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I am submitting herewith a dissertation written by Kai Arian Richards entitled “A Taped-Words Reading Intervention for Non-Native English-Speakers.” I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

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A Taped-Words Reading Intervention for Non-Native English Speakers

A Dissertation Presented for the Doctor of Philosophy Degree

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Abstract

The number of students in the United States for whom English is not their first language is increasing. As reading is integral to most classes taught in school, limited English reading proficiency can hinder students from succeeding academically. It is important to identify effective methods for quickly improving these students' English reading skills.

The purpose of the present study was to determine whether a taped-words intervention using Dolch words would improve the reading skills of young, non-native English-speakers. Specifically, the goal was to discover whether the intervention would help to increase the students' word list reading fluency and accuracy. A secondary goal was to investigate the relationship between the intervention and passage reading fluency, reading comprehension, and phonemic awareness.

The participants in the study were three general education first-grade students for whom English was not the first language. A multiple-baseline across word sets design was used to evaluate the intervention. The study consisted of a taped-words intervention. For the intervention, the students listened to a recording of one of three sets of 19 words read five times in different orders. While they listened, they followed along with printed word lists, reading each word with, or before, the recording. After each intervention session, the students were assessed on the set of words to which they had just listened. The same assessment procedures were used to collect baseline, intervention, and maintenance data. The same intervention and assessment procedures were followed

across all three word sets. The researcher also assessed the students on passage reading fluency, reading comprehension, and phonemic awareness.

The results suggested that the taped-words intervention improved the word-list reading fluency and accuracy of two of the students. The third student had stronger reading skills than the others from the beginning, and the intervention had less effect on her reading performance. An analysis of secondary data suggests a possible relationship between the intervention and phonemic awareness. More research is needed to investigate the relationship between the taped-words intervention and reading fluency and comprehension as well as to further explore the possible link between the intervention and phonemic awareness.

Table of Contents

Chapter I.....	1
Literature Review.....	1
Components of English Reading Skills Acquisition.....	2
ELL Reading Interventions.....	3
Sight-Word Reading Interventions	6
Taped-Words Interventions	11
The Current Study.....	21
Chapter II	23
Method	23
Participants.....	23
Materials	24
Design	26
General Procedures	27
Intervention Procedures	28
Interscorer Agreement	31
Procedural Integrity	39
Dependent Measures	39
Chapter III.....	40
Results.....	40
Sarah	41
Daniel.....	46
Peter	50
Comprehension	57
Phonemic Awareness	57
Treatment Acceptability.....	58
Chapter IV.....	60
Discussion	60
Summary	60
Limitations and Future Research	65
Conclusion	69
References	71
Appendix	80
Appendix A.....	81
Sample Assessment Sheet.....	82
Appendix B	83
Sample Intervention Sheet	83
Appendix C	85
Comprehension Stories	85
Appendix D.....	89
Instruction Scripts	89
Appendix E	90
Table E1. Sarah—Means and Effect Sizes for Words Correct Per Minute	90
Appendix F.....	91

Table F1. Sarah—Means and Effect Sizes for Number of Words	
Read Correctly Out of 19	91
Appendix G	92
Table G1. Daniel—Means and Effect Sizes for Word Correct Per Minute.....	92
Appendix H.....	93
Table H1. Daniel—Means and Effect Sizes for Number of Words	
Read Correctly Out of 19	93
Appendix I	94
Table I1. Peter—Means and Effect Sizes for Words Correct Per Minute	94
Appendix J	95
Table J1. Peter—Means and Effect Sizes for Number of Words	
Read Correctly Out of 19	95
Appendix K.....	96
Words Correct Per Minute for Passages	96
Appendix L	97
Comprehension Scores.....	97
Appendix M	98
Intervention Acceptability	98
Vita.....	101

List of Tables

Table 1. Sarah—Daily Activities.....	33
Table 2. Interrater Reliability for Reading Speed.....	39
Table E1. Sarah—Means and Effect Sizes for Words Correct Per Minute.....	84
Table F1. Sarah—Means and Effect Sizes for Number of Words Read Correctly Out of 19.....	85
Table G1. Daniel—Means and Effect Sizes for Word Correct Per Minute.....	86
Table H1. Daniel—Means and Effect Sizes for Number of Words Read Correctly Out of 19.....	87
Table I1. Peter—Means and Effect Sizes for Words Correct Per Minute.....	88
Table J1. Peter—Means and Effect Sizes for Number of Words Read Correctly Out of 19.....	89

List of Figures

Figure 1. Sarah—Words Correct Per Minute on Set A.....	43
Figure 2. Sarah—Words Correct Per Minute on Set B.....	43
Figure 3. Sarah—Words Correct Per Minute on Set C.....	43
Figure 4. Sarah—Number of Words Read Correctly on Set A.....	45
Figure 5. Sarah—Number of Words Read Correctly on Set B.....	45
Figure 6. Sarah—Number of Words Read Correctly on Set C.....	45
Figure 7. Daniel—Words Correct Per Minute on Set A.....	47
Figure 8. Daniel—Words Correct Per Minute on Set B.....	47
Figure 9. Daniel—Words Correct Per Minute on Set C.....	47
Figure 10. Daniel—Number of Words Read Correctly on Set A.....	48
Figure 11. Daniel—Number of Words Read Correctly on Set B.....	48
Figure 12. Daniel—Number of Words Read Correctly on Set C.....	48
Figure 13. Peter—Words Correct Per Minute on Set A.....	50
Figure 14. Peter—Words Correct Per Minute on Set B.....	50
Figure 15. Peter—Words Correct Per Minute on Set C.....	50
Figure 16. Peter—Number of Words Read Correctly on Set A.....	52
Figure 17. Peter—Number of Words Read Correctly on Set B.....	52
Figure 18. Peter—Number of Words Read Correctly on Set C.....	52
Figure K1. Sarah—Words Correct Per Minute on Passages.....	90
Figure K2. Daniel—Words Correct Per Minute on Passages.....	90
Figure K3. Peter—Words Correct Per Minute on Passages.....	90
Figure L1. Sarah—Comprehension Scores.....	91
Figure L2. Daniel—Comprehension Scores.....	91
Figure L3. Peter—Comprehension Scores.....	91

Chapter I

Literature Review

Reading English is essential for thriving in United States society and is a valuable tool for helping immigrant non-native English speakers adjust to life in the United States. Between 1995 and 2050, the U.S. population is expected to increase by about 131 million to about 394 million. Of those, more than 61% will be immigrants and their children with varying levels of English proficiency (Spencer & Hollmann, 1998). Thus, out of 30 students in a classroom, about six will be immigrants, or children of immigrants, who may have limited English proficiency. Many of these students will experience difficulty learning to read English because of their limited exposure to the English language (Greenwood, Arreaga-Mayer, Utley, Gavin, & Terry, 2001).

Reading is incorporated into most subjects taught in school, especially in higher grades, and the texts used demand increasingly sophisticated reading skills. Poor reading skills are linked to lower academic achievement (Haager & Windmueller, 2001). Therefore, it becomes increasingly important for schools to develop effective methods for helping non-English speaking children acquire English reading skills.

The purpose of the present study was to determine whether a taped-words intervention using Dolch words (a set of commonly used English words; Gemini Elementary School, n.d.) improved the reading skills of young non-native English-speakers. Specifically, the goal was to discover whether the intervention would help to increase the students' word list reading fluency and accuracy. A secondary goal was to investigate the possible relationship between the intervention and passage reading fluency, reading comprehension, and phonemic awareness.

According to Johns (1981), Dolch (as cited in Johns) developed a list of commonly used English words to be taught to school children. He based his word list on three other existing word lists. The Child Study Committee of the International Kindergarten Union (as cited in Johns) developed one list based on observations of the words known and used by kindergarteners. Choosing to only consider the most frequently used words from this list, Dolch narrowed the pool of words from the list to 510. A second list Dolch referred to consisted of 500 English words considered most important for children to learn to read (Gates; as cited in Johns). The third list that Dolch used to develop his list was composed of the 453 words printed most frequently in 20 different reading books published between 1922 and 1929 (Wheeler & Howell; as cited in Johns). Dolch's word list consisted of the 193 words that appeared on all three of the word lists he referenced plus an additional 27 words that appeared on two of the three lists and that he felt should be included. The final Dolch word list consisted of 220 words.

The importance of learning to read English is apparent, but it is also essential to determine the best way for students learning English to do so. In this review section, important components of the acquisition of English reading skills including phonemic awareness and sight-word vocabulary; specific English Language Learner (ELL) reading interventions; sight-word interventions; and the use of taped-words interventions applied to English reading instruction will be described and critiqued.

Components of English Reading Skills Acquisition

It is important to identify salient components in learning to read English, for example, phonemic awareness and sight-word identification (Ehri, 2005). Knowledge of the key aspects of English reading provides a basis for developing and implementing

effective reading interventions that will help students who are learning English to catch up to their peers in reading achievement.

Phonemic awareness plays a part in ELLs' acquisition of English skills. Phonemic awareness in children's first language may transfer to a subsequently learned language, predicting written phonemic awareness and other reading skills in the second language. Quiroga, Lemos-Britton, Mostafapour, Abbott, and Berninger (2002) investigated this topic using 30 Spanish-speaking first-grade students. Among their results, they found that students' real-word and pseudoword reading scores in English were better than their scores on similar tasks in Spanish. This was presumably because English was their language of instruction. They also found that phonemic awareness was linked to Spanish-speaking students' English reading skills acquisition. Specifically, both English and Spanish phonemic awareness predicted students' ability to read English words.

As previously mentioned, Ehri (2005) noted that phonemic awareness is among the building blocks for word reading skills. Such basic skills enable students to learn sight-words. The acquisition of sight-word reading skills, in turn, leads to greater efficiency and speed (fluency) in reading (Ehri, 2005; Levy, Abello, & Lysynchuk, 1997). Increased fluency is linked with increased reading comprehension (Levy et al.). As important as it is to identify some of the key skills associated with reading, it is also necessary to identify viable means of developing those skills in non-native English-speakers learning to read English.

ELL Reading Interventions

Findings such as Quiroga et al.'s (2002) may encourage questions regarding the efficacy of interventions applied to children's reading skills in their native language, with

the ultimate goal of improving their English reading skills. Vaughn et al. (2006) implemented an intervention for Spanish-speaking ELLs with poor reading skills. They wanted to determine how an intervention administered in Spanish and applied to Spanish language skills would affect students' Spanish and English reading and oral language abilities.

The participants were 69 first-grade students. All of the students were Hispanic and received their core reading instruction in Spanish from bilingual (Spanish and English-speaking) teachers. The students were randomly assigned to the treatment and control groups with 31 and 33 students in each group, respectively. The students in the treatment group received special Spanish instruction in letter-sound knowledge, phonemic awareness, speeded syllable reading, word recognition, fluency, and comprehension, as well as oral language and vocabulary. These students continued to receive their regular Spanish reading instruction. Students in the control group also received their regular Spanish reading instruction, and some also received interventions such as guided reading and tutoring, but they did not receive the special Spanish instruction (Vaughn et al., 2006).

The intervention designed by Vaughn et al. (2006) successfully improved the treatment groups' Spanish reading skills, but the treatment and control groups experienced approximately equal improvements in their English reading skills. Vaughn et al. suggested that students' English reading skills improved because the students were able to apply some of their acquired Spanish reading skills to reading English. However, since the treatment group had the advantage over the control group of additional Spanish language instruction that could be used coincidentally to improve English reading, one

would expect that the treatment group would experience higher, not equivalent, gains in English reading skills.

It is obvious that reading interventions administered in English are most convenient as students with limited English proficiency sometimes receive the majority of their instruction from monolingual, English-speaking teachers. Together, the Quiroga et al. (2002) and Vaughn et al. (2006) studies suggest that ELLs' phonemic awareness in their native language may predict their English phonemic awareness. However, reading instructions provided in English seem, intuitively, to be the most effective method for improving non-native English-speakers' English reading skills. Therefore, it is important to develop reading interventions for these students that can be administered in English.

In a recent qualitative report, Oyetunde (2002) described an effective English reading program that he created for a 9-year-old student in Nigeria (where English is the official language) who could not read or speak English. Two of the factors to which he attributed the student's improved reading skills were provision of time for academic engagement and the opportunity to improve sight-word vocabulary both in isolation and within text. These and other components, however, should be applied and evaluated in a more systematic, scientific manner than Oyetunde reported. Researchers have conducted several experimental and quasi-experimental studies in an attempt to do this.

For example, in their comprehensive review, Cheung and Slavin (2005) identified several empirically sound ELL reading interventions. They only included quantitative studies using random assignment or matching, and those that focused on elementary students who spoke a language other than English. In addition, only studies that were conducted over a period of 12 or more weeks were included. Using these criteria, Cheung

and Slavin found 20 studies describing reading interventions used with elementary school students. Not all of these were highly effective, empirically validated interventions. Also, many of the effective interventions were conducted, at least in part, in Spanish.

Additionally, many studies described programs that included several instructional components, making it difficult to determine which component or components were most responsible for students' improvement (for example, Calderón, Hertz-Lazarowitz, & Slavin, 1998; Denton, Anthony, Parker, & Hasbrouck, 2004). These findings serve to reinforce the need for further development and analysis of effective reading interventions, including English-based interventions, for the growing population of non-native English-speakers.

A review of the literature does reveal studies in which interventions not designed specifically for students with limited English proficiency have been shown effective for improving reading skills. One such class of interventions is sight-word reading interventions.

Sight-Word Reading Interventions

As mentioned previously, acquisition of sight-word reading skills can lead to fluency. Assuming a student has decoding skills, he or she can learn to recognize words as a whole (i.e., sight-words). Although the sight-word interventions discussed here were not applied specifically to non-native English-speakers, they may be relevant to reading interventions for this population.

In an early guide for teachers, McCabe (1976) discussed in detail an intervention using Dolch words to improve the sight-word reading skills of his students with reading difficulties. Of the 220 total Dolch words, he chose 170 words that he thought could be

easily grouped into “families” based on similarity of sounds. For example, *all*, *call*, *fall*, and *small* were part of the –*all* family. He then taught students to read the words within a family using Dolch word flashcards on the backs of which he had written all of the words belonging to the same family as the word on the front of the card. When a student missed a word, McCabe had the student write the base word of the family (e.g., “all”) several times then add letters to the base word to create the rest of the word family. For example, the student might add “t” to form “tall,” “b” to form “ball,” etc. Students practiced the words over the course of several weeks until mastery was achieved. However, McCabe did not define mastery, nor did he provide empirical evidence for the efficiency of his method. He also did not describe his participants or provide extensive details about his procedures.

In a more recent publication, Levy et al. (1997) conducted two experiments in which they looked at effects of improved word identification speed (sight-word reading speed) on reading fluency and comprehension. In Experiment 1, they included 28 fourth-grade students who were poor readers. During the training phase, the children read 72 of the 90 total content words (nouns, verbs, adjectives, adverbs, and proper names) from a story six times per day for 4 days. The students read the words from a computer that allowed them 2 seconds to respond to each word flashed on the screen. After the training phase, the students were asked to read two stories three times each. One story contained the words the children had studied using the computer; the other did not contain those words. The researchers measured the children’s reading speed and comprehension.

Experiment 2, which the researchers conducted with 40 poor readers in fourth grade, was similar. The primary differences were that the students learned all 90 of the

content words from one of the stories they would read (whereas the students in Experiment 1 learned only 72 of the words), and students in Experiment 2 were allowed only 1.5 seconds to respond to each word during training rather than 2 seconds (Levy et al., 1997).

The results of Experiment 1 were that the students' reading fluency improved, but not their comprehension skills. The students who participated in Experiment 2 experienced increases in reading fluency as well as improved comprehension of the stories read. Levy et al. (1997) suggested that the difference was a result of including all content words during the training phase in Experiment 2 and requiring that the students learn to read the words during the training phase in a shorter amount of time.

Mayfield and Holmes (1999) implemented an intervention for at-risk third-grade reading students. The authors used Direct Instruction to teach sight-words to students with low reading skills. The goal was to improve these students' scores on story and unit reading tests. They conducted the study in a Louisiana public school serving a rural, low-income population. Twenty-seven students from the two lowest ability third-grade classes in the school participated in the study. The 16 students in one class made up the comparison group. Eleven students, presumably from the second class, formed the treatment group; however, three of the 11 were inclusion students and did not fully participate in the intervention because they were not using third-grade level textbooks. The authors analyzed the students' scores from the reading battery of the Iowa Tests of Basic Skills and determined that there were no statistically significant pre-treatment differences between the control and treatment groups.

Both groups of students continued to participate in their regular language arts classes. The school used two books for third-grade reading instruction. Each book consisted of three units with four or five stories in each unit. The researchers taught one unit at a time, although it is not clear whether they used the two books alternately or sequentially. Each story contained six to eight important vocabulary words. These words were taught in class. After reading each story, the students took a corresponding test measuring story vocabulary, comprehension, and other skills. Students also took a test after the completion of each reading unit (Mayfield & Holmes, 1999).

For the treatment group, the researcher provided extra vocabulary word instruction. The word list was made up of sight-words the teacher thought the students might have difficulty identifying. The students read the words aloud to the teacher and took word lists home at night to practice. The students practiced the words until they mastered them or until the researchers gave them a new set of words, whichever happened first (Mayfield & Holmes, 1999).

At the end of the six-week study covering one unit of a textbook, students in the treatment group earned higher scores on one of the four story tests, on the comprehensive unit test (total score), and on three of the five subtests making up the unit test: reading vocabulary, fact/opinion, and graphic aids. No significant differences were found across groups on the reference sources and paraphrasing subtest scores (Mayfield & Holmes, 1999).

Although the results of the study are promising, Mayfield and Holmes (1999) pointed out that there were limitations to the study. The sample size was small, and the students were not randomly assigned to their groups. Also, students in the control group

should have received as much one-on-one time with the teacher as students in the experimental group did while receiving individual instruction. This would have provided tighter control over extraneous variables. Further research is needed to confirm the effectiveness of the sight-word intervention in raising struggling reading students' reading ability. In addition, the study should be expanded to other populations.

Rinder (1994), working with students with reading difficulties, designed an intervention to teach sight-word vocabulary, handwriting, and phonic analysis to four boys during the summer before first grade. Rinder used the precision teaching method as the basis for her intervention. Precision teaching involves measuring specific skills, measuring these skills daily, and measuring the speed of skill performance. Thus, accuracy and fluency are important outcomes of precision teaching.

The four children participated in activities designed to help them learn 20 preprimer level Dolch vocabulary words. Learning activities included practicing with flash cards, spelling out words with word tiles, and playing sight-word Bingo. The students also played educational games. Using these games, the students practiced their vocabulary words for 30 to 45 minutes per day. They also charted how many vocabulary words they could identify in one minute. Daily, each student discussed his performance and goals with the teacher. Rinder applied similar procedures to other language arts skills that the students learned (1994).

Overall, each of the four students made large gains in their vocabulary and other language-related skills, although Rinder (1994) did not specify which activities were responsible for improvements in individual areas. The interventions were intensive (i.e., they took place 5 days per week for 3 hours per day over the course of 6 weeks) so it is

unclear whether the academic improvements should be attributed to the intervention methodology or to the amount of time spent practicing the targeted academic skills. In addition, the research methodology was weak in that the study included neither a comparison group nor a single-subject design to control for extraneous variables.

Taped-Words Interventions

Although the previously mentioned sight-word interventions were mostly successful, the strength of their designs varied. Taped-words interventions are a class of sight-word reading interventions that have been validated in a number of empirically sound studies. Although typically used for native or fluent English-speakers, the taped-words intervention has shown promise as a technique for improving the English reading skills of non-native English-speakers. This intervention consists of one or more lists of words recorded on cassette tape and printed on sheets of paper. The student is asked to read each word on the printed list while listening to the word being read on tape. He or she attempts to read the word at the same time as or, if possible, before, the recording.

There are several reasons for the effectiveness of the taped-words intervention. Taped-words interventions allow for self-monitoring. When self-monitoring, students take note of, and frequently record, whether they have or have not engaged in a target behavior. They then modify their behavior to meet their goal (i.e., increasing a positive behavior or decreasing a negative one; Lalli & Shapiro, 1990). With the taped-words intervention, the tape provides feedback within about 1-5 seconds after students hear each prompt (e.g., the word number) and read the word. Students learn almost instantly whether they have read a word correctly and can use the model presented by the tape to modify their reading behavior if needed. If the student has read the word correctly, the

feedback may be considered reinforcement, the immediacy of which serves to strengthen the behavior (correct responding; Kazdin, 2001). The pre-recorded feedback also circumvents the potential for students to provide themselves with inaccurate or imprecise feedback. Thus, immediate, feedback prevents students from practicing reading words incorrectly (Skinner & Smith, 1992). Self-monitoring techniques typically appeal to both teachers and students. Students can monitor and modify their own behavior more or less independently, and contingent rewards are not necessary, enabling teachers to save time, effort, and even money (Lalli & Shapiro).

The use of progressive time-delay procedures in the taped-words intervention may also contribute to its effectiveness. Researchers have tested other academic interventions using such procedures (Duker, van Deursen, de Wit, & Palmen, 1997; Heckaman, Alber, Hooper, & Heward, 1998; McCurdy, Cundari, & Lentz, 1990). In these studies, the amount of time between the cue (for example, a written word) and the prompt (for example, the word read aloud by the interventionist) was increased each time the participant provided the correct responses to a set number of cues. In other words, as the participant provided correct responses, the amount of time he or she had in which to provide a response increased until the time-delay reached a maximum limit. The time-delay was decreased after a predetermined number of participant errors, leaving the participant with less opportunity to provide incorrect responses. Time-delay was an effective intervention strategy. In the Heckaman et al. and McCurdy et al. studies, time-delay was compared to another intervention procedure (least-to-most and trial-and-error, respectively). The researchers found time-delay to be the superior strategy.

In the Bliss, Skinner, Adams, and Chafouleas (2006), McCallum, Skinner, and Hutchins (2004), McCallum, Skinner, Turner, and Saecker (2006), and Poncy, Skinner, and Jaspers (2006) studies, as the interventions were presented primarily via tape recorder, the time delays were increased and decreased at predetermined intervals rather than in response to the participants' correct and incorrect responding. Additionally, in these three studies, the time-delays were shorter at the beginning and end of the interventions and longer in the middle. Shortening the amount of time before feedback at the beginning provides less opportunity for incorrect responding. Shorter intervals at the end of each intervention session occasion students' more automatic responses after having practiced each word several times during the intervention session. It is important that students develop automaticity as the more automatic a response, the less cognitive effort it takes (Hasselbring, Goin, & Bransford, 1987).

Modeling is yet another component of the taped-words intervention. Sterling, Robinson, and Skinner (1997) found that the speed of the taped-words that students listened to (fast versus slow) had little impact on students' reading fluency, but did improve their accuracy. Skinner, Johnson, Larkin, Lessley, and Glowacki (1995) found similar results (this study is discussed in more detail later). In a different but related line of study, Lionetti and Cole (2004) found that when students listened to tapes onto which passages had been read at fast and slow speeds, the speed of the taped passages had no substantial impact on the speed at which the students read the passages themselves. However, modeled reading (e.g., tape recordings of word lists or passages), regardless of speed, can help increase students' reading accuracy (Skinner, Logan, Robinson, & Robinson, 1997).

In addition to modeling correct responding, taped-words interventions provide many opportunities for students to respond to specific cues. This is beneficial to student learning (Halle, Marshall, & Spradlin, 1979). In fact, increased opportunities to respond can increase the effects of already effective interventions (Skinner & Shapiro, 1989). In the Christle and Shuster (2003) study in a fourth-grade math class, under one condition, only one student could respond to each question from the teacher. Under the other condition, all students were able to respond using written response cards. The researchers found that the second condition, in which the students had more opportunities to respond, was associated with better math scores. From their review of the literature, Sutherland and Wehby (2001) also concluded that increased opportunities to respond lead to increased learning.

Research exists to support the theoretical foundations of the taped-words intervention. The intervention is also supported by a number of studies in which it was successfully used to improve students' reading skills. In a study of high school students, six boys participated in an early taped-words intervention that Freeman and McLaughlin (1984) conducted using a multiple-baseline across subjects design. All six students had been diagnosed with learning disabilities and had poor reading skills. The researchers made up different lists of 80 sight-words. The lists differed in their difficulty level. Which list(s) each student used depended upon his reading ability. During the intervention, each student listened to a tape recording of a list of sight-words while reading along with the tape from a printed list. Immediately after listening to the tape, each student read the list of words to the teacher who counted words read correctly per minute and number of errors. By the end of the study, all six students demonstrated an

increase in the average number of words they read correctly and a decrease in their average error rate.

Shapiro and McCurdy (1989) conducted a similar taped-words intervention for five ninth- and tenth-grade students with behavior disorders. All five students had reading skills at or below the sixth-grade level. To develop materials for this study, the researchers used twenty-four 236 to 306-word passages from the Pennsylvania Driver Education Manual. They developed five comprehension questions for each passage and made a list of 80 sight vocabulary words based on the passages.

For the intervention, each student was required to read the 80 sight-words along with a tape. Next, he or she read the words again without the tape while a researcher counted words read correctly and incorrectly per minute. Then, the student read one passage while the researcher again counted words correct and incorrect per minute. Finally, the student answered five comprehension questions about the passage read. A different passage and corresponding set of questions were used each day (Shapiro & McCurdy, 1989).

The researchers used a multiple-baseline design across subjects to determine the effectiveness of the intervention. On the word list, students 1 to 4 demonstrated an increase in words correct per minute from baseline to treatment phase. Student 5's words correct per minute rate increased during baseline but changed little during the treatment phase. There was little change in words incorrect per minute rates across students or across the baseline and treatment phases. The students' words correct per minute rates increased only slightly on the passage readings. Only one student showed improvements in the number of comprehension questions answered correctly due to the intervention.

Therefore, it appears that the intervention may have improved the students' vocabulary list reading fluency, but not their passage reading fluency or comprehension (Shapiro & McCurdy, 1989). More research is needed to further explore any effects of the taped-words intervention on passage reading fluency and reading comprehension.

In 1997, Sterling et al. investigated the effects of two taped-words interventions, rapid taped-words and slow taped-words, in three boys with mental retardation, ages 10, 11, and 12. The researchers constructed two sets (Set A and Set B) of words, each consisting of seven words unknown to the students. Each set of words was typed in different orders on four different worksheets for a total of eight worksheets. The researchers recorded audiotapes onto which they read the words on each worksheet twice: once rapidly (one word per second) and once slowly (one word per 5 seconds).

During baseline sessions, researchers assessed each student once on Set A and once on Set B. During the alternating treatments phase, the researchers gave each student a randomly selected worksheet. The student read aloud from the worksheet while listening to the recording of the words. During each session, each student listened to and read with the words presented at a rapid rate and a slow rate. After each treatment session, researchers assessed each student by having him read aloud the same set of words as used during the treatment, but in a different order (Sterling et al., 1997).

All three students experienced immediate increases in the number of words read correctly. Results based on comparisons of the rapid and slow taped-words treatments were inconsistent across students. One of the students read more accurately under the slow taped-words condition; one read more accurately under the rapid taped-words condition; and one student performed equally well under both conditions. Based on these

results, the researchers concluded that the taped-words intervention increases accuracy, but the rate at which the words are recorded (fast vs. slow) has little to no effect on learning (Sterling et al., 1997).

Skinner et al. (1995) conducted a taped-words intervention with three students, Susan, Charles, and Bill, who were attending a residential school for students with behavioral and emotional disorders. All three students, ages 7, 8, and 9, manifested low reading achievement. The researchers sought to determine whether the taped-words intervention would improve the reading ability of students with less than first-grade level reading skills and to determine whether the speed with which the taped-words were presented would affect the students' reading speed and accuracy.

Skinner et al. (1995) began by constructing a set of words that were unknown to both Susan and Charles, the initial participants. A total of 45 unknown words from different grade levels were grouped into three sets of words. Set A, Set B, and Set C each consisted of 15 different, nonoverlapping words. The words were stratified based on grade level. The researcher typed each set of words in six different orders to decrease the likelihood that the students would simply memorize each list. The Set A lists were used only for assessment. The Set B lists and Set C lists were read onto cassette tape and used for intervention. Each of the six lists for Sets B and C were recorded at a fast rate (one word per second) and at a slow rate (one word per 5 seconds).

The researchers used two treatment speed conditions, the fast and slow taped-words conditions. They also used two assessment-only conditions, intermittent assessment (Charles, only, because he began complaining about having to read Set A twice daily), which they conducted about once per week, and daily assessment. During

the taped-words conditions, the researchers gave the student a printed list of 15 words and asked him or her to read each word aloud with the tape. Researchers followed this procedure in both the fast-tape word (FTW) condition and the slow-tape word (STW) condition. During the assessment phases of the taped-words conditions, the researchers assessed the student immediately following the FTW or STW condition using a different version of the same word set used in the taped-words condition. During the assessment-only conditions, the students were assessed using a list from Set A. During daily assessment-only conditions, the students read the words list twice; during intermittent assessment-only conditions, Charles (the only student who got this condition) read the word list once. During each session, the experimenters applied two or three conditions (FTW, STW, and/or assessment-only conditions) to the student in random order (Skinner et al., 1995).

The researchers used an adapted alternating treatments design. The dependent variables in this study were the number of words read correctly, words correct per minute (WCPM), and time required to read each list during the assessment conditions. The FTW, STW, and assessment-only conditions were compared. FTW and STW improved accuracy and WCPM more than did the assessment-only conditions. Susan read faster under the FTW condition than the STW condition. Her accuracy was about the same under both the FTW and STW conditions. On the other hand, the STW condition resulted in greater accuracy and higher WCPM (but not higher word list reading speed) for Bill and Charles than did the FTW condition. The researchers offered two possible explanations for the discrepancy. One was that Susan's stronger reading skills in comparison to the boys enabled her to perform better under the FTW condition than

under the STW condition. The other possible explanation was that she modeled the reading rate of the tape more than did Bill or Charles because the voice on the tape was a woman's and therefore, provided a more fitting model (Skinner et al., 1995).

In three studies (McCallum et al., 2004; McCallum et al., 2006; Poncy et al., 2006) the taped-words intervention was adapted for application to math skills. In the first study, McCallum et al. (2004) used a taped-problems intervention to help a fourth-grade student, Peter, to improve his division fluency. The primary researcher gave Peter a printed list of division problems and an audiotape to listen to on which the problems and their answers were recorded. His instructions were to write the correct answer to each problem before hearing the correct answer from the tape. The primary researcher used progressive time-delay across each intervention session. With time-delay, the amount of time between the reading of the problem and the reading of the answer began at less than 1 second, providing Peter with no time to make an error in responding, then the amount of time between the reading of the problem and the reading of the answer gradually increased to provide more time for responding, and then decreased again as Peter developed automaticity in responding with the correct answers. As a result of the intervention, Peter showed quick increases in digits correct per minute (a measure of math fluency).

In the second study, McCallum et al. (2006) conducted a class-wide taped-problems intervention to help a class of third-graders improve their multiplication fluency. The methods were similar to those used in the 2004 McCallum et al. study. Again, as with the previously mentioned study, the class, on average, showed an increase in their math fluency as a result of the intervention.

The third study (Poncy et al., 2006) was a comparison of taped-problems to cover, copy, compare. Cover, copy, compare is a procedure in which the student looks at a printed math problem and answer, covers it, copies the problem and answer, then compares it to the original problem and answer. If he or she has copied the problem and answer incorrectly, he or she must then rewrite them correctly. Both interventions resulted in increased math performance from the participant, a 10-year-old special education student. However, the taped-problems intervention was less time-consuming.

Recently, Bliss et al. (2006) employed a multiple-baseline across probes design with a taped-words intervention for an English language learner. The student, Dimitri, immigrated to the United States with his family two years before this intervention was implemented. His conversational English was acceptable; however, his English reading skills were poor. Dimitri spent the majority of his time in the general education classroom but also worked with an ELL teacher. Dimitri struggled to read simple English words even though the ELL teacher worked with him on his phonemic skills.

The primary investigator used Dolch sight-words from the primer through third-grade levels to construct the tapes and word lists. One hundred eighty words were stratified by grade level and divided into six sets containing 30 words each with no overlapping words. The investigator typed each of the six sets of words in three different orders. Audiotapes were then made of each word list. There were a total of 18 taped-words lists. On the first recording of a set of words, the word was read 1 second after the number of the word was read. On the second recording of a set of words (arranged in a different order), there was a 3-second delay between the reading of the number and the reading of the word. The third recording of the words did not contain any delay between

the reading of the words and their numbers. The assessment tape consisted of numbers read 3 seconds apart but no words (Bliss et al., 2006).

The intervention required Dimitri to independently listen to lists of Dolch words. As he listened to the tape, he read the words from the printed list, attempting to read each word before hearing it from the tape. Periodically, his word reading skills were assessed using the assessment tape, and the percentage of words read correctly was computed. Once Dimitri performed consistently on one set of words (e.g., Set A) during the intervention phase, he began the intervention phase for the next set of words (Set B). Previously learned set(s) of words were assessed intermittently to check for maintenance. Results indicated that the intervention increased Dimitri's sight-word reading accuracy (Bliss et al., 2006).

The Current Study

A review of the literature shows that the body of research on English reading instruction for the non-native English-speaking population is expanding. Still, there is much more we can learn about effective English reading interventions for students with limited English proficiency. For example, there are well-supported reading interventions designed for native English-speakers that could be adapted for use with non-native English-speakers. One such intervention is the taped-words reading intervention. Researchers have applied this intervention effectively to native English-speakers (usually, in special education populations) several times, but in only one study (Bliss et al., 2006) have researchers described its application to a non-native English-speaker. Furthermore, researchers have not established whether the intervention generalizes to reading passage fluency or to phonemic awareness.

The purpose of this study was to extend the Bliss et al. (2006) study of the taped-words technique by investigating the effects of the technique across several non-native English-speaking students with poor reading skills, and, secondarily, to explore the technique's relationship with passage reading fluency, comprehension, and phonemic awareness. According to Levy et al. (1997), improved sight-word skills are associated with improved reading comprehension and reading fluency. This study will help to provide further information regarding this relationship. Finally, in their study, Bliss et al. (2006) suggested that the sight-word intervention did not generalize to Dimitri's word decoding skills; however, the direct measurement of phonemic awareness or decoding skills was not a part of their study. As phonemic awareness is valuable in English reading, this study includes an assessment to investigate a potential link between the intervention and phonemic awareness as measured by pseudoword decoding skills.

Research questions include: (a) Will the taped-words intervention result in an increase in the students' word list reading accuracy? (b) Will the intervention result in an increase in the students' word list reading fluency (as measured in words correct per minute)? Secondarily, the researcher sought to investigate the relationship between the intervention and (a) passage reading fluency, (b) reading comprehension, and (c) phonemic awareness.

Chapter II

Method

Participants

The participants in this study were three general education first-grade students in an urban southeastern elementary school. English was not their first language. Sarah, a 6-year-old girl, was Arabic-speaking. Her family emigrated from Sudan. Seven-year-old Daniel spoke Spanish and was from Mexico. Peter, a 7-year-old boy, spoke Moldovan (a language similar to Romanian).

The students were assessed for ELL eligibility using the Comprehensive English Language Learning Assessment (CELLA). The test measures Oral Skills (speaking and listening), Reading, and Writing. Classifications of the CELLA are beginner, high beginner, intermediate, high intermediate, and advanced. To exit or be exempt from ELL, a student must score as “advanced” in two of the three sections. (For newly enrolled students, one of these sections must be Oral Skills; Tennessee State Board of Education, 2006.)

Sarah was initially classified as active ELL, then just before beginning the intervention, was tested again and reclassified as a transitional ELL. This means that, while still considered ELL, she no longer attended the biweekly ELL classes. Instead, the ELL teacher simply monitored her progress. Daniel was classified as active ELL and attended biweekly ELL classes. Peter was classified as ELL at his previous school; however, when he enrolled in the current school and was tested, his CELLA scores did not qualify him for ELL. He was included in the study, however, because he was still

developing English proficiency, and his classroom teacher thought that he could benefit from the intervention.

These three students were chosen in conjunction with their school principal, general education teachers, and the ELL teacher because of their beginning English reading skills. These students were receiving English reading instruction using both phonics and whole word approaches; however, previous research has shown that an intervention aimed at improving sight-word recognition can enhance the regular instruction non-native English-speakers receive from their classroom and ELL teachers.

Materials

Materials used in this intervention included three original short story passages written by the researcher, three corresponding sets of five comprehension questions also written by the researcher, printed word lists, word lists recorded on CD, a CD player with headphones, a mini tape recorder, and a stopwatch. The word lists were made up of 57 Dolch words (Gemini Elementary School, n.d.) at the pre-primer through third-grade reading levels. Each of the Dolch words in the lists appeared in at least one of the three passages at least once.

To determine which of the over 200 Dolch words (Gemini Elementary School, n.d.) to use, the researcher first pretested the three students on all of the words. The words were randomized using a randomization formula for Excel found online (see Dallal, 2004). Each child was asked to read all of the words three times. The words that two or more students missed at least once were included in the intervention pool. The result was an intervention pool of 57 words. The researcher conducted most of the pretesting over the course of 2 days before winter break; however, because of an error, not all of the

words were administered at that time. Specifically, a flaw in the Excel formula resulted in 20 words from the original list being omitted and several words being repeated. To compensate for this mistake, the researcher pretested the students on a randomized list of the 20 omitted words three times during one day after winter break. There was no indication that this affected the intervention outcomes.

The intervention pool of 57 words was divided into three randomized sets of 19 words each. Each set of 19 words was printed in random order on 20 lists (see Dallal, 2004). Five lists from each set were used strictly for assessment (see Appendix A for a sample assessment sheet). The other 15 lists from each set were arranged in random order on three sheets, each consisting of five lists. These sheets of five lists, arranged in five columns, were used only for the intervention (see Appendix B for a sample intervention sheet). Again, because of the flaw in the Excel formula, the randomized word lists that were generated contained one random word listed twice, and one word from the original list was left out. The researcher attempted to find and replace each repeated word with the omitted word; however, she discovered after beginning the intervention that on the Set A intervention sheets, the word “myself” replaced the word “never” in three or four of the five columns of words on each of the three Set A intervention sheets.

Each intervention sheet (again, consisting of five randomized lists of the same set of words) was read into a computer voice recording program. Similarly to the Bliss et al. (2006) study, for the first and fifth lists on each intervention sheet, each word was read 1 second after the word’s corresponding number was read. The second, third, and fourth lists on each sheet were read with a 2-second delay between the reading of the number and the reading of the corresponding word. For all lists, there was a 3-second pause

between the reading of each word and the beginning of the next item. The 1-second delay between the reading of each item number and the reading of the word on the first list of each intervention sheet provided the students little time to read the word incorrectly before hearing it read correctly from the tape. Thus, the students had limited opportunities, initially, to “practice” reading words incorrectly. The 2-second delay for the second, third, and fourth lists provided the students time to attempt to read each printed word correctly before hearing it from the tape. By the fifth list, the students, presumably, had practiced the words enough times to produce automaticity, thus, not needing greater than a 1-second delay.

Each set of words (Sets A, B, and C) was recorded on a separate CD. Each CD had three tracks corresponding to the three intervention sheets. When recording the CDs, the researcher spoke the set letter and sheet number at the beginning of each track, as well as the column number at the beginning of each new column (e.g., “Set A, list two, column one”).

The researcher constructed the comprehension passages with a range of 117 to 145 words each. The passages’ difficulty levels ranged from 1.1 to 1.5 on the Flesch-Kincaid Grade Level scale. Each passage was followed by five comprehension questions. The students could receive a score of 0, 1, or 2 on each of the comprehension questions (see Appendix C for passages and questions).

Design

As in the Bliss et al. (2006) study, a multiple-baseline across word sets design was used to evaluate the effects of the intervention. A multiple-baseline design was chosen because it easily demonstrates whether a particular outcome can be attributed to the

intervention. When the outcome is due to the intervention, the changes in the dependent variable occur only when the intervention is implemented. That the changes occur when, and only when, the intervention is in place, indicates that it is unlikely that the changes result from extraneous variables, such as events in the home or school (Kazdin, 2001).

General Procedures

After obtaining permission to conduct the study from the Institutional Review Board, school board, and principal, the researcher mailed permission forms to the parents of seven first-grade students for whom English was not the first language. The permission forms included an introductory letter and an informed consent form. The Spanish-speaking parents received forms translated into Spanish. The Moldovan and Arabic-speaking parents received permission forms in English. One permission form was returned to the researcher as undeliverable. One parent refused permission, and two students' parents did not respond. The parents of the remaining three students returned signed permission forms to the school via their children.

The researcher met with each student individually to explain the intervention, conduct the pretest, and obtain student assent before beginning the intervention. To obtain student assent, the researcher read the student assent form to each child, then briefly summarized the information. The researcher met with as many of the three students as possible on a daily basis to conduct the intervention and assessments. Because of factors such as student absences, time limitations, and other school activities, the researcher was sometimes unable to conduct sessions with all three of the children each day. Therefore, as far as possible, she "skipped" students on a rotating basis so that no child missed a session for 2 school days in a row.

Intervention Procedures

At the beginning of the study, the researcher read a set of instructions asking each of the three students to read the three passages aloud (see Appendix D for all instruction scripts). As each child read, the researcher followed along on another copy of the passage, marking any mistakes made (i.e., misreading a word, not reading a word within 3 seconds, skipping a word, skipping a line). The researcher then computed words correct per minute (WCPM) using the formula
$$\frac{\text{Number of words read correctly}}{\text{Number of seconds read}} \times 60 = \text{WCPM}$$
 (Shapiro, 1996). After the child read each passage, he or she answered five comprehension questions read by the researcher (the questions did not appear on the child's copy of the passage). Of the three passages, the researcher recorded the median WCPM and comprehension score.

Baseline phase procedures. To obtain baseline data, each student was assessed using the assessment sheets from word Sets A, B, and C on 3 or 4 consecutive days. One of the five assessment sheets from each set was randomly chosen each day, except that the researcher made sure that the same list was not used 2 days in a row. The researcher read a set of instructions asking each child to read each of the word lists once. During this time, the researcher followed along on another copy of the word list. Each time a child did not read a word correctly within 3 seconds, the researcher asked the child to move on, then put a mark by that word on her copy of the word list. She did not provide corrections or specific feedback. She used a stopwatch to time the student as he or she read each list. Afterwards, she counted the number of words read correctly on each list, computed WCPM and recorded these scores.

The researcher continued to collect baseline data on Sets B and C during the first, Set A, intervention phase. At this point, baseline data were collected, on average, every 3-4 days to minimize the practice effect.

Intervention phase procedures. For the intervention, each child began with sheet 1 of the Set A intervention sheets. For subsequent intervention administrations, the child rotated through sheets 1, 2, and 3 of the Set A intervention sheets until ready to move to the next (Set B) intervention phase. The same procedures were followed for Set B and Set C intervention phases. Each intervention administration consisted of the child's listening to the corresponding recording for the chosen intervention word list (e.g., Set A, sheet 2), consisting of five columns of 19 words each. The child was instructed to attempt to read each word from the sheet aloud before hearing it from the CD. If the child could not or did not read the words aloud, the researcher did not repeat the instructions; however, if the child appeared to be off-task (e.g., staring at a wall), the researcher redirected the child's attention to the task. Following each intervention administration, the researcher assessed the child's reading accuracy, as during the baseline phase, by having him or her read aloud a randomly selected assessment sheet (consisting of 19 words) from the appropriate word set. Again, when a child did not read a word correctly within 3 seconds, the researcher asked the child to move on, then put a mark by that word on her copy of the word list. Scoring procedures for the passages and word lists were based loosely on the scoring procedures used for the Dynamic Indicators of Basic Early Literacy Skills (DIBELS; Good & Kaminski, 2002).

The first intervention phase for each student continued until that student's number of words read correctly stabilized and the student was able to read at least 20 WCPM on

the assessment sheets at least three times in a row. At this point, the research moved the student to the next intervention phase. The researcher chose 20 WCPM as the target score based on the DIBELS Oral Reading Fluency target of 20 or more WCPM for students in the middle of the first-grade year (Good & Kaminski, 2002). At the conclusion of the first intervention phase, the child was again asked to read the three passages and answer comprehension questions about them. During the second intervention phase, the students learned the words from Set B, and during the third intervention phase, they learned the words from Set C. The child was asked to read the three passages and answer the corresponding comprehension questions at the end of each intervention phase. The procedures for each of the three intervention phases were the same.

Maintenance phase procedures. After the conclusion of each intervention phase, the students were periodically assessed using one of the assessment sheets on the previously learned set(s) to check for maintenance. For example, after moving to the Set C intervention phase, the researcher periodically assessed the students using Set A and Set B assessment sheets. The researcher continued to check for maintenance until the end of the study.

The methods for collecting baseline, intervention, and maintenance data were exactly the same. The same assessment sheets, each consisting of one list of 19 words, were used. The only difference between baseline, intervention, and maintenance phase procedures was that during the intervention phase, the students listened to a CD and read from a corresponding intervention sheet consisting of five columns of the same 19 words listed in different orders in addition to reading from the assessment sheets. At no time did

the researcher conduct any type of assessment or collect any data while the students were listening to the CDs and reading from the intervention sheets.

To monitor any change in phonemic awareness skills, the researcher administered the Word Attack Test of the Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001) at the beginning and at the conclusion of the study. The study spanned approximately nine weeks during the third quarter of the school year.

See Table 1 for a day-by-day description of activities. The chart displayed outlines the study as conducted with Sarah and includes all weekdays (including one day when school was not in session) but no weekends. Charts for Daniel and Peter would look similar, although some activities would appear on different days.

Interscorer Agreement

At the conclusion of the study, other graduate students independently scored tapes. The assistants were not present during sessions with the students. To check for interscorer agreement, they listened to 20% of the word list assessments (baseline assessments, intervention assessments, and maintenance assessments) and 25% of the passages and their comprehension questions. They scored the students' word list and passage reading accuracy as well as their responses to the comprehension questions, and recorded their reading speed (in minutes and seconds).

Interscorer agreement was based on a word-by-word comparison. For each assessment and each reading passage, the number of agreements was divided by the number of agreements plus disagreements. This number was multiplied by 100 (Kazdin, 1982). Interscorer agreement on the word list assessments ranged from 68.42% to 100%

Table 1. Sarah—Daily Activities.

Days	Daily activities
Prior to day 1	WJ III Ach., Word Attack Test: 1. Researcher administered Word Attack Test. Passages and comprehension: 1. Student read each of the three passages aloud. Researcher timed student on each passage and scored reading accuracy. 2. Following each passage, student answered five corresponding comprehension questions.
Days 1-4	Baseline Sets A, B, and C: 1. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Day 5	Intervention Set A: 1. Student listened to Set A CD and read along silently or aloud from corresponding Set A intervention sheet. 2. Student read aloud from Set A assessment sheet. Researcher timed student and scored reading accuracy.
Day 6	No activity

Table 1. Continued.

Days	Daily activities
Day 7	Intervention Set A, Baseline Sets B and C: 1. Student listened to Set A CD and read along silently or aloud from corresponding Set A intervention sheet. 2. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Day 8	Intervention Set A: 1. Student listened to Set A CD and read along silently or aloud from corresponding Set A intervention sheet. 2. Student read aloud from Set A assessment sheet. Researcher timed student and scored reading accuracy.
Day 9	Intervention Set A, Baseline Sets B and C: 1. Student listened to Set A CD and read along silently or aloud from corresponding Set A intervention sheet. 2. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.

Table 1. Continued.

Days	Daily activities
Day 10	Passages and comprehension: 1. Student read each of the three passages aloud. Researcher timed student on each passage and scored reading accuracy. 2. Following each passage, student answered five corresponding comprehension questions.
Days 11 and 12	No activity
Day 13	Maintenance Set A, Intervention Set B, Baseline Set C: 1. Student listened to Set B CD and read along silently or aloud from corresponding Set B intervention sheet. 2. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Days 14 and 15	Intervention Set B: 1. Student listened to Set B CD and read along silently or aloud from corresponding Set B intervention sheet. 2. Student read aloud from Set B assessment sheet. Researcher timed student and scored reading accuracy.

Table 1. Continued.

Days	Daily activities
Day 16	Passages and comprehension: 1. Student read each of the three passages aloud. Researcher timed student on each passage and scored reading accuracy. 2. Following each passage, student answered five corresponding comprehension questions.
Day 17	No activity
Day 18	Maintenance Sets A and B, Baseline Set C: 1. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Day 19	No activity
Days 20 and 21	Intervention Set C: 1. Student listened to Set C CD and read along silently or aloud from corresponding Set C intervention sheet. 2. Student read aloud from Set B assessment sheet. Researcher timed student and scored reading accuracy.
Day 22	No activity

Table 1. Continued.

Days	Daily activities
Day 23	Maintenance Sets A and B, Intervention Set C: 1. Student listened to Set C CD and read along silently or aloud from corresponding Set C intervention sheet. 2. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Day 24	Passages and comprehension: 1. Student read each of the three passages aloud. Researcher timed student on each passage and scored reading accuracy. 2. Following each passage, student answered five corresponding comprehension questions.
Day 25	No activity
Day 26	WJ III Ach., Word Attack Test: 1. Researcher administered Word Attack Test.
Day 27	No activity
Day 28	Maintenance Sets A, B, and C: 1. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Days 29 and 30	No activity

Table 1. Continued.

Days	Daily activities
Day 31	Maintenance Sets A, B, and C: 1. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.
Days 32-34	No activity
Day 35	Maintenance Sets A, B, and C: 1. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy. Treatment acceptability: 1. Researcher used questionnaire to collect treatment acceptability data.
Day 36 and 37	No activity
Day 38	Maintenance Sets A, B, and C: 1. Student read aloud from three assessment sheets, one from Set A, one from Set B, one from Set C. Researcher timed student on each of the three and scored reading accuracy.

with a mean of 91.65%. Interscorer agreement on the passages ranged from 87.5% to 100% with a mean of 93.53%.

Similarly to Skinner, Robinson, Adamson, Atchison, and Woodward (1998), the criterion for interscorer agreement on reading speed was exact agreement in seconds ± 2 seconds. Out of 29 assessments, there were 27 agreements. On the assessments where there were disagreements, there was a discrepancy of 3 seconds on one assessment and 4 seconds on one assessment (see Table 2). Out of nine reading passages, there were seven agreements. On the reading passages where there were disagreements, there was a discrepancy of 3 seconds on one passage and 2 seconds on the other passage. For comprehension questions, the number of agreements was divided by the number of agreements plus disagreements and multiplied by 100. The resulting interscorer agreement scores ranged from 80% to 100% with an average of 93.33%.

Table 2. Interscorer Agreement on Assessment Reading Speed.

Interscorer agreement	Reading speed discrepancy	Number of word list assessments out of 29
Yes	0-2 seconds	27
No	3 seconds	1
No	4 seconds	1

Procedural Integrity

One assistant listened to recordings of the first several sessions to check for procedural integrity. She listened for and recorded whether the instructions (as found in Appendix D) were read appropriately during the first few sessions. The researcher did not continue to read the instructions at each session once the students remembered and understood the directions. Procedural integrity was 100%.

Dependent Measures

There were two main dependent measures. The first was word list reading accuracy. This was expressed as the number of words read correctly out of 19 (the number of words on each assessment sheet). The second was word list reading fluency, which was expressed in WCPM.

Three other dependent variables were measured, although these were not the primary focus of the study. The first was passage reading fluency, expressed in WCPM. The second was reading comprehension. Reading comprehension was measured by computing the percentage of points earned out of 10 possible points on each set of five comprehension questions following each passage. The researcher included a measure of reading comprehension to check for generalization; however, Shapiro (1996) suggested that WCPM is an accurate predictor of comprehension. Additionally, many education professionals prefer instruments that measure comprehension more directly (Potter & Wamre, 1990). The third variable was phonemic awareness. The researcher used the Word Attack Test of the Woodcock-Johnson III Tests of Achievement (Woodcock et al., 2001) to check for a relationship between the sight-word intervention and students' ability to decode novel words.

Chapter III

Results

Research questions of the current study include: (a) Will the taped-words intervention result in an increase in the students' word list reading accuracy? (b) Will the intervention result in an increase in the students' word list reading fluency (as measured in words correct per minute)? Secondly, the researcher sought to investigate the relationship between the intervention and (a) passage reading fluency, (b) reading comprehension, and (c) phonemic awareness.

There were two primary dependent variables: word list reading accuracy and word list reading fluency. The three secondary dependent variables were passage reading fluency, comprehension, and phonemic awareness.

The effects of the intervention were measured using effect sizes and percentages of nonoverlapping data (PND). Cohen's effect size [$d = \frac{(m_A - m_B)}{\sigma}$], where d indicates the effect size, m_A is the intervention mean, m_B is the baseline mean, and σ is the standard deviation of the baseline; Cohen, 1988, 1992] has been used to evaluate the change from baseline to intervention with single-subject designs (for examples, see McCallum et al., 2006; Pappas, 2006; Popkin & Skinner, 2003). Still, there is some controversy about such use (Faith, Allison, & Gorman, 1996). Single-subject design data are frequently autocorrelated, meaning that a given data point can be predicted by the preceding data point (Campbell, 2004; Gorman & Allison, 1996). This reduces data variability (Hersen & Barlow, 1976), and a small standard deviation (a measure of variability) produces a larger effect size. Thus, the effect size may indicate more favorable (or less favorable)

results than actually obtained due, in part, to autocorrelation (Faith, Allison, & Gorman, 1996).

Calculating percentages of nonoverlapping data sidesteps problems caused by autocorrelation. PND is the number of intervention phase data points that do not overlap the highest baseline data point divided by the total number of intervention phase data points (Scruggs, Mastropieri, Castro, 1987; Schwartz & Nye, 2006). Only a PND above 50% is considered to indicate that a treatment or intervention was effective, with a PND of 50% to 70% indicating mild or questionable effectiveness, a PND of 70% to 90% indicating moderate effectiveness, and a PND above 90% indicating high effectiveness (Schwartz & Nye).

Sarah

Words correct per minute (WCPM). Figures 1-3 display WCPM for Sarah across each of the three word sets. During Set A baseline, Sarah's WCPM were increasing. In general, Sarah's WCPM showed an increasing trend on Set B from baseline, through intervention, and maintenance. Set C data were variable with a slight upward trend. The researcher compared the baseline and intervention data and found large, positive effects across all word sets (Set A baseline to intervention ES = 1.82, Set B baseline to intervention ES = 2.12, Set C baseline to intervention ES = 1.99; see Cohen, 1992 for effect size classifications). She obtained similar results when comparing baseline and maintenance. (Set A baseline to maintenance ES = 2.67, Set B baseline to maintenance ES = 3.78, Set C baseline to maintenance ES = 3.19; see Table E1). Although the effect size data indicates that the intervention was effective, the percentages of nonoverlapping

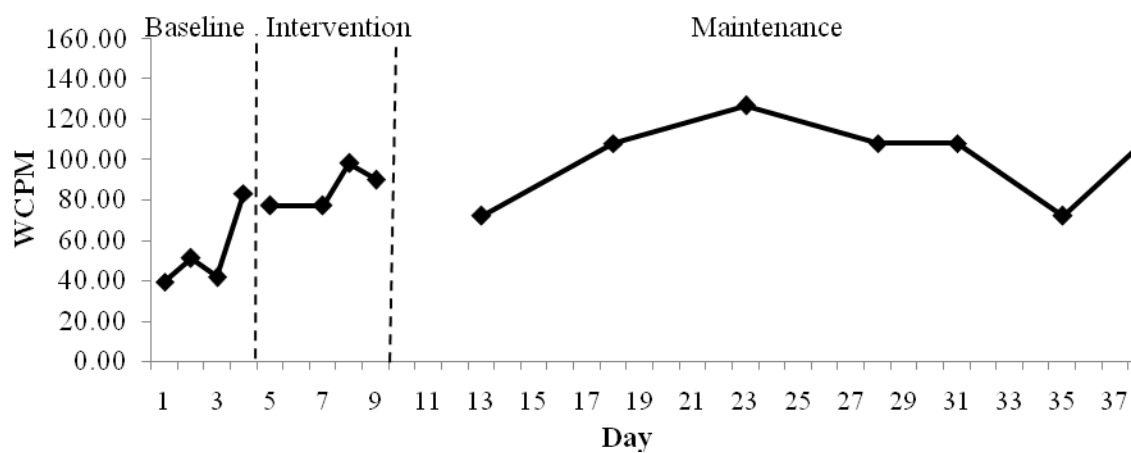


Figure 1. Sarah—Words correct per minute on Set A.

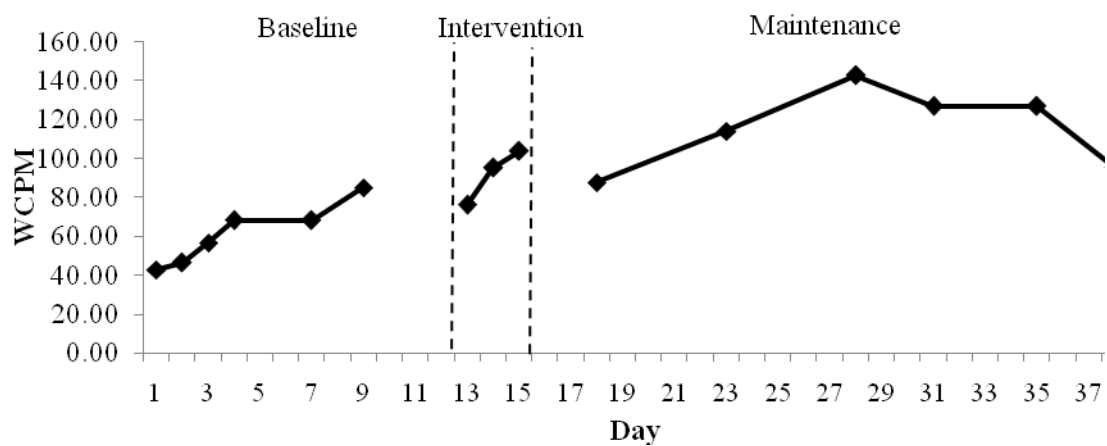


Figure 2. Sarah—Words correct per minute on Set B.

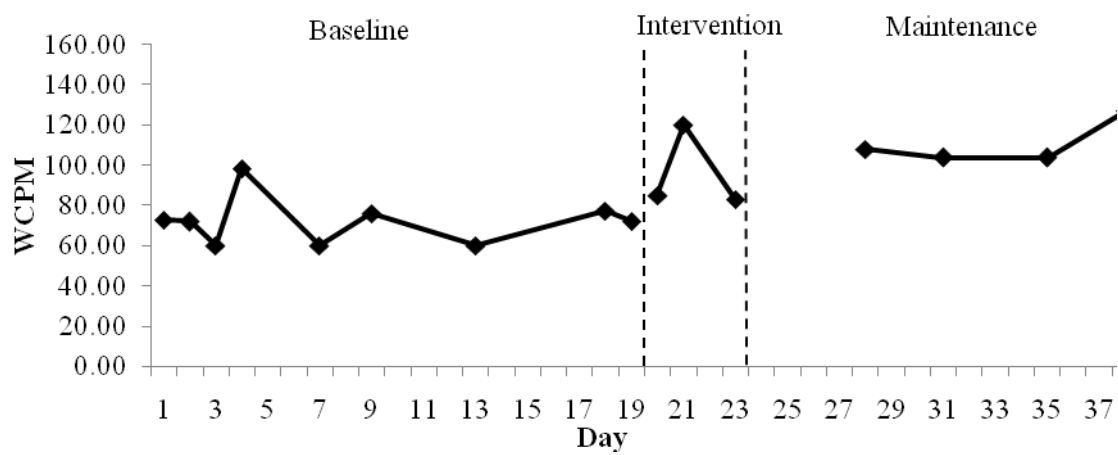


Figure 3. Sarah—Words correct per minute on Set C.

data indicate otherwise. There was a PND of 50% on Set A, PND of 66.66% on Set B, and PND of 33.33% on Set C. Overall, the results indicate that the intervention did not significantly affect Sarah's fluency. Some of Sarah's apparent increase in reading fluency may be attributed to the practice effect.

Number of words read correctly. Figures 4-6 display the number of words out of 19 that Sarah read correctly across each of the three word sets. The data across Sets A, B, and C stabilized immediately before or after the introduction of the intervention. During the intervention and maintenance phases, and with the exception of the first intervention data point on Set C, Sarah correctly read no fewer than 18 words out of 19. On Sets A and C, the effect sizes were smaller than those for either Sarah's WCPM data or the other two students' data. The researcher compared the baseline and intervention data and found a medium, positive effect size for word Set A (Set A baseline to intervention $ES = 0.45$) and a large, positive effect size for word Set B (Set B baseline to intervention $ES = 3.13$), but a medium, negative effect size for Set C (baseline to intervention $ES = -0.23$). When comparing baseline and maintenance phase data she found a medium, positive effect size for word Set A (Set A baseline to maintenance $ES = 0.57$), a large, positive effect size for word Set B (Set B baseline to maintenance $ES = 3.13$), and a positive, but small effect size for word Set C (Set C baseline to maintenance $ES = 0.13$). (See Table F1 for effect sizes.) PND for number of words read correctly across Sets A, B, and C were 0%, 100%, and 0%, respectively. (It should be noted here that according to Faith, Allison, and Gorman's 1996 book chapter, when one or more baseline data points are outliers, PND is not the best measure of effect. In this particular case, the presence of baseline scores of

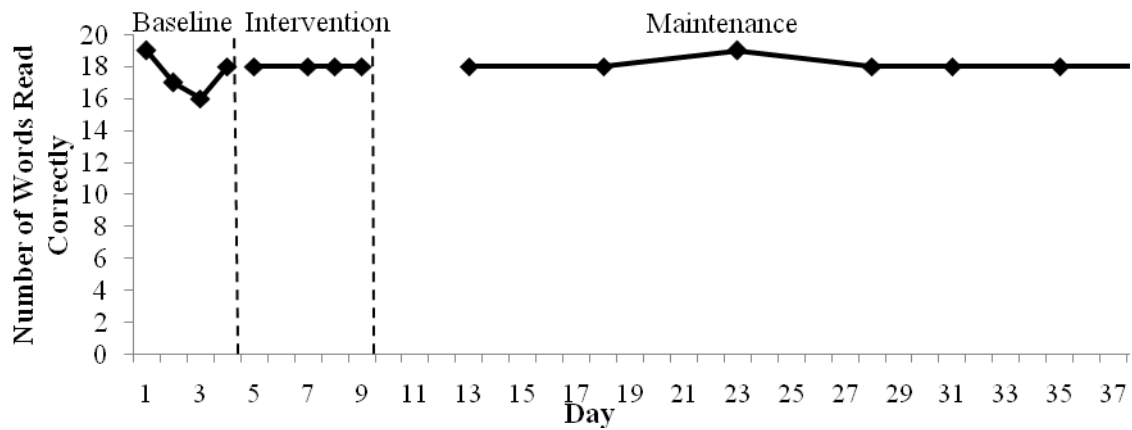


Figure 4. Sarah—Number of words read correctly on Set A.

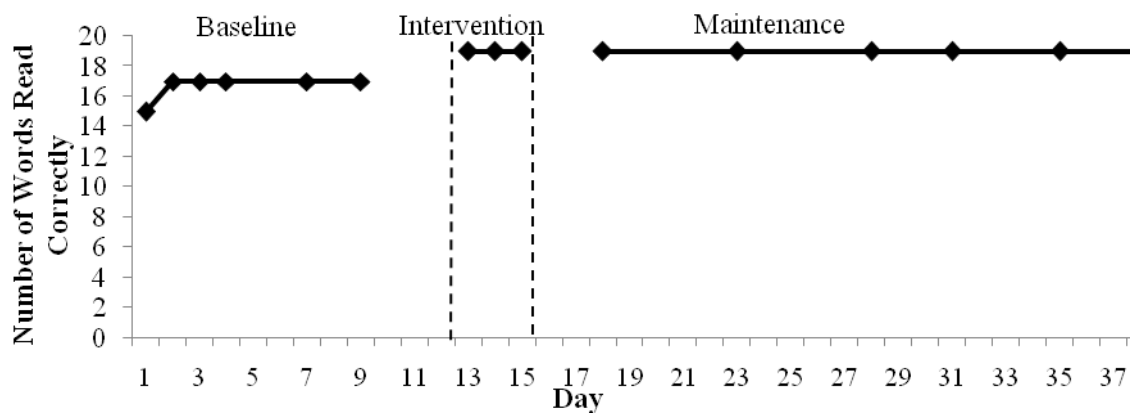


Figure 5. Sarah—Number of words read correctly on Set B.

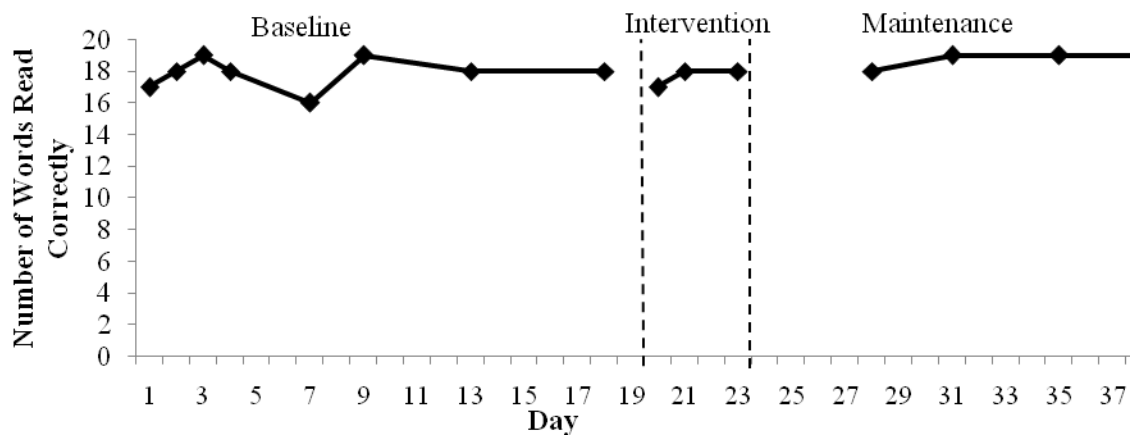


Figure 6. Sarah—Number of words read correctly on Set C.

19, the highest score possible, produced PNDs of 0% on two word sets, making it appear that the intervention had no effect at all on these word sets.) Together, the results reflect, in part, Sarah's high accuracy during baseline and the associated limited opportunity for further improvement.

Passage reading fluency. Figure K1 shows the median WCPM for each of the four passage-reading trials. Sarah's fluency increased from 52.73 WCPM to 85.10 WCPM until the final trial, at which point her fluency dropped slightly to 75.54 WCPM. The intervention may not have caused her improvement. Rather, it may have been caused by the practice effect.

Daniel

Words correct per minute (WCPM). Figures 7-9 display WCPM for Daniel across each of the three word sets. Sets A, B, and C data show increases in fluency after the start of the intervention. Daniel's baseline to intervention effect sizes were large and positive across all word sets (Set A baseline to intervention ES = 17.01, Set B baseline to intervention ES = 3.38, Set C baseline to intervention ES = 5.26) as were his baseline to maintenance effect sizes (Set A baseline to maintenance ES = 23.20, Set B baseline to maintenance ES = 5.70, Set C baseline to maintenance ES = 5.15; see Table G1). Daniel's PND for WCPM were 100%, 83.33%, and 83.33% on Sets A, B, and C, indicating moderate to high intervention effectiveness. The immediate increases in fluency at the beginning of the intervention phases of Sets A and C and his generally greater rate of improvement during intervention phases, together with the ES and PND data, suggest that the intervention is, indeed, responsible for the improvement.

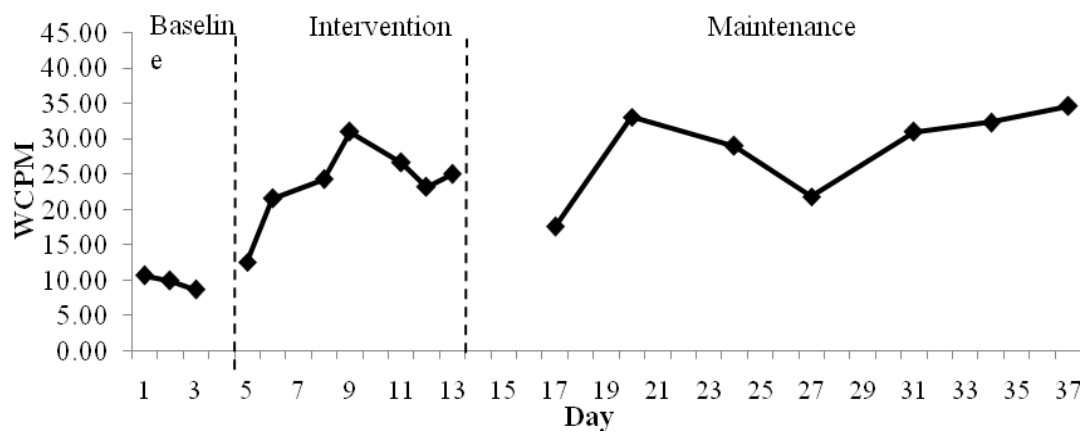


Figure 7. Daniel—Words correct per minute on Set A.

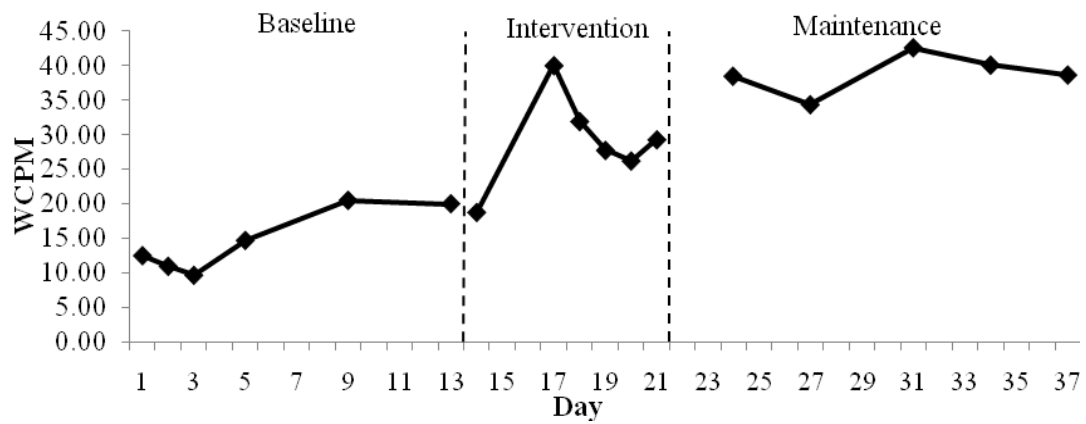


Figure 8. Daniel—Words correct per minute on Set B.

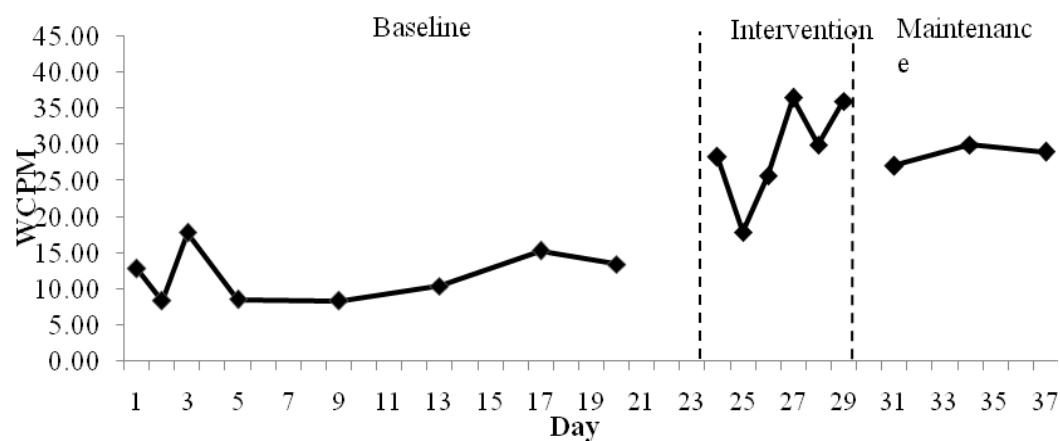


Figure 9. Daniel—Words correct per minute on Set C.

Number of words read correctly. Figures 10-12 display the number of words out of 19 that Daniel read correctly across each of the three word sets. Daniel's accuracy began low across all three sets, then increased with the introduction of the intervention. Daniel sustained more or less stable accuracy levels across the intervention and maintenance phases of all word sets. This provides evidence that the intervention caused the increase in Daniel's reading accuracy. Effect sizes were large and positive for both intervention (Set A baseline to intervention $ES = 15.67$, Set B baseline to intervention $ES = 3.38$, Set C baseline to intervention $ES = 4.76$) and maintenance (Set A baseline to maintenance $ES = 13.25$, Set B baseline to maintenance $ES = 3.29$, Set C baseline to maintenance $ES = 3.85$) phases of all word sets (see Table H1). Daniel's PND on number of words read correctly on Sets A, B, and C were 100%, 83.33%, and 100%. Together, the data indicate that the intervention was effective in increasing his word list reading accuracy.

Passage reading fluency. Figure K1 shows the median WCPM for each of the four passage-reading trials. Daniel's fluency increased steadily, increasing from 26.90 WPCPM to 49.67 WCPM.

Peter

Words correct per minute (WCPM). Figures 13-15 display WCPM for Peter across each of the three word sets. Peter's fluency increased during Set A baseline. This poses a problem when interpreting the effects of the intervention. Peter's PND of 100% on Set A indicates that the intervention was highly effective; however, the fact that Peter's WCPM increased during baseline and continued increasing into the intervention

phase means that Peter's fluency increase may not have been due to the intervention. His

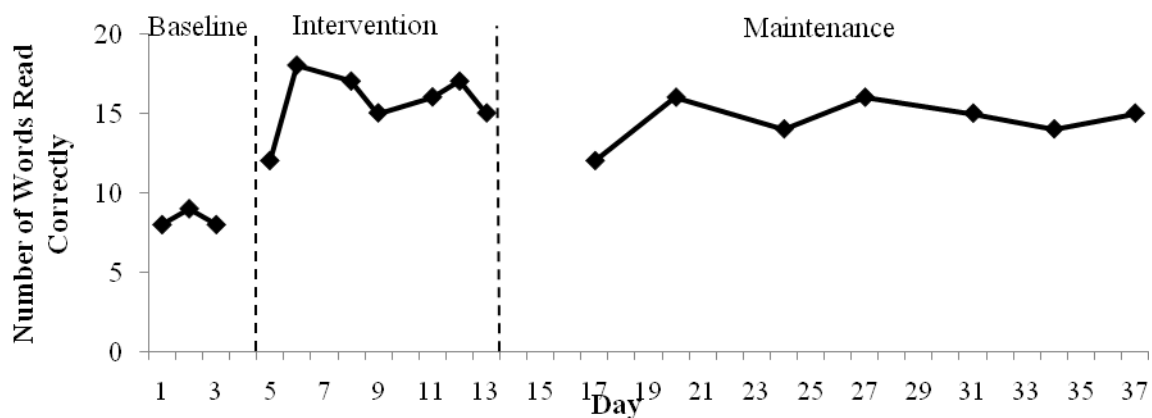


Figure 10. Daniel—Number of words read correctly on Set A.

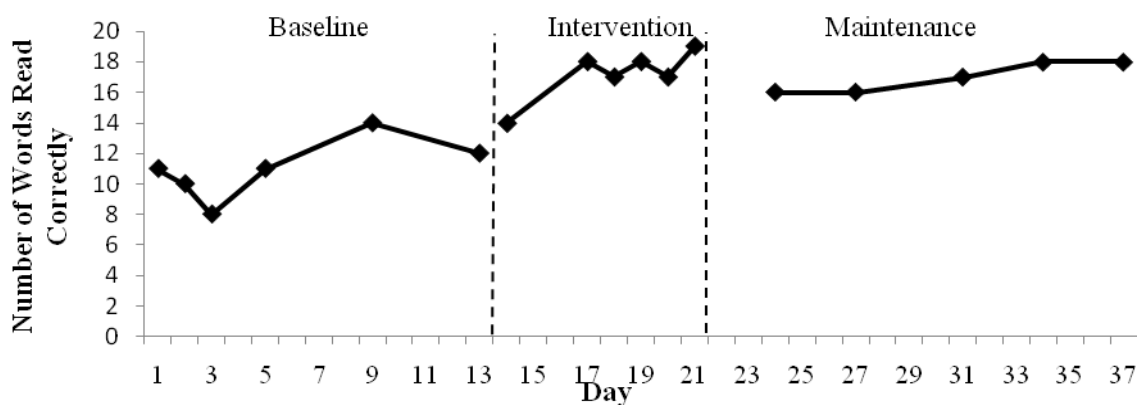


Figure 11. Daniel—Number of words read correctly on Set B.

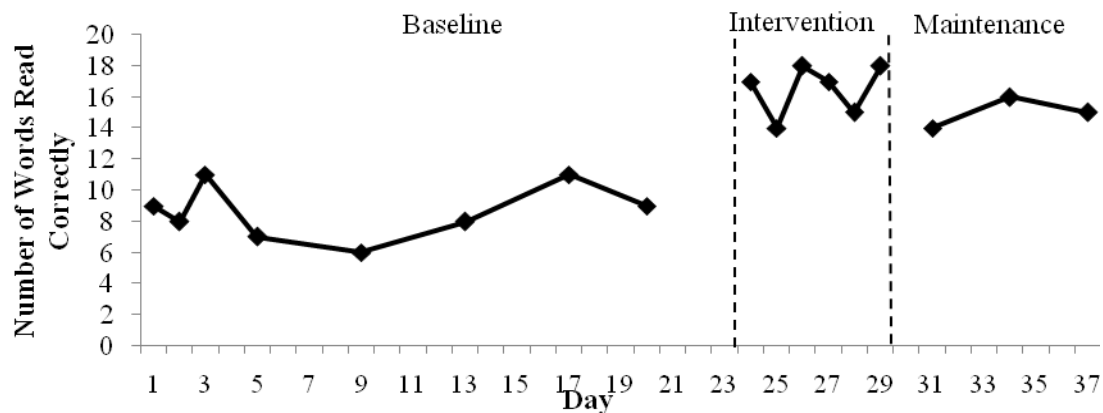


Figure 12. Daniel—Number of words read correctly on Set C.

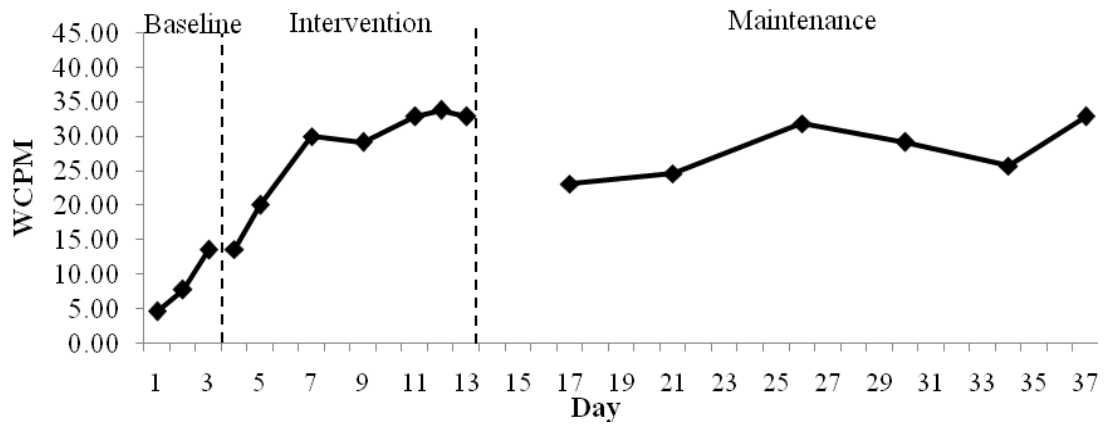


Figure 13. Peter—Words correct per minute on Set A.

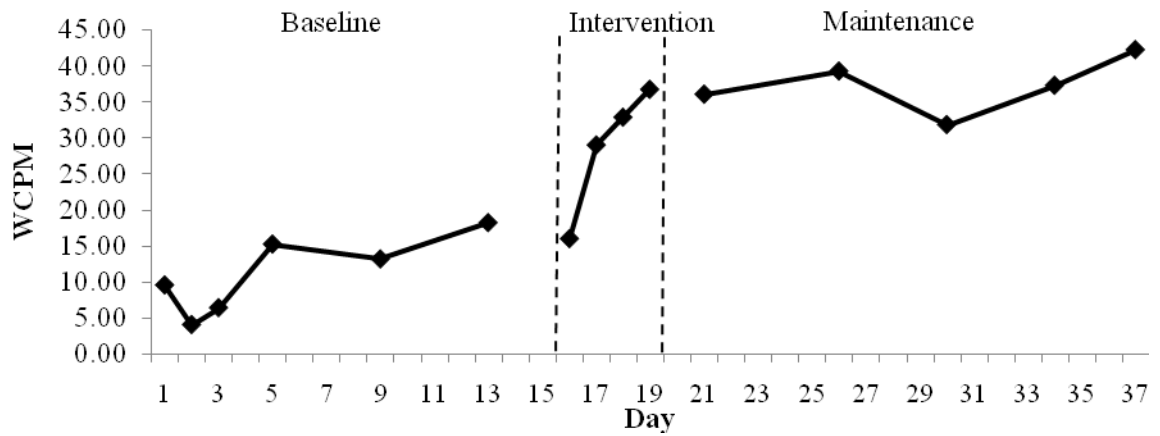


Figure 14. Peter—Words correct per minute on Set B.

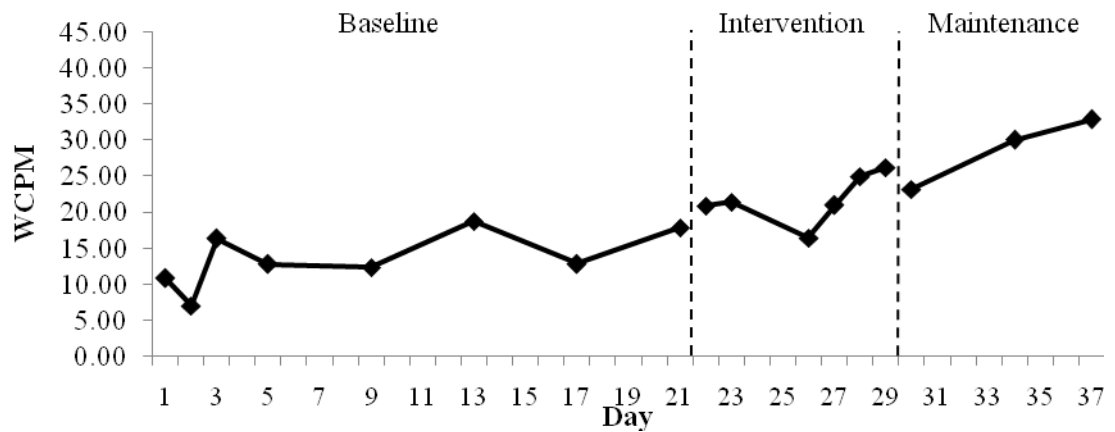


Figure 15. Peter—Words correct per minute on Set C.

Set B data were relatively stable before increasing sharply after the introduction of the intervention. Set C data showed a relatively stable baseline and an increasing trend across the intervention and maintenance phases. All of Peter's baseline to intervention and baseline to maintenance effect sizes were large and positive (Set A baseline to intervention $ES = 5.09$, Set B baseline to intervention $ES = 3.54$, Set C baseline to intervention $ES = 2.35$, Set A baseline to maintenance $ES = 5.21$, Set B baseline to maintenance $ES = 5.28$, Set C baseline to maintenance $ES = 4.15$; see Table I1). Peter's percentages of nonoverlapping data points on Sets B and C were 75% and 83.33%, indicating moderate intervention effectiveness.

Number of words read correctly. Figures 16-18 display the number of words out of 19 that Peter read correctly across each of the three word sets. Peter's accuracy on Sets A and B increased both during baseline and intervention phases, again preventing the conclusion that the intervention brought about the improvement. His Set C data varied with a small increasing trend. His baseline to intervention effect sizes were: Set A $ES = 2.09$, Set B $ES = 1.74$, Set C $ES = 0.88$. His baseline to maintenance effect sizes were: Set A $ES = 2.02$, Set B $ES = 2.51$, Set C $ES = 2.07$ (see Table J1). These were all large effect sizes. Peter's PND on word Sets A and B were 85.71% and 75%, indicating moderate intervention effectiveness. His PND on Set C was 16.66%, however, suggesting that the intervention did not improve Peter's accuracy on Set C. The role of the intervention in improving Peter's word reading accuracy is not well established based on words read correctly.

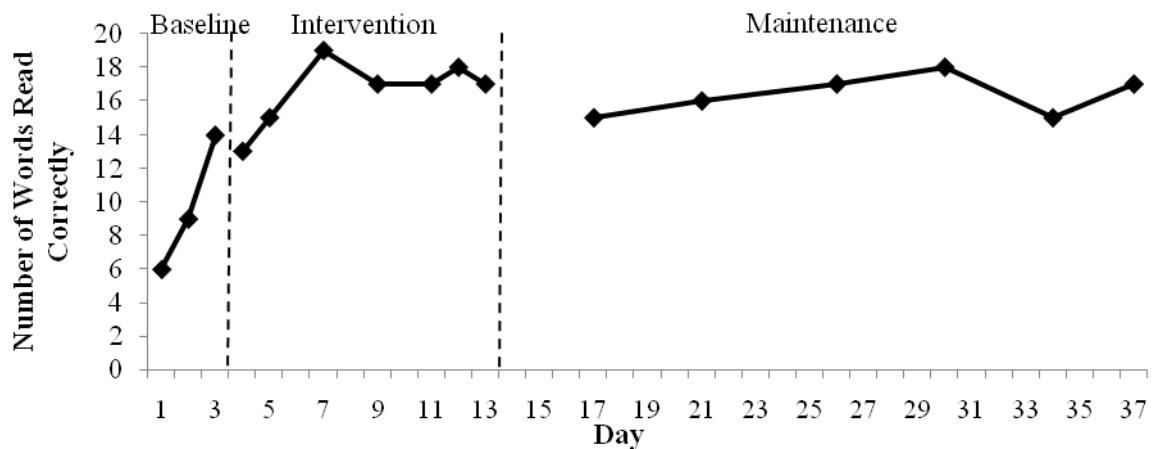


Figure 16. Peter—Words read correctly on Set A.

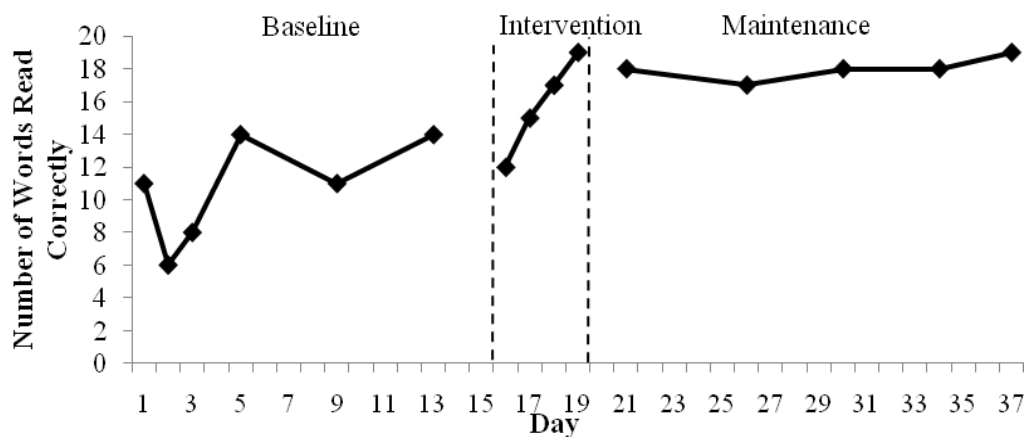


Figure 17. Peter—Words read correctly on Set B.

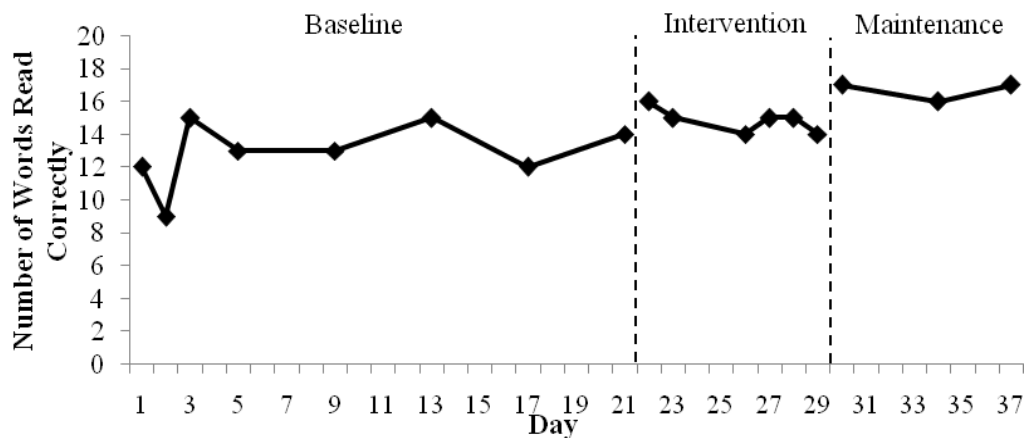


Figure 18. Peter—Words read correctly on Set C.

Passage reading fluency. Figure K1 shows the median WCPM for each of the four passage-reading trials. Peter's passage reading fluency increased from 22.73 WCPM to 44.48 WCPM.

Comprehension

Figures L1-L3 show the median score (expressed in a percentage) for each of the comprehension assessments for each student. Daniel and Peter's comprehension scores increased over four trials. Sarah's scores fluctuated between 90 and 100%. The conclusions that can be drawn from these data are limited by the lack of a control group and the fact that the students read the same three passages at each trial and were asked the same sets of questions, suggesting that any increase was probably due to practice. Additionally, the researcher was not consistent in allowing students to see the passages as they answered the questions.

Phonemic Awareness

The researcher used the Word Attack Test of the Woodcock-Johnson III Tests of Achievement (Woodcock et al., 2001) to assess phonemic decoding as an indication of phonemic awareness at the beginning and end of the study. Sarah's standard scores of 124 (122-126 confidence band) and 125 (123-127 confidence band) at pre- and posttest were both superior. Sarah's initial grade equivalency was 3.6 (i.e., third grade, sixth month) and final grade equivalency was 3.9. The difference between Sarah's standard scores was not significant. There was a 3-month increase in her grade equivalency scores, suggesting improvement, but since Sarah only answered one additional item correctly during the second administration, the significance of the 3-month increase is

questionable. Daniel achieved a standard score of 86 (low average) with a 68% confidence band of 77-96 at pretest and a standard score of 106 (average; 102-109 confidence band) at posttest. His grade equivalency scores were 1.0 and 1.7, respectively. These data suggest that, for Daniel, the intervention did improve his phonemic decoding skills. Peter's pretest standard score was 117 (114-119 confidence band), and his grade equivalency score was 2.4. Due to an error in examination, his exact posttest score could not be computed; however, based on an estimate of his performance, it appears that his performance may have improved.

Treatment Acceptability

The treatment acceptability form for teachers (Appendix N) consisted of four open-ended questions and seven Likert scale-type questions on which response options ranged from 1 (negative response) to 5 (positive response). The questions addressed issues such as the teachers' perceptions of the efficacy of the intervention, drawbacks of the intervention, and whether the teachers would implement the intervention themselves. The average teacher response score was 4.44 (for the purpose of averaging scores, the scores on item 6 of the second page of the teacher acceptability form were reversed so that the positive response was scored as a "5" rather than a "1").

The treatment acceptability form for students (Appendix N) consisted of one open-ended question and five questions for which there were three response options (e.g., "yes," "maybe," "no"). To score the responses, the research assigned a score of "5" to positive responses, "1" to negative responses, and "3" to responses in the middle. These scores were aligned to facilitate comparison with scores on the teachers' treatment acceptability form. For the purpose of averaging scores, the scores on item 6 of the

student acceptability form were reversed so that the positive response was scored as a “5” rather than a “1.” The average student response score was 4.33. However, it should be noted that one of the students responded with a “yes” to item 6 (“Did you mind being pulled out of class to do this?”), but appeared to be confused by the wording of the item. When the researcher rephrased the question by asking the student if he would rather that she did not pull him out of class, he responded that he didn’t know. The researcher used his initial response of “yes” to score the item, however, his initial response may have been different had the item been worded more clearly. Still, the teacher and student acceptability data indicate that the intervention was acceptable, overall, to both students and teachers.

Chapter IV

Discussion

Summary

The population of students in the United States for whom English is not the native language is growing. Reading English will be vital to their success in the country's education system, yet may be a challenge due to their limited exposure to English (Greenwood et al., 2001; Haager & Windmueller, 2001). It is imperative to develop and implement efficient, effective English reading interventions for these students. However, in their review of the literature, Cheung and Slavin (2005) found a limited amount of empirical research on successful ELL reading interventions. This study seeks to make a contribution to the body of literature from which practitioners may draw effective interventions for students with limited English proficiency.

In developing a reading intervention for students learning English, it is important to identify and address the components of English reading. As Quiroga et al. (2002) found, the strength of students' phonemic awareness skills in their native language does help predict their English reading skills, yet English reading instruction can substantially improve those skills. Well-developed sight-word identification skills are a key component of reading that can lead to improved reading fluency and, in turn, improved reading comprehension (Ehri, 2005; Levy et al., 1997). Previous research has shown that a taped-words intervention can be used to effectively improve students' sight-word reading skills. Several components contribute to the intervention's effectiveness including the use of self-monitoring, progressive time-delay, modeling, and increased

opportunities to respond (see Bliss et al., 2006; Duker et al., 1997; Heckaman et al., 1998; Kazdin, 2001; Lalli & Shapiro, 1990; McCallum et al., 2004; McCallum et al., 2006; McCurdy et al., 1990; Skinner et al., 1997; Skinner & Smith, 1992).

Although the taped-words intervention has typically been used to improve native or fluent English speakers' reading skills, Bliss et al. (2006) used it to help a sixth-grade ELL student who was struggling with reading to strengthen his English reading skills. This study incorporated the key components of a taped-words intervention and expanded Bliss et al.'s application of the intervention across languages/ethnic groups.

The primary purposes of the current study were to determine whether a taped-words reading intervention would improve the word list reading fluency and accuracy of three non-native English-speaking students. Secondarily, the research sought to determine the relationship between the intervention and passage reading fluency, reading comprehension, and phonemic awareness.

The intervention consisted of the students listening to one of three sets of target words on CD and following along from a corresponding printed sheet of words. The researcher then assessed the students on the word set. These procedures were repeated across all three target word sets. A multiple-baseline across word sets design was used. At the beginning of the study and at the conclusion of each intervention phase, the researcher assessed the students' passage reading fluency and comprehension. At the beginning and end of the study, she also assessed their phonemic awareness.

Overall, the intervention was deemed effective for two students, although the effects of classroom instruction cannot be completely ruled out. Two of the three students, Daniel and Peter, showed improvement in word list fluency and accuracy

(although the intervention's role in Peter's improvement in accuracy was not well-established). Effect sizes for both boys were positive and strong for fluency and accuracy across all word sets. Daniel showed clearer improvement in accuracy, while Peter showed clearer improvement in fluency. On two of three words sets, a comparison of baseline and intervention data shows a clear increase in Daniel's fluency and accuracy. His PND data indicate slightly greater intervention effects for accuracy than for fluency. On one word set, Peter showed a sharp increase during the intervention. For Peter, PND were moderate to high for fluency and accuracy on all word sets except Set C accuracy (number of words read correctly out of 19). However, although most of their improvements were not dramatic, both boys' reading skills unquestionably improved over time. It is interesting that, although the two boys had similar fluency rates (WCPM), the researcher observed different patterns between the boys. Specifically, Peter was slower but more accurate, while Daniel was faster but less accurate. For example, several times Daniel read "laugh" as "lunch." Thus, the boys showed the greatest improvement in their respective weakest areas.

Of the three students, Sarah had the most advanced reading skills from the beginning of the study. Consequently, she had little room for improvement in her word list reading accuracy. For her, the intervention resulted in nearly 100% accuracy on the word lists. Her fluency, while high from the beginning, did improve over time. It is questionable, however, whether this was a result of the intervention. Considering that her fluency continued to improve after the conclusion of the intervention phases, it is more likely that simply being assessed on the word lists regularly (i.e., practicing) was enough to increase her fluency. Sarah's passage reading fluency also improved over the first three

data points, but dipped slightly at the final assessment. The reasons for this dip are unknown, but could be due to extraneous factors such as tiredness or distraction.

Although the data regarding the effects of the intervention for Sarah were equivocal, her reading fluency did increase, and her teacher felt that the one-on-one reading experience boosted Sarah's confidence when reading in the classroom. Sarah, herself, seemed to enjoy both the personal interaction and the intervention. Toward the end of the final phases of the study, she frequently asked the researcher to provide additional words for her to learn.

In addition to a discussion of visual analysis of the data, effect size, and PND, Sarah, Daniel, and Peter's fluency data may be discussed in terms of frustration, instructional, and mastery levels. Reading materials at the frustration level are too difficult, those at the mastery level are too easy, and those at the instructional level are ideal for use in reading instruction (Shapiro, 1996). In his book, Shapiro included a chart from Fuchs and Deno describing the frustration, instructional, and mastery level for reading material at different grade levels. For first-grade reading materials, <40 WCPM = frustration level, 40-60 WCPM = instructional level, and >60 WCPM = mastery level. Sarah's word list baseline WCPM were at the instructional and mastery levels, with the points at the instructional level being concentrated at the beginning of the baseline phases. Her WCPM were consistently at the mastery level after the baseline phases. Again, it is evident that Sarah's reading skills were strong even before beginning the intervention. On the other hand, all of Peter and Daniel's word list WCPM data were at the frustration level with the exception of a few data points falling between 40 and 60 WCPM.

The intervention may have caused an improvement in performance on the Word Attack Test of the Woodcock-Johnson III Tests of Achievement (Woodcock et al., 2001). Daniel's results provide the best evidence for this as his scores went from low average to average, and his grade equivalency score increased by 7 months. As previously mentioned, Daniel's reading accuracy was lowest among the students', and it may be that his inaccuracy was a function of low word attack (decoding) skills. So, it may be that rote word learning, in addition to regular classroom instruction, led to improved word decoding skills. Sarah's improvement was more modest as her standard score only improved by one point, and her grade equivalency score increased by 3 months. (Peter's data are inconclusive as his posttest score was invalidated.) Thus, it may be that rote learning helps students with poor decoding skills more than those with stronger skills. These results provide evidence contrary to Bliss et al.'s (2006) assertion that the intervention does not generalize to word decoding skills. Still, grade equivalencies (which showed more sensitivity to change than did standard scores) are not the best indicators of academic ability. Additionally, norm referenced tests, such as the Woodcock-Johnson III Tests of Achievement (Woodcock et al.), are generally not sensitive enough to detect improvements in individual students' skills (Marston, 1989). Therefore, more research is needed to establish the generalization of the taped-words intervention to word decoding (or phonemic awareness) skills.

No clear conclusions can be drawn regarding the relationship between the intervention and passage comprehension skills. The same self-made comprehension questions were used for each assessment, leaving open the possibility of improvements

due to the practice effect. Additionally, the researcher was not consistent in allowing students to see the passages as they answered the questions.

Limitations and Future Research

A common trend among the data was increasing baselines. This trend may have been influenced by regular classroom reading instruction. One solution is to remove the target students from their reading class to obtain a cleaner measure of the intervention's effect. Another solution is to compare the participant students to a matched control group receiving the same classroom reading instruction as the participants.

Trend variability was another problem manifest in the word list fluency (WCPM) data. Such wide variability was not seen in the accuracy data (partly because of a ceiling effect, in Sarah's case). Additionally, WPCM data are sensitive to extraneous factors such as student distraction and can fluctuate accordingly. Still, fluency is probably a more important indicator of the intervention's effectiveness than is accuracy as a goal of improved accuracy is improved fluency.

The use of a matched control group would make it easier to more clearly establish the success of the intervention despite the data variability. The results of the study may also have been clearer had the intervention been tailored to a single student rather than to all three. The intervention words chosen were those Dolch words (Gemini Elementary School, n.d.) that a majority of the children read incorrectly during the pretest. Therefore, for different students, some included words were known words (this was particularly true for Sarah). The present procedures, which produced the data variability that a teacher may expect to find when implementing the intervention across a small group of students, may be more applicable to real-life practice than to research. Future researchers may

design the intervention to meet the more specific needs of an individual student. They may also extend the pool of words, for example, by including textbook vocabulary words.

In this study, interscorer agreement was conducted by graduate assistants who listened to audio recordings of the sessions. Future researchers are encouraged to conduct interscorer agreement in person rather than via audio recording, as in this study, background noise and poor recording quality coupled with the already inherent challenge of understanding the children's accents probably lowered interscorer agreement rates. Furthermore, the use of recordings for such purposes increases the potential for technical malfunctions.

The researcher was able to collect procedural integrity data (100%); however, she was unable to collect treatment integrity data on the students' responses to the recorded intervention cues (i.e., the number preceding each word heard from the intervention CDs) because the students did not always read aloud from the intervention sheets while listening to the CDs. When the students did read aloud, the use of headphones prevented the researcher from determining with certainty to which cue the students were responding. It may be assumed, although not proven, that the students read the words sub-vocally when they did not read aloud. Researchers wishing to collect data on the students' appropriate responses to the recorded cues during the intervention should provide prompts as frequently as needed to ensure that students read each word from the intervention sheet audibly.

Another limitation to the study was the inability to work with all three students 5 days per week. Factors such as student absences, time limitations, a snow day, and other required student activities prevented the researcher from working with each student each

day. Although such circumstances are not out of the ordinary, it would be ideal to work with each student daily to help ensure that regular progress is made and to minimize the amount that the student “forgets” between sessions.

In order to maintain control over the independent variables, the researcher did not give the students specific feedback regarding their performance during assessment. When using the intervention in normal classroom settings, interventionists should provide feedback to the students and even let the students chart progress themselves to take further advantage of principles of self-management (see Lalli & Shapiro, 1990; Skinner & Smith, 1992).

There were also limitations related to the materials used. In exploring the relationship between the intervention and reading passage fluency and comprehension, the researcher used three self-authored passages. The same three passages were assessed four times, albeit in different orders. It is possible that part of the students’ increases in passage reading fluency resulted from reading the same passages for each assessment (i.e., the practice effect). Future researchers should assess students using three different but equivalent reading passages for each assessment (Shapiro & McCurdy, 1989). Alternately, because of the difficulty in finding or constructing several equivalent passages that include a predetermined pool of vocabulary words, they may consider using two equivalent passages, one for pretesting and one for posttesting. Also, the comprehension questions were self-made. There was little variation in students’ comprehension scores, suggesting that the question sets were not sensitive enough to detect comprehension skill changes. Future researchers should consider using standardized comprehension assessment instruments, particularly those with alternate

forms, such as the Woodcock Reading Mastery Tests-Revised-Normative Update (Woodcock, 1997), the Wide Range Achievement Test 4 Progress Monitoring Version (Roid & Ledbetter, 2007), or the Dynamic Indicators of Basic Early Literacy Skills (Good & Kaminski, 2002).

A different instrument should be used to explore the relationship between the intervention and phonemic awareness, as well. The Woodcock-Johnson III Tests of Achievement (Woodcock et al., 2001), a norm-referenced instrument, is probably not sensitive enough to detect improvement in individual students' skills (Marston, 1989). However, more reflective data may have been obtained with the use of alternate forms of the test. DIBELS (Good & Kaminski, 2002) is possibly a more appropriate assessment for students at the kindergarten to first-grade level. The researcher did not use DIBELS, though, in order to avoid interfering with the results of the participants' school's tri-yearly DIBELS assessments. Additionally, future researchers may check the intervention's effects on decoding in non-native English-speakers with low decoding skills by using a control group matched on decoding skill level.

Finally, Sarah complained that the words on the CDs were read too slowly. When the researcher asked Daniel and Peter whether they thought the words were read too slowly, both replied that the reading speed was OK. Still, the researcher noticed that Peter's attention appeared to wander frequently while listening to the intervention CDs. Sarah also seemed to lose interest in the CDs at times. Because of these factors, as well as the finding that simple word reading practice may have had an impact on the students' increases in fluency, future researchers should create word set recordings for the

intervention with shorter pauses in between words and fewer repetitions of each word set per intervention session.

Conclusion

The current study demonstrated the effects of a taped-word reading intervention on the reading skills of three non-native English-speakers. Results showed that the intervention may improve the word list reading accuracy of students learning English. However, it can produce less dramatic effects with students who already have strong reading skills. Sight-word reading skills improvement was associated with increased reading fluency, as Ehri (2005) and Levy et al. (1997) suggested. However, at least in some cases, simple sight-word reading practice, ideally with feedback, may be as effective as a taped-words intervention.

There is some evidence that the study was internally valid. A graduate student assistant found 100% procedural integrity, which contributes to internal validity. Additionally, much of the data for Daniel and Peter shows that reading fluency and accuracy improved during the intervention phase, providing evidence for the internal validity of the study. However, the presence of some increasing baselines and data variability provide evidence against the internal validity of the study. The use of a matched control group would have been beneficial in further establishing the study's internal validity and ruling out the impact of regular classroom reading instruction.

The external validity of the study is limited due to the small number of participants. There is some evidence that the results generalize among young, non-native English-speakers with poor reading skills. Additionally, there is evidence that the results generalize across languages (i.e., Spanish and Moldovan in this study and Ukrainian in

the 2006 Bliss et al. study) and grade levels (i.e., first grade in this study and sixth grade in the Bliss et al. study). Further research on the taped-words intervention using a larger number of participants is needed to more firmly establish external validity.

Based on the limitations of this study, future researchers should seek to refine the intervention and further explore its effects on the reading skills of students learning English. Potential lines of research include reassessing the influence of the taped-words intervention on phonemic decoding and reading comprehension using sensitive, standardized assessments such as DIBELS (Good & Kaminski, 2002), comparing a group of intervention students with low decoding skills to a matched control group, and expanding the pool of target words to include textbook vocabulary words.

Although for this study the researcher stayed with each student throughout each intervention session, the students could have participated in the intervention independently. Therefore, the intervention requires little time commitment from teachers once materials are created. Teachers need only provide initial instructions for the intervention. Although this study had several limitations, and additional research will be beneficial in refining this intervention and further exploring its effects, the taped-words intervention appears to be an effective and efficient tool for teachers and school psychologists seeking to help improve the reading skills of students who are English language learners.

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Appendixes

Appendix A

Set B: List 1

hers

when

goes

around

better

about

pretty

myself

gave

kind

fall

just

out

under

came

own

ask

ate

her

Sample Assessment Sheet

Appendix B

Sample Intervention Sheet

Set B: Int. sheet 3

1. out	1. kind	1. pretty	1. gave	1. pretty
2. gave	2. fall	2. own	2. fall	2. her
3. ask	3. hers	3. about	3. better	3. ask
4. kind	4. out	4. fall	4. came	4. when
5. just	5. just	5. came	5. around	5. came
6. goes	6. goes	6. better	6. when	6. better
7. own	7. ask	7. kind	7. about	7. myself
8. hers	8. her	8. around	8. pretty	8. hers
9. her	9. about	9. when	9. goes	9. own
10. about	10. around	10. her	10. just	10. under
11. myself	11. gave	11. goes	11. hers	11. goes
12. pretty	12. pretty	12. myself	12. ate	12. kind
13. when	13. own	13. just	13. under	13. gave
14. came	14. ate	14. out	14. kind	14. just

15. ate	15. came	15. gave	15. out	15. out
16. around	16. under	16. ate	16. ask	16. ate
17. under	17. myself	17. hers	17. her	17. about
18. better	18. better	18. under	18. myself	18. fall
19. fall	19. when	19. ask	19. own	19. around

Appendix C

Comprehension Stories

Lee is eight years old. He has a little sister. Her name is Anna. Lee is kind and takes good care of Anna. When she goes outside to play, Lee goes with her. One day, Anna said, "I shall go down the slide by myself." Lee said, "Be careful! You could fall and get hurt!" Just then, Anna fell off the slide. "Ouch!" She cried big, round tears. "Don't cry," Lee said. "Mom will help us." "She will wash your cut and help you feel better." When Mom was done washing Anna's cut, Anna did start to feel better. Mom said, "I want you to be very careful when you are outside so you don't get hurt again." Lee and Anna said, "OK, Mom." They ran outside to play again. This time, Anna sat upon Lee's lap and they went down the slide together. (144:1.3)

1. Who is this story about? (Lee, Anna, Lee and Anna)
2. Who is Anna? (Lee's sister)
3. What were Lee and Anna doing outside? (playing)
4. What happened to Anna when she went down the slide by herself? (she fell, got hurt, got cut)
5. Why do you think Anna and Lee went down the slide together at the end of the story? (so [they, Anna, Lee, the kids, the children, the people] wouldn't

[fall, get hurt, get cut], to be safe, to be careful)

Amy is six years old. Today, she found a pretty pink and yellow sheet. She made a tent out of the sheet. She made the tent all on her own. She didn't have to ask for any help at all! She put her tent up on the front porch where she could watch her dogs play in the yard. These dogs made her laugh. They ran and jumped and just never seemed to stop. She wanted to draw pictures of the dogs and write stories about them. Later, Amy ate her snack in her tent. When she fell asleep in there, her dogs laid down beside her and kept her warm. Amy had fun in her tent. (117:1.5)

1. What is the name of the girl in the story? (Amy)
2. What did Amy make? (tent)
3. What did Amy make her tent out of? (sheet, fabric)
4. What did Amy do in her tent? (watch dogs, draw, write, eat, sleep [any one of these])
5. Does Amy like her dogs? (yes)

Lisa and Matt like to play together. They play around the pond and under the trees that grow by the pond. They would play in the pond if they could, but Matt's mom told them, "Don't get wet!" Lisa and Matt almost always play with four balls. Lisa likes the red and blue balls. She said those were hers. She gave the white and green balls to Matt. Once, the red ball fell right into the pond. The kids said, "Oh, no!" What could they do? They both knew better than to go in the water to get the ball. Lisa ran to get her dad. Her dad came with a big stick to use to pull the ball out of the water. Lisa and Matt said, "Thank you!" They had their ball back. Now, they always play ball far, far away from the pond.

(145:1.1)

1. Who is the story about? (Lisa and Matt, kids, children, boy and girl)
2. What did they play with? (ball, balls)
3. Where did their ball go? (in the pond, in the water)
4. How did they get their ball back? (got their/her dad [or other word for father], dad got it out, dad used a stick)
5. Why do they always play ball far away from the pond now? (b/c it fell in the pond/water, so it doesn't go in the water)

Appendix D

Instruction Scripts

Instructions for Intervention CDs

You are going to listen to a CD with some words on it. The same words are printed on this list.

You will hear a number (point at first number), then you will hear the word that goes with it (point at first word). Try to read the word from this printed list before you hear the word from the CD. Read each word aloud. If you can't read a word, that's OK. First, you will hear the first column of words, then the second column of words, and so on. Do you have any questions? (Give further explanation if needed.)

Baseline/Assessment Instructions

Read down this list. When you get to the bottom of the column, start here (point to second column).

Go ahead. (Start timer.)

(Mark all word misread or not read within 3 sec.)

(Start timer when child reads last word or when child does not respond to last word for 3 sec.)

(Record time at bottom of the page.)

Comprehension Passage Instructions

I'd like you to read some stories to me. When you have read each story, I'll ask you some questions about it. OK?

Go ahead. (Start timer.)

(Mark all word misread or not read within 3 sec.)

(Start timer when child reads last word or when child does not respond to last word for 3 sec.)

(Record time at bottom of the page.)

(Begin asking questions.)

Appendix E

Table E1. Sarah—Means and Effect Sizes for Words Correct Per Minute

Word Set	Mean (Effect Size)		
	Baseline	Intervention	Maintenance
Set A	53.78	85.62 (1.82)	100.38 (2.67)
Set B	61.15	91.55 (2.12)	115.42 (3.78)
Set C	72.02	96.03 (1.99)	110.42 (3.19)

Appendix F

Table F1. Sarah—Means and Effect Sizes for Number of Words

Word Set	Mean (Effect Size)		
	Baseline	Intervention	Maintenance
Set A	17.50	18.00 (0.45)	18.14 (0.57)
Set B	16.67	19.00 (3.13)	19.00 (3.13)
Set C	17.88	17.67 (-0.23)	18.00 (0.13)
Read Correctly Out of 19			

Appendix G

Table G1. Daniel—Means and Effect Sizes for Word Correct Per Minute

Word Set	Mean (Effect Size)		
	Baseline	Intervention	Maintenance
Set A	9.80	23.49 (17.01)	28.48 (23.20)
Set B	14.69	28.94 (3.38)	38.75 (5.70)
Set C	11.92	29.06 (5.26)	28.71 (5.15)

Appendix H

Table H1. Daniel—Means and Effect Sizes for Number of Words

Read Correctly Out of 19

Word Set	Mean (Effect Size)		
	Baseline	Intervention	Maintenance
Set A	8.33	15.71 (15.67)	14.57 (13.25)
Set B	11.00	17.17 (3.38)	17.00 (3.29)
Set C	8.63	16.50 (4.76)	15.00 (3.85)

Appendix I

Table I1. Peter—Means and Effect Sizes for Words Correct Per Minute

Word Set	Mean (Effect Size)		
	Baseline	Intervention	Maintenance
Set A	8.67	27.48 (5.09)	27.90 (5.21)
Set B	11.12	28.68 (3.54)	37.29 (5.28)
Set C	13.62	22.16 (2.35)	28.69 (4.15)

Appendix J

Table J1. Peter—Means and Effect Sizes for Number of Words

Read Correctly Out of 19

Word Set	Mean (Effect Size)		
	Baseline	Intervention	Maintenance
Set A	9.67	16.57 (2.09)	16.33 (2.02)
Set B	10.67	15.75 (1.74)	18.00 (2.51)
Set C	12.88	14.50 (0.88)	16.67 (2.07)

Appendix K

Words Correct Per Minute for Passages

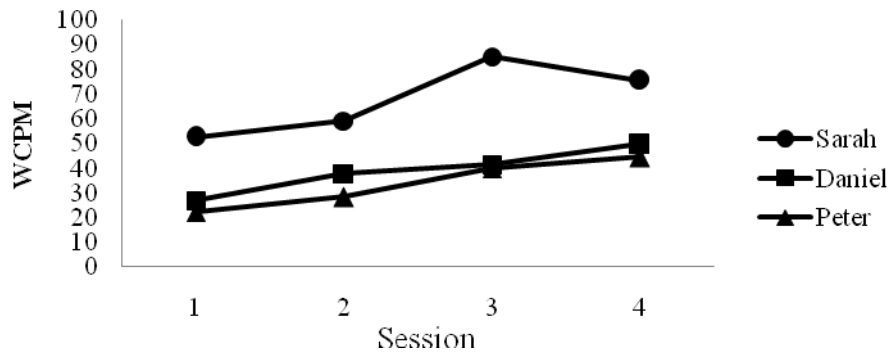


Figure K1. Sarah, Peter, and Daniel—Words Correct Per Minute on Passages.

Appendix L

Comprehension Scores

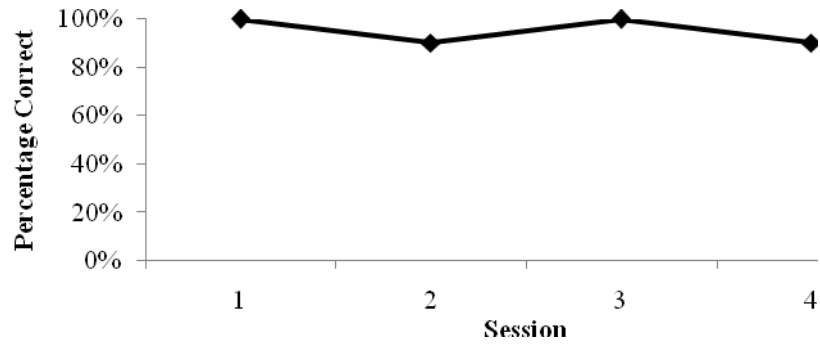


Figure L1. Sarah—Comprehension Scores.

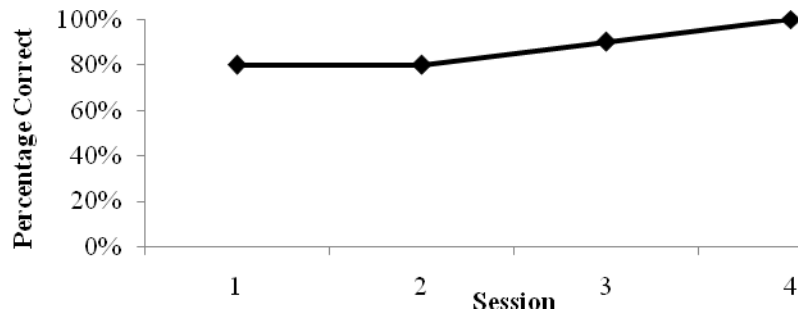


Figure L2. Daniel—Comprehension Scores.

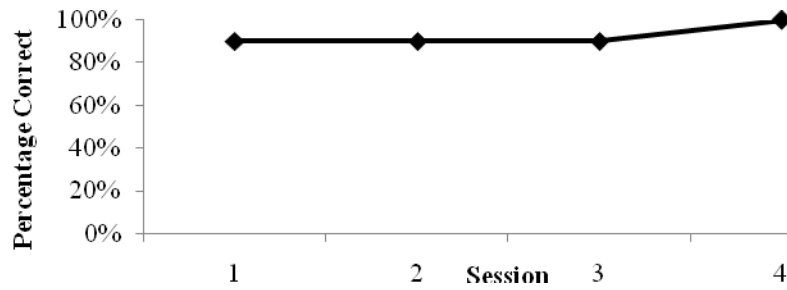


Figure L3. Peter—Comprehension Scores.

Appendix M

Intervention Acceptability

Teacher Intervention Acceptability Form—Results

1. Overall, how effective do you think this reading intervention has been for this student?

1	2	3X	4	5XX
Not at all effective				Very effective

2. Please list any specific improvements in the student's reading skills you have observed.

- Confidence builder

3. How worthwhile do you think this intervention has been for this student given the time commitment required?

1	2	3X	4	5XX
Not at all worthwhile				Very worthwhile

** These questions are in reference to the intervention in general.*

1. Would you consider this intervention for other students who need to improve their reading skills?

1	2	3	4	5XX
No		Maybe		Definitely

2. Is this an intervention you would consider learning and implementing yourself?

1	2	3X	4X	5
No		Maybe		Definitely

3. Would you recommend this intervention to other teachers?

1	2	3	4X	5X
No		Maybe		Definitely

4. Do you think this intervention has any positive side-effects for students?

1	2	3	4X	5X
No		Maybe		Definitely

5. Please list any positive side-effects.

- One-on-one reading
- Very good program

4. Do you think this intervention has any negative side-effects for students?

1XX	2	3	4	5
No		Maybe		Definitely

5. Please list any negative side-effects.

6. Is there any other feedback you would like to provide?

Student Intervention Acceptability Form

1. How much did you like the activities we did together? A lot X, a little XX, not at all
2. Which was your favorite activity?
 - Word lists
 - Word lists
 - Reading stories
3. Do you think you read better now because of our work? Yes XXX, maybe, no
4. Do you think other kids should do this to get better at reading? Yes XXX, maybe, no
5. Are you glad we did these activities? Yes XX, maybe X, no
6. Did you mind being pulled out of class to do this? Yes X, a little, no XX

Vita

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