated</td>
<td>Donned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spectacles</td>
<td>Coiled</td>
</tr>
</tbody>
</table>

Blues = English-only treatment condition,    Reds = Bilingual treatment condition

Note: Sequence of Language Treatment = Order in which the storybook treatment language conditions were presented (i.e., English first, Bilingual second OR Bilingual first, English second). Sequence of Presentation Treatment = Distinguishes which word set, within each book, was presented implicitly or elaborated. Each book had five words that were elaborated and five words that were presented implicitly. The word sets that were elaborated or implicitly presented were counterbalanced within and across each storybook treatment language condition (i.e., Sequence 1= Word sets A B C D; Sequence 2= Word sets B A D C). Period = Time period in which the treatment condition was presented in. This is confounded with storybook [i.e., Period 1= Storybook, “Henry’s Happy Birthday,” (Keller, 1990); Period 2= Storybook 2, “Baby Bird’s First Nest,” (Asch, 1999)]. Each period lasted two weeks.
Appendix G

Parameter Estimates and Effects for All Variables Included in the Regression Models

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter estimates</th>
<th>Standard Error</th>
<th>z</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_{\text{constant}}$</td>
<td>3.61</td>
<td>0.43</td>
<td>8.44</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\beta_{\text{STVT-C pretest}}$</td>
<td>0.21</td>
<td>0.16</td>
<td>1.28</td>
<td>0.20</td>
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<tr>
<td>$\beta_{\text{languageSequence}}$</td>
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<td>0.36</td>
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<tr>
<td>$\beta_{\text{presentationSequence}}$</td>
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<td>0.35</td>
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<tr>
<td>$\beta_{\text{period}}$</td>
<td>1.04</td>
<td>0.25</td>
<td>4.12</td>
<td>&lt;0.01</td>
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<tr>
<td>$\beta_{\text{language}}$</td>
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<td>0.24</td>
<td>4.24</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>$\beta_{\text{presentation}}$</td>
<td>1.51</td>
<td>0.24</td>
<td>6.31</td>
<td>&lt;0.1</td>
</tr>
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<td>$\beta_{\text{interaction}}$</td>
<td>0.66</td>
<td>0.18</td>
<td>3.74</td>
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</table>

AIC 4.96
BIC 326.55

Note. ROWPVT-SBE = Receptive One-Word Picture Vocabulary Test- Spanish Bilingual Edition; PPVT-4 = Peabody Picture Vocabulary Test- Fourth Edition; STVT-C = Storybook Target Vocabulary Test- Composite; AIC = Akaike information criterion; BIC = Bayesian information criterion
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter estimates</th>
<th>Standard Error</th>
<th>z</th>
<th>p value</th>
</tr>
</thead>
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<td>2.18</td>
<td>-4.52</td>
<td>&lt;0.01</td>
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<td>$\beta_{\text{STVT-C pretest}}$</td>
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<td>0.18</td>
<td>-0.31</td>
<td>0.76</td>
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<tr>
<td>$\beta_{\text{languageSequence}}$</td>
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<td>0.27</td>
<td>-1.50</td>
<td>0.13</td>
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<td>$\beta_{\text{presentationSequence}}$</td>
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<td>0.25</td>
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<td>0.11</td>
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<tr>
<td>$\beta_{\text{period}}$</td>
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<td>4.36</td>
<td>&lt;0.01</td>
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<td>$\beta_{\text{language}}$</td>
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<td>&lt;0.01</td>
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<td>$\beta_{\text{presentation}}$</td>
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<td>0.24</td>
<td>6.10</td>
<td>&lt;0.01</td>
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<td>$\beta_{\text{interaction}}$</td>
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<td>3.85</td>
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<td>$\beta_{\text{ROWPVT-SBE}}$</td>
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<td>3.82</td>
<td>&lt;0.01</td>
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AIC 4.71
BIC 128.57

Note. ROWPVT-SBE = Receptive One-Word Picture Vocabulary Test - Spanish Bilingual Edition; PPVT-4 = Peabody Picture Vocabulary Test - Fourth Edition; STVT-C = Storybook Target Vocabulary Test - Composite; AIC = Akaike information criterion; BIC = Bayesian information criterion
### Table G3

Parameter Estimates and Effects for All Variables in the Regression Model, Conditioned by Initial English Vocabulary, After Controlling for Initial Bilingual and English Vocabulary

<table>
<thead>
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<th>Parameter</th>
<th>Parameter Estimates</th>
<th>Standard Error</th>
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<th>p value</th>
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</thead>
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<td>0.17</td>
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<td>-1.50</td>
<td>0.13</td>
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<tr>
<td>$\beta_{\text{presentationSequence}}$</td>
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<td>0.25</td>
<td>1.54</td>
<td>0.12</td>
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<td>$\beta_{\text{period}}$</td>
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<td>&lt;0.01</td>
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<td>$\beta_{\text{language}}$</td>
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<tr>
<td>High</td>
<td>1.47</td>
<td>0.44</td>
<td>3.34</td>
<td>&lt;0.01</td>
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<tr>
<td>Low</td>
<td>0.61</td>
<td>0.24</td>
<td>2.56</td>
<td>0.01</td>
</tr>
<tr>
<td>$\beta_{\text{presentation}}$</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>2.19</td>
<td>0.40</td>
<td>5.45</td>
<td>&lt;0.01</td>
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<tr>
<td>Low</td>
<td>1.00</td>
<td>0.23</td>
<td>4.34</td>
<td>&lt;0.01</td>
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<tr>
<td>$\beta_{\text{interaction}}$</td>
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<tr>
<td>High</td>
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<td>3.89</td>
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<td>Low</td>
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<td>0.20</td>
<td>2.03</td>
<td>0.04</td>
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<tr>
<td>$\beta_{\text{ROWPVT-SBE}}$</td>
<td>0.07</td>
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<td>2.11</td>
<td>0.04</td>
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<tr>
<td>$\beta_{\text{PPVT-4}}$</td>
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<td>3.79</td>
<td>&lt;0.01</td>
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<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>4.64</td>
<td>72.09</td>
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</tbody>
</table>

Note. ROWPVT-SBE = Receptive One-Word Picture Vocabulary Test-Spanish Bilingual Edition; PPVT-4 = Peabody Picture Vocabulary Test-Fourth Edition; STVT-C = Storybook Target Vocabulary Test-Composite; AIC = Akaike information criterion; BIC = Bayesian information criterion