Abstract

A link between vocabulary knowledge and reading comprehension has been well-established in research, and students who are English Language Learners (ELLs) are at risk for difficulties in both general reading achievement as well as academic vocabulary knowledge. Despite this link, relatively few studies have examined whether direct vocabulary instruction is an effective strategy for improving reading comprehension in students who are ELLs.

The current study investigated whether incorporating vocabulary instructional procedures into brief, individualized reading fluency interventions would successfully enhance reading comprehension in students who were ELLs. An alternating treatments design comparing two instructional vocabulary procedures with a fluency-building only condition was used with four students who were ELLs. It was hypothesized that participants would show greater gains in reading comprehension following interventions that featured vocabulary instruction compared to interventions with no vocabulary instruction components. Further, it was predicted that instructional procedures encouraging active engagement with words would improve students’ comprehension more than simple vocabulary instructional procedures. Finally, participants’ reading fluency was examined to determine whether spending intervention time on vocabulary instruction in place of extra fluency exercises negatively impacted their reading fluency.

In contrast with the study hypotheses, results indicated that neither one of the two vocabulary instructional procedures resulted in significant improvements in students’ comprehension of either taught or untaught material. However, instructional time spent on vocabulary activities yielded similar gains in reading fluency as time spent on additional fluency-building activities. In light of the findings, practical implications for reading interventions as well as future research directions are discussed.
Preface

Data collection for this project was approved by the University of British Columbia’s Research Ethics Board (certificate no. H12-02452) and was supported by a UBC Humanities and Social Science (HSS) Research Fund / Faculty of Education HSS Seed Grant to the thesis supervisor, Dr. Sterett Mercer. The basic design of the study was created collaboratively by Dr. Mercer and me with input from Dr. Laura Grow and Dr. Ruth Ervin. Specific instructional procedures were developed by me, with input from Dr. Mercer and Rhonda Geres-Smith. All content of vocabulary instructional materials and comprehension questions described in the Methods section are original and were developed collaboratively by Rhonda Geres-Smith and me. All written content of this thesis represents my original, unpublished work.
Table of Contents

Abstract................................................................................................................................. ii
Preface..................................................................................................................................... iii
Table of Contents .................................................................................................................. iv
List of Tables .......................................................................................................................... v
List of Figures ........................................................................................................................ vi
Acknowledgements .............................................................................................................. vii

I. Introduction ........................................................................................................................ 1
   Reading Comprehension and Vocabulary Knowledge....................................................... 2
   Effective Vocabulary Instruction ....................................................................................... 3
   English Language Learners and Vocabulary Knowledge.................................................. 4
      Studies Linking Vocabulary Instruction & Reading Comprehension in Students who are ELLs .................................................................................................................... 5
   Individual Reading Interventions with Vocabulary Instructional Components ............... 8
   The Present Study .............................................................................................................. 12
      Hypotheses .................................................................................................................... 13

II. Method ................................................................................................................................ 15
   Participants ....................................................................................................................... 15
   Measures ......................................................................................................................... 16
   Materials ......................................................................................................................... 19
   Procedure ......................................................................................................................... 19

III. Results .................................................................................................................................. 24
   Oral Reading Fluency ....................................................................................................... 24
   Reading Comprehension ................................................................................................. 26
   Maze ................................................................................................................................. 27

IV. Discussion ........................................................................................................................ 29
   Contributions to Research .............................................................................................. 30
   Study Strengths & Limitations ....................................................................................... 32
   Future Research Directions & Implications for Practice ................................................ 36
   Conclusions ..................................................................................................................... 37

References ............................................................................................................................. 38

Appendix A: Critical Steps for Intervention Conditions ..................................................... 44
   Simple Vocabulary Instruction Condition ........................................................................ 44
   Complex Vocabulary Instruction Condition .................................................................... 45
   Fluency-Only Condition ................................................................................................. 46

Appendix B: Sample Instructional Materials ....................................................................... 48
   Simple Vocabulary Instruction Condition ........................................................................ 48
   Complex Vocabulary Instruction Condition .................................................................... 49
List of Tables

Table 1. Student Demographics and Screening Results .................................................................15
Table 2. Median WCPM Across Grade Levels Based on Survey-Level Assessment ........ 16
Table 3. Means & Standard Deviations for WCPM & Comprehension Questions Answered Correctly Across Conditions ...........................................................................................................24
Table 4. Means & Standard Deviations for Maze Scores Across Conditions .......................24
List of Figures

Figure 1. Words Read Correctly Per Minute (WCPM) Across Conditions.................................24
Figure 2. Reading Comprehension Scores Across Conditions.....................................................26
Figure 3. Maze Scores Across Conditions ..................................................................................27
Acknowledgements

What a project this has been! It never would have been possible without the help of many wonderful others. Many thanks to…

My research supervisor, Dr. Sterett Mercer, for providing ongoing input, guidance, and encouragement throughout this study, from start to finish.

Rhonda-Geres Smith, who spent many hours patiently collaborating with me on the study, carrying out interventions, and providing good company. Seeing this study through would not have been possible without your help.

Ms. Deirdre O’Callaghan and staff at St. Joseph’s for their interest in the study and for welcoming Rhonda and I into their school.

My committee members, Dr. Ruth Ervin, Dr. Laura Grow, and Dr. Rachel Weber for input, suggestions, and feedback.

Mom and Dad for providing ongoing support and encouragement to persevere.

My cohort mates for providing moral support and many laughs throughout this process.

And of course, the study participants for their co-operation, patience, and hard work!
I. Introduction

Although early reading instruction is heavily focused on directly teaching reading sub-skills such as phonics, the central aim of reading is to comprehend written text, rather than to read words (Pullen, Tuckwiller, Ashworth, Lovelace, & Cash, 2011). Unfortunately, mastering component skills such as decoding and recognizing sight words does not necessarily result in the ability to understand the meaning of text (Oakhill, Cain, & Bryant, 2003). In recognition of this, many researchers have focused their attention on developing reading interventions that specifically target reading comprehension.

In an effort to clarify the existing link between vocabulary knowledge and reading comprehension (Baumann, 2009; Helman, 2009), some researchers have examined whether interventions aimed at broadening students’ vocabulary knowledge directly enhances their reading comprehension skills. However, this type of research is lacking with students who are English Language Learners (ELLs), even though these students generally have more limited vocabularies than their fluent English-speaking peers (Lesaux, Kieffer, Faller, & Kelley, 2010). One-on-one or small group reading interventions are a common solution to help students who do not respond to regular classroom instruction (Rathvon, 2008), and students who are ELLs are especially likely to participate in these interventions because they are at a greater risk for reading difficulties (Helman, 2009). Very little research has explored ways that vocabulary instruction can be incorporated into one-on-one reading interventions for students who are ELLs, and development of such interventions would offer a major asset to schools. Targeted interventions with vocabulary instruction may have the potential to improve students’ overall reading skills, including comprehension.
What follows is a review of existing research that examines vocabulary and reading comprehension in students who are fluent English speakers, and those who are ELLs. Studies of both classroom-based and individualized vocabulary interventions will be examined. In addition, evidence based strategies for vocabulary instruction that are closely linked to reading comprehension will be highlighted. Following this overview, pertinent research questions and rationale for the current study will be outlined.

**Reading Comprehension and Vocabulary Knowledge**

Although many reading interventions focus on improving students’ word decoding and fluency, it is crucial for students to master comprehension skills so they can understand what they read (Sideridis, Mouzaki, Simos, & Protopapas, 2006). Component skills such as word decoding and fluency are precursors to understanding text, yet developing these skills does not guarantee that higher-level comprehension will follow (Oakhill et al., 2003). Because it is necessary to know what individual words mean in order to understand the sentences they comprise, students’ vocabulary knowledge also contributes to their reading comprehension skills (Pullen et al., 2011).

Perfetti and Hart’s (2002) lexical quality hypothesis (LQH) posits that the depth of a student’s lexical, or word knowledge, involves several levels of understanding, including phonological, orthographic, morphological, syntactic, and semantic representations of words. These representations are interrelated, and the more representations a student has acquired, the stronger the quality of their lexical knowledge. Thus, a student’s word knowledge may range from failing to recognize a word completely (knowledge of no components), to recognizing its pronunciation and spelling but not understanding its meaning (knowledge of phonological and orthographic components), to having a vague knowledge of something the word is associated
with (some knowledge of semantic component), to a rich understanding of the word’s meaning and its use in different contexts (knowledge of all components). According to this hypothesis, students differ in the quality of their lexical knowledge, and those who have better developed lexical representations are stronger readers than those who have more limited lexical representations. Semantic knowledge, or knowledge of word meanings, may be the most important level of representation to foster a rich understanding of words.

As would be predicted by the LQH, a correlation does exist between students’ level of vocabulary knowledge and their comprehension skills. Students with stronger vocabularies are generally better comprehenders of text, and students with poor vocabularies tend to have difficulty understanding what they read (Baumann, 2009; Helman, 2009). In fact, Lesaux and Kieffer (2010) found that while 6th grade students with comprehension difficulties varied in their reading decoding and fluency skills, limited vocabulary knowledge was common to all struggling readers. In addition to correlational evidence, some studies also support a direct link between teaching vocabulary and improving reading comprehension. In one classic study, Beck, Perfetti, and McKeown (1982) found that, compared to a control group who received no intervention, students who participated in a 12-week classroom intervention where they were taught new vocabulary words recalled more detailed information from stories that included those vocabulary words. Other researchers, however, have failed to demonstrate that vocabulary interventions significantly improve reading comprehension. This conflicting evidence may be in part due to variability in the quality of vocabulary instruction across studies, as not all types of vocabulary instruction may equally enhance reading comprehension (Baumann, 2009).

**Effective vocabulary instruction.** As mentioned, differences in the quality of vocabulary instructional strategies may account for inconsistent findings regarding reading
comprehension outcomes. Researchers agree that effective vocabulary instruction encourages a deep understanding of word meanings achieved through active engagement with words. Effective techniques give students multiple opportunities for practice, exposure to words in multiple contexts, opportunities to explore the interconnections among different word meanings, and opportunities to discuss words as they relate to the stories they appear in (e.g., Bryant, Goodwin, Bryant, & Higgins, 2003; Helman, 2009). Kieffer and Lesaux (2012) contend that it is depth, rather than breadth, of vocabulary knowledge that is crucial to comprehension, and point out that the instructional strategies outlined above are most successful in enhancing reading comprehension. Indeed, in the Beck et al. (1982) study that demonstrated gains in comprehension, the instructional approach was designed to foster a deep understanding of the words that were taught. Students reviewed the targeted vocabulary words on different days, giving them multiple exposures to words. They were also given various practice opportunities through daily activities that included explaining relationships between different vocabulary words, and answering questions about word meanings in different contexts. It is plausible, then, that interventions focused on active engagement with vocabulary words may be more successful in strengthening students’ reading comprehension than strategies that only focus on teaching word definitions.

English Language Learners and Vocabulary Knowledge

While not all vocabulary instructional strategies enhance reading comprehension to the same degree, techniques that encourage active engagement with words may be critical to fostering gains in comprehension. Certain students may especially benefit from using this approach. Compared with students who are fluent in English, students who are ELLs are at a greater risk for problems with reading achievement, including reading comprehension difficulties.
Interestingly, both the U.S. Department of Education’s Institute of Education Sciences Practice Guide (Gersten et al., 2007), as well as the Centre for Applied Linguistics National Literacy Panel of Language Minority Children and Youth (August & Shanahan, 2006) have identified vocabulary as an instructional area to focus on for students who are ELLs.

It has been proposed that the vocabulary deficits of students who are ELLs are specific to academic English words, which are lower-frequency words in text that are not typically used in conversation (Lesaux et al., 2010). Even if students who are ELLs appear to be proficient with social or conversational English, they may not understand many words that are critical to acquiring academic and content-area knowledge, simply because they have had less exposure to them (Carlo et al., 2004; Taboada & Rutherford, 2011). Thus, a reasonable explanation for the reading difficulties experienced by students who are ELLs is their limited vocabulary skills.

**Studies linking vocabulary instruction and reading comprehension in students who are ELLs.** While researchers have emphasized the apparent disparity between the comprehension skills of students who are ELLs and those who are fluent in English, there is a lack of research linking vocabulary instruction and reading comprehension in students who are ELLs. In 2000, the National Reading Panel reported approximately 50 vocabulary intervention studies conducted with fluent English speaking students (Lesaux et al., 2010), yet only a handful of studies have examined the efficacy of vocabulary intervention for improving reading comprehension in students who are ELLs (August, Carlo, Dressler & Snow, 2005; Calderon et al., 2005). Several research reviews have reported that only three to four studies of this nature were conducted between 1980 and 2005 (e.g., August & Shanahan, 2006; Calderon et al., 2005; Gersten et al., 2007), and in some of these studies, the methods had clear limitations. As an example, Perez (1981) reported that the reading skills of Mexican-American third graders
improved following a three-month intervention aimed at teaching unfamiliar English vocabulary words and concepts. The instructional activities used in this study included analogies, synonyms, antonyms, and word riddles, but it is unclear what specific reading skills were assessed.

Although findings reported by Perez (1981) are limited, other existing research does suggest that vocabulary interventions may successfully enhance comprehension in students who are ELLs. Carlo et al. (2004) compared the effectiveness of a 15-week vocabulary intervention on various reading outcomes in a classroom of both fluent English-speaking students and students learning English with a control classroom receiving no intervention. In the intervention classroom, students learned approximately 10 academic vocabulary words each week related to a broader topic covered in the curriculum. During 45 minute sessions held four days a week, students engaged in various vocabulary building activities including word association tasks, synonym and antonym identification, analysis of words in different contexts, derivation of root words, and review of word definitions. Following the intervention, the researchers found a significant medium-sized improvement ($\eta^2 = .08$) in reading comprehension as assessed by students’ post-test performance on a multiple-choice reading task. On this measure, students read passages where approximately every seventh word was deleted, and they were required to select the most appropriate word to complete the sentence from a choice of three words (i.e., a cloze task). Target multiple-choice items included words taught throughout the intervention, as well as untaught words. Similarly, Calderon et al. (2005) compared eight third-grade control classrooms with eight classrooms of students who participated in a comprehensive vocabulary program over 6 months. The program included various word engagement activities, as well as discussing targeted vocabulary words. Students in both classrooms were ELLs, and small
improvements in passage comprehension in the experimental classrooms were found following the intervention ($d = .16$).

More recently, Lesaux et al. (2010) evaluated the effectiveness of an 18-week academic vocabulary program in a sample of 6th graders from seven schools. The sample included 130 students fluent in English, and 346 students learning English. Within the sample, approximately two-thirds of the students participated in the intervention, while the remaining students were in a control classroom. The intervention consisted of eight two-week units comprised of lesson cycles that lasted 45 minutes a day for four days a week, as well as two week-long review units. Similar to the Carlo et al. (2004) study described above, the academic vocabulary words were linked to the curriculum, and the vocabulary activities encouraged active engagement with, and multiple exposures to, words. Specific vocabulary activities included teaching multiple meanings of words, word-learning strategies, understanding word morphology, writing with the target words, and discussion of words. Students then answered multiple-choice questions about passages containing the vocabulary words they learned. Consistent with the Carlo et al. (2004) and Calderon et al. (2005) studies, students’ comprehension of targeted words in context improved as a result of the intervention, yielding a small but significant effect ($d = .20$). In addition to investigating students’ comprehension of text that contained the instructional vocabulary words, the researchers also examined students’ comprehension of unrelated passages that did not contain vocabulary words. Interestingly, they observed a marginally significant small effect for comprehension of unrelated passages following intervention ($d = .15$).

Overall, the small body of existing research on vocabulary interventions with students who are ELLs suggests that in-depth vocabulary instruction yields small-to-medium effects in reading comprehension. While less compelling than findings regarding comprehension of
passages with explicitly taught vocabulary words, research conducted by Lesaux et al. (2010) additionally offers preliminary evidence that broadening vocabulary knowledge may have a generalized effect by improving comprehension on material with untaught words.

**Individual Reading Interventions with Vocabulary Instructional Components**

Although existing research on vocabulary instruction and reading comprehension conducted with students who are ELLs is promising, a caveat with the studies described above is that they all involved classroom-based vocabulary interventions that were very time intensive. While experimental research comparing treatment and control conditions is an essential part of developing evidence-based practices, not all students who are ELLs necessarily require intensive intervention. It is likely that those who exhibit the greatest difficulties will benefit the most from intervention, yet in classroom-based interventions, the most powerful effects on reading comprehension may be lost as individual intervention effects are averaged out in group comparisons (Barlow, Nock, & Hersen, 2009). Thus, the utility of vocabulary instruction as a tool for improving comprehension in students who are ELLs may be underestimated in the studies mentioned above. In addition, students who experience persistent reading difficulties are likely to receive individualized or small-group reading assistance outside of regular classroom instruction (Rathvon, 2008). Because of these issues, it is worth examining the effectiveness of vocabulary instruction within the context of individual reading interventions.

Unfortunately, the extant literature examining vocabulary instruction and reading comprehension in individualized interventions is even more scarce than that examining classroom vocabulary interventions for students who are ELLs. Only three existing studies, all of which used single-case designs, have examined the impact of vocabulary instruction on reading comprehension in individual reading interventions. In the most recent of these studies,
Hawkins, Hale, Sheeley, and Ling (2011) examined the reading fluency and comprehension of six high school students reading below grade level following exposure to two different reading intervention packages. In one intervention, students read a short passage twice while being timed (i.e., repeated readings), receiving correction on any words they misread. In the second condition, students were initially presented with several key words that appeared in the passages along with the definitions of these words. After the students could accurately define each key word three times, they read the passage twice with error correction. In both interventions, students answered ten multiple-choice comprehension questions about the passage following the intervention sessions. Only half of the students answered more comprehension questions correctly in the vocabulary instruction condition versus the repeated reading only condition. However, five out of six of the students’ rate of comprehension, or proportion of correctly answered questions for each minute spent reading (Hawkins et al., 2011), was superior in the vocabulary instruction condition. In spite of this positive finding, the vocabulary instructional procedure did not employ any techniques that encourage active engagement with words, and the participating students were not ELLs. Nevertheless, this study demonstrates that even brief vocabulary instruction may successfully improve rate of comprehension for struggling readers.

Unlike the Hawkins et al. (2011) study, the remaining two studies with single-case designs did, in fact, examine students who were ELLs. Using a combined alternating treatments and withdrawal design, Rousseau, Tam, & Ramnarain (1993) examined the effectiveness of different reading intervention packages on five 6th grade Hispanic students’ English reading comprehension. Each student underwent four different intervention phases that all involved orally reading a short passage and answering comprehension questions about it. In the baseline phase, the students read the story silently before reading it aloud. In the second intervention
phase, a teacher read the passage aloud for them (i.e., listening passage preview; LPP). In the third phase, the students participated in a group vocabulary lesson prior to reading the passages where 10-12 key vocabulary words from the passage were taught and discussed in detail. Finally, a combined strategy was employed where students received both LPP and vocabulary instruction. To ensure that any observed effects were not simply due to improvement over time, the combined strategy was then withdrawn, and replaced with the vocabulary instruction alone condition. Following this withdrawal phase, the combined intervention was then reinstated. It was found that students answered more open-ended comprehension questions correctly following the vocabulary instruction intervention phases compared with the LPP intervention. The number of comprehension questions answered correctly was strongest, however, when LPP was combined with vocabulary instruction. In this condition, four out of the five students answered all eight questions correctly.

Finally, Tam, Heward and Heng (2006) examined the efficacy of a repeated reading intervention with error correction combined with vocabulary instruction in five students who were ELLs aged 9-11. For some intervention sessions, students read short passages three times each, while in other sessions, they read the passages repeatedly until they reached a predetermined fluency criterion. Similar to the studies described previously, students answered comprehension questions about the passages at the end of the readings. Their fluency and comprehension in the two intervention conditions was compared against their baseline reading performance on short passages. It was also compared to their performance during a control condition where a story was read to and discussed with the students before they were asked comprehension questions. The students exhibited better reading comprehension in the two repeated reading with vocabulary instruction interventions compared with both the baseline and
control conditions. In the repeated reading conditions, the students answered 4.1 out of 5 comprehension questions correctly on average for the reading to criterion condition, and 4.8 out of 5 correctly for the fixed reading condition. In contrast, they answered only 1 and 1.2 comprehension questions correctly on average during the baseline and control conditions, respectively. The apparent effects of the repeated reading with vocabulary instruction intervention were also observed for additional untaught passages that the students did not read repeatedly. Again, the students answered more comprehension questions correctly following the intervention conditions compared with the baseline and control conditions.

The three studies described above provide evidence that in the context of brief, individualized reading interventions, vocabulary instruction may enhance reading comprehension for struggling readers, including those who are ELLs. However, these studies have significant limitations in light of the existing research on effective vocabulary instruction. Pre-teaching vocabulary to improve reading comprehension was not the central focus of these studies; rather, they examined the overall effect of combined intervention strategies on fluency and comprehension. The vocabulary procedure in the Tam et al. (2006) study, for example, was part of a combined intervention package, and no component analysis was conducted to determine if pre-teaching vocabulary specifically improved comprehension or fluency. In addition, effective instructional procedures that encourage active engagement with vocabulary words were not employed in the Tam et al. (2006) study or in the Hawkins et al. (2011) study; nor was it clear that they were implemented in the Rousseau et al. (1993) study. Given that vocabulary instruction strategies that encourage active engagement with word meanings are important for learning new vocabulary words and enhancing comprehension (Baumann, 2009), students who
are ELLs are likely to benefit even more from individualized interventions that employ meaningful engagement with vocabulary words.

**The Present Study**

While only a few studies have evaluated the merit of vocabulary instruction as a method of improving reading comprehension for students who are ELLs, the small body of existing research shows promise. The positive initial findings are encouraging because students who are ELLs are especially susceptible to having limited academic vocabularies, which puts them at risk for reading comprehension difficulties. However, the lack of research on how to adapt vocabulary instructional strategies to individualized reading interventions is problematic, given that such interventions are relatively easy to implement, and offer a practical means of assisting struggling readers. In the three studies using single-case designs that were reviewed, researchers successfully incorporated vocabulary instructional procedures into brief, individualized reading interventions, and showed some improvements on students’ reading comprehension. However, they did not use strategies that expose students to words in a variety of contexts with multiple opportunities for practice. These strategies are recognized as best practices for vocabulary instruction, and are likely to contribute to reading comprehension outcomes (Baumann, 2009). Use of these strategies may be especially important for students who are ELLs, as they are particularly prone to having a limited depth of vocabulary (August et al., 2005).

To address the limitations in existing research, the aim of the present study is to investigate the impact of adding vocabulary instruction strategies to individualized reading interventions for students who are ELLs. The effectiveness of three reading intervention packages will be compared: one that utilizes a simple word definition teaching procedure, one that applies evidence-based strategies for active engagement with word meanings, and one that
features no vocabulary instruction. All intervention conditions will also target reading fluency. In the comparison, total intervention time will be approximately equal across all instructional procedures to determine whether vocabulary instruction is beneficial to overall reading performance in a limited amount of intervention time. The following research questions will be addressed:

1a. **Do vocabulary instructional strategies enhance comprehension more than fluency-building activities alone?**

1b. **Do vocabulary strategies designed to foster active engagement with words enhance comprehension more than simple review of word definitions?**

It is hypothesized that interventions with vocabulary instructional strategies will enhance students’ reading comprehension more so than those without vocabulary instructional strategies. It is further hypothesized that strategies designed to foster a deeper understanding of word meanings will enhance comprehension more than those with simple vocabulary instructional strategies.

2. **Do interventions with fluency-building and vocabulary instructional strategies enhance reading fluency to the same degree as interventions that spend additional time on fluency-building activities?**

By devoting more instructional time to vocabulary instruction during the reading intervention, it is possible that gains in fluency will be smaller, as time will be taken away from fluency-building exercises. It is important to examine this possibility because this information may be helpful in determining the optimal balance between vocabulary and fluency building exercises.

3. **Do vocabulary instructional strategies result in generalized gains in reading comprehension to untaught material?**
One of the classroom intervention studies reviewed provided evidence that vocabulary instruction may result in generalized gains in reading comprehension. The possibility that vocabulary instructional strategies yield comprehension gains on untaught material will also be examined.
II. Method

Participants

Participants included four students in grades 3 and 5 from an elementary school in Vancouver, British Columbia (BC). All participants were identified as English Language Learners (ELLs) as outlined by the BC Ministry of Education, meaning they spoke a primary language at home other than English (Province of British Columbia, 2009). To be eligible for the study, participants had to be reading at least one grade level below their current school grade. They were also required to be able to read at least 40 words correct per minute (WCPM) on first grade reading probes, as this is the suggested minimum level that students will benefit from a reading intervention targeting fluency rather than early literacy skills (Daly, Chafouleas, & Skinner, 2005). Finally, participants had to score no more than 1.5 standard deviations below the mean on two tests of cognitive functioning. Evidence suggests that cognitive functioning predicts responsiveness to comprehensive reading interventions, and growth in reading comprehension in particular (Fuchs & Young, 2006). Student demographics and selected screening results are presented below in Table 1. Pseudonyms are used in place of participants’ real names.

Table 1. Student Demographics & Screening Results

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Grade</th>
<th>First Language</th>
<th>Instructional Reading Level&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Matrices T-Score&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Pattern Construction T-Score&lt;sup&gt;b&lt;/sup&gt;</th>
<th>PPVT-4 Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abby</td>
<td>3</td>
<td>Vietnamese</td>
<td>2</td>
<td>50</td>
<td>45</td>
<td>94</td>
</tr>
<tr>
<td>Ralph</td>
<td>3</td>
<td>Vietnamese</td>
<td>2</td>
<td>45</td>
<td>60</td>
<td>106</td>
</tr>
<tr>
<td>Stacey</td>
<td>5</td>
<td>Tagalog</td>
<td>4</td>
<td>51</td>
<td>47</td>
<td>78</td>
</tr>
<tr>
<td>Jim</td>
<td>5</td>
<td>Cantonese</td>
<td>1</td>
<td>39</td>
<td>44</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 2.
Median WCPM Across Grade Levels Based on Survey-Level Assessment

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Grade 5</th>
<th>Grade 4</th>
<th>Grade 3</th>
<th>Grade 2</th>
<th>Grade 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abby</td>
<td>N/A</td>
<td>N/A</td>
<td>41</td>
<td>54</td>
<td>43</td>
</tr>
<tr>
<td>Ralph</td>
<td>N/A</td>
<td>N/A</td>
<td>30</td>
<td>60</td>
<td>44</td>
</tr>
<tr>
<td>Stacey</td>
<td>98</td>
<td>100</td>
<td>108</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Jim</td>
<td>N/A</td>
<td>22</td>
<td>31</td>
<td>37</td>
<td>46</td>
</tr>
</tbody>
</table>

*Note. WCPM = Words read correctly per minute; N/A = Passage set not administered.*

**Measures**

**Cognitive functioning.** The Pattern Construction and Matrices subtests from the Differential Ability Scales, Second Edition (DAS-II; Elliot, 2007a) were used as brief indicators of cognitive functioning. The DAS-II is a standardized, norm-referenced battery of cognitive tests designed for children aged 2 years, 6 months to 17 years, 11 months. These two tests were selected because the cognitive functions they measure (visual-spatial skills and fluid reasoning) correlate highly with general intelligence (Elliot, 2007b), and they carry low demands on both language and cultural knowledge (Flanagan, Oritz, & Alfonso, 2007). The DAS-II demonstrates good validity (average $r = .80$ with other intelligence measures), and the selected subtests have demonstrated adequate reliability (internal consistencies $>.80$; Elliot, 2007b).

**Receptive vocabulary.** The Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4; Dunn & Dunn, 2007) served as a measure of English vocabulary knowledge. The PPVT-4 is a norm-referenced, standardized test appropriate for individuals aged 2 years, 6 months to 90 years that assesses receptive vocabulary. In the PPVT-4, test-takers are presented with various images one at a time and instructed to identify the name of each image. The PPVT-4 has demonstrated excellent reliability (internal consistency $>.95$; test-retest $r > .90$) and adequate validity ($r > .80$ with measures of expressive vocabulary; $r = .41-.79$ with other measures of language; Dunn & Dunn, 2007).
Oral reading fluency. Oral reading fluency (ORF) probes from the Dynamic Indicators of Basic Early Literacy Skills, 6th Edition (DIBELS; Good & Kaminski, 2002, 2011a) were used to determine students’ instructional reading level prior to intervention, and as indicators of fluency during intervention. ORF passages are curriculum-based measures of accurate and fluent reading of connected text (Good & Kaminski, 2011b). Passages are available for each grade level from grade one to grade six. Throughout the course of the intervention sessions, DIBELS passages were presented to students in the order that they appeared in each grade-level passage series. Therefore, the passages were semi-randomly assigned to conditions.

Oral reading fluency was measured by the number of words read correctly per minute (WCPM) by the student on their third or fourth reading trial, depending on the condition. WCPM is a common measure of reading fluency, and reflects the number of words the student pronounces correctly while reading for one minute. In this procedure, any mispronunciations, word substitutions, omissions, reversals, hesitations of more than 3 seconds, or words that are not read as whole words are counted as errors (Hosp, Hosp, & Howell, 2005). WCPM was computed by dividing the total number of words read correctly by the total number of seconds the student spent reading the passage, multiplied by sixty. Although WCPM is typically based on only 1 minute of reading in total, this scoring procedure was necessary because the students read the entire passage. WCPM on DIBELS passages has been to shown to be a reliable measure of oral reading fluency, with test-retest and interrater reliability $rs > .90$, and alternate forms reliability $rs > .84$. WCPM on DIBELS passages also has good validity, as it shows moderate to strong relationships with other measures of overall reading, and has been shown to be a strong predictor of later DIBELS reading scores (Good et al., 2011).
**Passage reading comprehension.** Students were asked eight open-ended reading comprehension questions following each passage they read during the intervention sessions. Questions and examples of acceptable answers for each question were developed, reviewed, and agreed upon by two research assistants. As recommended by Shapiro (2011), both literal and inferential questions were used for each passage, and at least three of each type were included for each set of questions. Each comprehension question was scored by one of the two research assistants on a scale from 0-2 (0 = incorrect answer; 1 = partially correct answer; 2 = correct answer).

**Generalized reading comprehension.** Generalization of reading comprehension to material unrelated to intervention passages was assessed using AIMSweb Maze passages (Shinn & Shinn, 2002). Maze passages involve a multiple-choice cloze activity where students silently read a short passage at their instructional level. In these passages, the first sentence is left intact, but for the rest of the passage, approximately every seventh word is deleted. For each of the deleted words, students are required to select the best word to complete the sentence from a choice of three words. One of these words correctly completes the sentence, while the other two are distractor words. One distractor word is similar to the correct word, and the other is a distractor word dissimilar to the target word. Students are given 3 minutes to complete the task. The number of correct answers minus $\frac{1}{2} \times$ incorrect answers was used as an index of reading comprehension. While AIMSweb recommends scoring the total number of correct answers, the aforementioned alternative scoring procedure has demonstrated high levels of reliability and validity, and adjusts for random guessing (Pierce, McMaster, & Deno, 2010). AIMSweb Maze passages have adequate reliability and validity, as evidenced by moderate to strong estimates of
alternate-form reliability, and moderate correlations with end-of-year statewide reading assessments (AIMSweb, 2012).

**Materials**

**Vocabulary words.** For each probe, five potential target vocabulary words that appeared in the passage were chosen to present to the participants on flashcards. Words that were especially pertinent to the story or were likely to be unfamiliar to participants were selected as target words. Potential words underwent a review process by two research assistants to ensure there was agreement on appropriate words. Definitions were short, concise, and appropriate for English learners, and were adapted from the WordSmyth Beginner’s Dictionary (2012) and Longman’s Dictionary of Contemporary English (2012).

**Vocabulary processing questions.** Participants were asked five questions about each of the three targeted vocabulary words in the complex vocabulary instruction condition. Three of the questions were asked during the teaching procedure prior to the participants’ repeated readings, and two were asked following the repeated reading procedure. All questions were either yes/no or forced-choice questions about the target words. Questions were adapted from vocabulary activities suggested by Beck, McKeown, & Kucan (2002) that are intended to actively engage students with vocabulary word meanings. For example, if the targeted vocabulary word was “astonished,” a vocabulary processing question may be: “What would make you more astonished—to find a dinosaur bone or a bird’s bone?” (Beck et al., 2002, p. 63). All questions were created, reviewed, and agreed upon by two research assistants.

**Procedure**

**Recruitment and screening.** Participants were nominated by the school principal and special education teacher to be part of the study, and informed consent was obtained from their
parents. Prior to the intervention sessions, one of the two research assistants administered a brief diagnostic cognitive and academic assessment in order to provide background information on participants’ baseline English language and literacy skills, and to ensure that they met the study inclusion criteria.

Each student’s baseline reading level, or instructional level, was determined using a survey level assessment (e.g., Shapiro, 2011). In this procedure, each student was timed while reading three grade-level ORF passages, and their median WCPM was compared with grade-level percentiles from AIMSWeb (2012). If the student did not read within the instructional level (i.e., the grade level at which their median WCPM falls between the 25th and 75th percentile of Winter norms for that grade) for their grade level, an ORF passage one grade-level below their current grade level was presented. This process was repeated until the student’s highest instructional level was identified.

**Reading fluency intervention.** Following the screening assessment, one of two graduate students in the UBC School Psychology program met with the participants in their school for individual reading intervention sessions. During each intervention session, participants were presented with a DORF passage at their highest instructional level to read 3-4 times, depending on the intervention condition. Sessions lasted approximately 30-40 minutes each, and were delivered twice weekly. An alternating treatments design was used to compare the relative effectiveness of the three intervention conditions (fluency-only, simple vocabulary instruction, complex vocabulary instruction). In this type of design, two or more treatments are compared by rapidly altering the intervention conditions in a randomly assigned order (Barlow & Hayes, 1979). In the current study, each student received 15 intervention sessions in total, with five
sessions of each intervention condition. Sessions were administered in five blocks of three sessions, with the order of conditions randomly assigned across blocks.

**Identification of target vocabulary words.** In the two vocabulary instruction conditions, students were presented with five potential vocabulary words on flashcards prior to reading the passages. Students were then asked to tell what each word of the words meant, and the three words with the least accurate or detailed definitions were selected as target words to teach during the intervention. The three words were taught according to the instructional procedures described below for each vocabulary instruction condition. No vocabulary words were presented or taught during the fluency-only sessions. A detailed list of critical steps for each intervention condition is described in Appendix A, and sample instructional vocabulary and comprehension items for the vocabulary conditions are outlined in Appendix B.

**Simple vocabulary instruction.** For the simple instruction condition, the interventionist presented the vocabulary flashcard, supplied a simple definition of the word, and used it in a sentence. Students were then asked to repeat the word and its definition. This was repeated for the remaining two words.

**Complex vocabulary instruction.** In this condition, each vocabulary word was taught according to a procedure adapted from Beck et al. (2002). First, the vocabulary word was presented as it appeared in context of story, and explained using a simple definition. The interventionist then provided another example of the word in a sentence that was unrelated to the story. The interventionist then asked three forced-choice questions about the word to enhance the students’ understanding of the word’s meaning. Finally, students were asked to repeat the word and its meaning. This teaching procedure was repeated for all three targeted words before completing the repeated reading procedure. Following the repeated readings, students were
asked two more forced-choice questions about each of the targeted vocabulary words before completing comprehension exercises. This instructional procedure was designed to encourage active engagement with words, multiple opportunities for practice, and exposure to words in different contexts.

**Listening passage preview with repeated readings.** All intervention sessions consisted of a repeated reading (RR) with modeling procedure. Repeated reading interventions, where students practice reading a passage multiple times, have been shown to effectively improve reading fluency and comprehension (Therrien, 2004). In the two vocabulary conditions, the RR procedure immediately followed vocabulary instruction. First, the interventionist modeled fluent reading by reading the passage aloud once. This modeling procedure is called listening passage preview (LPP) and is effective in improving oral reading fluency (Daly et al., 2005). Students then read the entire story aloud, and the interventionist reviewed any errors the student made. The interventionist pointed out any incorrectly read words one at a time, modeled the correct pronunciation, and had the students read the sentence with the incorrectly read word three times, supplying feedback (Daly et al., 2005). The students then read the story two more times in the simple and complex vocabulary conditions, and three more times in the fluency-only condition. Students’ progress was tracked on a sheet using stickers as motivators, and they received a sticker after completing each reading trial. The students’ oral reading scores, in terms of WCPM, was recorded on the final reading trial. After the repeated reading procedure, students were asked eight comprehension questions about each passage. Finally, they completed one maze passage at the end of each session to assess generalization of comprehension skills.

**Treatment integrity and inter-scorer agreement.** An appendix of critical intervention steps for each condition was supplied to the interventionists (listed in Appendix A), and audio
recordings of 27% of the sessions were reviewed by the interventionists. On average, 99% of critical intervention steps were followed for the sessions that were reviewed, with percentage of steps followed ranging from 93% to 100%. Words read correctly per minute and students’ responses to the comprehension questions were also reviewed by the interventionists for inter-scorer agreement. Agreement for WCPM ranged from 94-100%, with an average agreement of 99%. Initial reviews of the comprehension question responses yielded inter-scorer agreements ranging from 63-100%, with an average of 91% agreement. Students’ responses were then discussed until 100% agreement in scores was reached between the raters.

**Data analysis.** Data from the interventions were graphed and analyzed using visual analysis techniques including level, variability, and overlap in performance (Riley-Tillman & Burns, 2009). Graphs were examined for separation in performance across conditions.
III. Results

Table 3. Means & Standard Deviations for WCPM & Comprehension Questions Answered Correctly Across Conditions

<table>
<thead>
<tr>
<th>Student</th>
<th>WCPM</th>
<th>Comprehension Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FO</td>
<td>SI</td>
</tr>
<tr>
<td>Abby</td>
<td>76</td>
<td>80</td>
</tr>
<tr>
<td>Ralph</td>
<td>60</td>
<td>66</td>
</tr>
<tr>
<td>Stacey</td>
<td>125</td>
<td>119</td>
</tr>
<tr>
<td>Jim</td>
<td>55</td>
<td>57</td>
</tr>
</tbody>
</table>

Note. WCPM = Words correct per minute on last reading trial; FO= Fluency-Only; SI= Simple Instruction; CI= Complex Instruction

Table 4. Means & Standard Deviations for Maze Scores Across Conditions

<table>
<thead>
<tr>
<th>Student</th>
<th>Generalized Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FO</td>
</tr>
<tr>
<td>Abby</td>
<td>8.3</td>
</tr>
<tr>
<td>Ralph</td>
<td>2</td>
</tr>
<tr>
<td>Stacey</td>
<td>19.3</td>
</tr>
<tr>
<td>Jim</td>
<td>7.8</td>
</tr>
</tbody>
</table>

Oral Reading Fluency

Figure 1. Words Read Correctly Per Minute (WCPM) on Last Reading Trial Across Conditions
Figure 1 compares students’ oral reading fluency across the 3 intervention conditions. Overall, few common patterns in performance were observed across participants. Jim’s mean level of fluency was comparable across all conditions, with the most last-trial WCPM in the complex condition ($M = 59$), closely followed by the simple condition ($M = 57$), and the fluency-only condition ($M = 55$). A high degree of overlap was observed, with very little separation in performance across conditions. Abby similarly showed a great deal of overlap and little separation in performance across conditions, but read the most WCPM on average during the simple condition ($M = 80$). There was little difference in her performance between the fluency-only ($M = 76$) and complex conditions ($M = 75$). Ralph demonstrated the highest level of fluency during the simple instruction condition ($M = 66$), and the lowest level of fluency during the complex instruction condition ($M = 51$). There was no overlap in performance observed in these 2 conditions, indicating that Ralph consistently read more fluently during simple instruction. Ralph’s fluency was more variable throughout the fluency-only condition ($M = 60$, $SD = 14$), but only one data point from this condition overlapped with the simple instruction condition. Finally, Stacey showed generally higher fluency levels in the fluency-only condition ($M = 125$) as compared with the simple instruction condition ($M = 119$), with only one overlapping point from the simple instruction condition. Stacey’s fluency was highly variable during the complex instruction condition ($M = 120$, $SD = 13$), and overlapped with the other two conditions. Overall, average last-trial WCPM was highest in one of the vocabulary conditions for 3 of the 4 students, and all students showed substantial overlap in performance between the fluency-only condition and at least one of the vocabulary conditions. These results indicate that there was no clear cost in fluency for spending more time on vocabulary instruction.
Reading Comprehension

Figure 2.
Reading Comprehension Scores Across Conditions

Figure 2 display students’ scores on reading comprehension questions across the three conditions. A high degree of overlap in performance was observed across conditions for Abby, Ralph, and Stacey, indicating that vocabulary instruction had no overall impact on their reading comprehension. In addition, the average scores on comprehension questions for these students suggested no clear advantages in the simple (SI) or complex (CI) vocabulary instruction conditions compared to the fluency-only (FO) condition (Abby: SI $M = 10.8$; CI $M = 10.4$; FO $M = 11$; Ralph: SI $M = 12.4$; CI $M = 14.6$; FO $M = 13.4$; Stacey: SI $M = 8.8$; CI $M = 10.8$; FO $M = 10.4$). However, Jim scored higher on comprehension questions in the two vocabulary instruction conditions relative to the fluency-only condition. He performed the highest on average in the simple teaching condition ($M = 9$), and showed some separation in performance from the fluency-only condition ($M = 4.4$), with only one data point from the fluency-only
session overlapping with simple instruction. His average performance during complex instruction ($M = 6.6$) was also higher than his performance during fluency-only sessions, but it overlapped with his performance in both the fluency-only and simple conditions.

**Maze**

Figure 3.

*Maze Scores Across Conditions*

Figure 3 displays students’ performance on Maze passages following each type of intervention condition. In general, there was little separation in performance observed across conditions, indicating no clear differential impact of the conditions on generalized reading comprehension. However, Ralph showed higher performance during the simple and complex vocabulary conditions relative to his performance during fluency-only sessions, with only one fluency-only session overlapping with either of the two vocabulary conditions. In addition, Ralph showed the highest Maze scores on average during the complex condition ($M = 5.9$),
followed by the simple ($M = 4.8$) and fluency-only ($M = 2$) conditions. When comparing mean performance, Abby also scored slightly higher on average following complex ($M = 11.9$) and simple ($M = 11.3$) vocabulary instruction conditions versus the fluency-only condition ($M = 8.3$). However, there was a great deal of variability and overlap in her performance. Stacey scored higher on average during the complex ($M = 21.7$) and fluency-only ($M = 19.3$) conditions relative to the simple condition ($M = 14.9$), but also showed a high degree of overlap in performance. No notable differences in mean scores across conditions were observed for Jim (FO $M = 7.8$; SI $M = 8.6$; CI $M = 7.6$).
IV. Discussion

The present study had several goals. One was to investigate whether adding vocabulary instructional activities to repeated reading interventions would enhance ELLs’ passage comprehension beyond the comprehension benefits produced by repeated readings alone. A second goal was to examine the extent to which brief instructional procedures intended to mirror active engagement strategies (e.g., multiple exposures to words, words in multiple contexts, exploring word interconnections) yielded meaningful improvements in students’ passage comprehension beyond teaching them simple word definitions. Another aim was to explore whether simple and complex vocabulary instructional techniques resulted in generalized gains in students’ comprehension. Finally, the study evaluated whether spending instructional time on vocabulary instructional activities in place of additional repeated readings resulted in smaller gains in students’ reading fluency.

For the majority of participants, the vocabulary instructional procedures used in this study did not result in greater comprehension benefits than those of repeated reading trials alone, indicating there was no clear link between vocabulary instruction and reading comprehension improvements. However, the student with the weakest level of vocabulary knowledge did answer more passage comprehension questions correctly during the vocabulary conditions compared to the fluency-only condition. This suggests that it is possible that brief vocabulary instructional procedures may be effective for ELLs with very low levels of vocabulary knowledge. Across all students, there was also no clear advantage in generalized comprehension resulting from any one intervention condition. Two students showed some generalized improvements in comprehension during the two vocabulary instruction conditions, but there was too much variability and overlap in their performance across conditions to draw firm
conclusions. Finally, it was found that only one of the four students read more WCPM on average during the fluency-only condition and that all students showed a great deal of overlap in performance across different conditions, suggesting there was little cost to dedicating instructional time to vocabulary instruction in place of additional fluency-building activities.

**Contributions to Research**

While the current study adds to the body of research examining individual vocabulary instruction and reading interventions, it unfortunately does not fully clarify the link between brief vocabulary instructional activities and reading comprehension outcomes. There is some evidence from previous studies that teaching vocabulary words during reading interventions improves students’ comprehension, but findings have not been consistent. For example, Rousseau et al. (1993) found that reading interventions with vocabulary previewing and passage modeling components resulted in greater comprehension gains for ELLs compared to control interventions, and that interventions combining both of these strategies yielded the greatest improvements in comprehension. Tam et al. (2006) also found that ELLs’ reading comprehension improved following interventions with vocabulary instruction compared to interventions with repeated readings alone. In contrast, Hawkins et al. (2011) failed to demonstrate that interventions combining vocabulary previewing with repeated readings were consistently superior to interventions with repeated readings alone in terms of improving students’ reading comprehension. While the students in the Hawkins et al. study were not ELLs, the current study utilized similar intervention components, and yielded no clear effects for comprehension in a sample of ELLs.

Mixed findings across studies may be in part due to inconsistencies in study design, intervention components, and participant characteristics. For example, both Tam et al. (2006)
and Rousseau et al. (1993) only asked their participants literal comprehension questions, whereas both literal and inferential comprehension questions were included in both the Hawkins et al. (2011) study as well as the current study. It is possible that exposure to vocabulary words results in enhanced recall of factual information in passages, but does not result in better understanding of the overall content. Research by Taboada and Rutherford (2011) supports this possibility, as they demonstrated that explicitly teaching academic vocabulary words to a classroom of fourth grade ELLs improved the students’ comprehension on literal, but not inferential, questions. However, it should be noted that question format has also differed across studies, which is another confounding factor. In the Hawkins et al. (2011) study, researchers asked participants multiple-choice questions, whereas the other two studies asked participants open-ended questions. These differences make it difficult to pinpoint whether question type, question format, or some combination of these factors influences students’ overall performance on comprehension questions.

Aside from inconsistencies in how reading comprehension was measured, the studies reviewed have also differed in the procedures used for baseline and control conditions. For example, while Rousseau et al. (1993) found positive comprehension effects following both vocabulary previewing and passage modeling strategies, their control condition did not have a repeated reading procedure. The current study featured passage modeling coupled with at least three repeated reading trials in all conditions. It is possible that brief vocabulary instructional procedures do not result in comprehension gains beyond those produced by enough repeated readings, or by a combination of repeated readings and passage modeling. In line with this idea, research by Therrien (2004) suggests that repeatedly reading a passage 3 to 4 times yields the greatest benefits in both fluency and comprehension. Reading a passage three times enhances
fluency beyond the improvements gained from reading it twice, but reading it four times does not greatly enhance comprehension beyond the gains from reading it three times.

Finally, it is important to note that participants’ English language proficiency and their level of vocabulary knowledge has not been consistent across studies. For example, all participants in the Tam et al. (2006) had relatively low English proficiency, whereas no students were ELLs in the Hawkins et al. (2011) study. Vocabulary knowledge, but not English language proficiency, was assessed in the current study, and although all students were ELLs, they differed greatly in their receptive vocabulary skills, ranging from below the 1st percentile to the 66th percentile.

**Study Strengths & Limitations**

While the current study did not demonstrate strong overall improvements in ELLs’ reading comprehension following vocabulary instruction procedures, several important strengths should be highlighted. First, using an alternating treatment design allowed for direct comparison of specific intervention components, including repeated reading with modeling in isolation, as well as two distinct vocabulary instructional procedures. These specific intervention components have not been clearly isolated out from one another in previous studies. In addition, this was among the first single-case studies to attempt to incorporate in-depth teaching of vocabulary words by adapting some of the instructional procedures recommended by Beck et al. (2002) for use in brief, individual reading interventions. The vocabulary instructional procedures used in previous single-case studies have primarily focused on teaching word definitions, rather than emphasizing active engagement with word meanings. Third, utilizing both simple and complex vocabulary instructional procedures in addition to repeated readings did appear to benefit the reading comprehension of a student with very low vocabulary knowledge, opening up the
possibility that while not all ELLs benefit greatly from brief vocabulary instructional procedures, these techniques may be worthwhile for those with very low levels of vocabulary knowledge. Finally, current findings suggest that dedicating instructional time to vocabulary exercises in place of extra reading practice in interventions that combine repeated reading and modeling trials does not result in any great cost in students’ fluency. As noted in Therrien (2004), comprehension improvements appear to level off after 3 repeated reading trials, therefore instructional time may be better spent on alternative activities. Given that Perfetti and Hart’s (2002) Lexical Quality Hypothesis posits that phonological, orthographic, and semantic representations of words are interrelated in their contribution successful reading, this finding partially supports the utility of incorporating vocabulary instruction into individual reading interventions, as teaching word meanings may support the development of fluency as well as comprehension.

Despite these areas of strength, this study also carried several limitations. Although the aim of the complex vocabulary instruction condition was to provide efficient instruction that encouraged multiple exposures to, and active engagement with, words, the procedures used may have been too brief for students to gain a deep understanding of the targeted words. For example, while students were given multiple exposures to the words they were taught during intervention sessions, they were taught a new set of words during each session, meaning that the words were not reviewed on separate days. In addition, the activities intended to enable active engagement with words were limited to forced-choice questions, which, in isolation, may not have allowed them to deeply engage with the word meanings. Studies that have demonstrated improvements in students’ reading comprehension following vocabulary instruction have all featured class-wide interventions that had daily vocabulary lessons lasting several months (e.g.,
Beck et al., 1982; Calderon et al., 2005; Carlo et al., 2004; Leseaux et al., 2010). Their vocabulary instructional activities were more varied than those in the current study, enabled more student participation, and the targeted words were all tied into a larger unit being taught in the classroom, meaning they had exposure to the same words throughout the course of the interventions. In addition, these interventions were exclusively focused on vocabulary instructional activities, rather than having vocabulary instruction as one part of more general reading interventions.

A second limitation to this study is that there was minimal evaluation of the words selected for vocabulary instruction. It has been suggested that it is most useful to teach high-frequency academic words that are likely to appear across texts (Carlo et al., 2004; Lesaux & Kieffer, 2010), or Tier 2 words according to Beck et al.’s (2002) taxonomy. Many of the targeted vocabulary words taught in this intervention would more likely be considered Tier 3 words, as they were highly specific to the intervention passages, but unlikely to appear repeatedly in other texts.

A third limitation of this research is that there was a wide range of vocabulary knowledge across participants. Although two of the participants had relatively weak vocabulary knowledge, the remaining two had vocabulary knowledge within normal age expectations. While ELL status is associated with low vocabulary knowledge, the ELL population is highly heterogeneous in terms of English proficiency, and language status may be too general a characteristic to rely on for targeted vocabulary instruction. For example, in a group vocabulary intervention study with ELL and native English speaking kindergarten students, Crevecoeur, Coyne, and McCoach (2014) found that that language status did not predict any additional variance in post-test vocabulary and listening comprehension measures beyond the variance accounted for by pre-test
receptive vocabulary knowledge. Similarly, Lesaux and Kieffer (2010) observed three distinct profiles of struggling readers, and while low vocabulary knowledge was common across all three types of struggling readers, language status (i.e., ELL versus Native English Speaker) did not predict any specific pattern of reading profile. In addition, the large-scale vocabulary intervention studies discussed had classrooms of both ELLs and Native English speakers, and interventions have shown positive effects for both groups.

In addition to limitations regarding vocabulary procedures and knowledge, several other factors that may have impacted study results were not explored. For example, while including both literal and inferential passage comprehension questions was an asset to the study, students’ comprehension of these different types of questions was not examined separately. As mentioned earlier, some research suggests that vocabulary instruction may enhance students’ performance on factual, but not inferential questions (Taboada and Rutherford, 2011). In addition, repeated reading trials of the passages may have produced memory effects that resulted in enhanced recall of factual information, but not inference making. Thus, it is possible there may have been differential effects across types of questions in the current study. Finally, it is possible that intervention effects may have differed if the students read passages at their grade level in school, rather than at the level of their instructional reading rate. Morris et al. (2013) note that while a student’s instructional reading rate may be lower than their grade level, their accuracy and comprehension may still be on par with their grade level in school. Thus, while the students’ instructional reading levels were appropriate for fostering fluency gains, they may have shown more improvements in comprehension if they read more challenging material.
Future Research Directions & Implications for Practice

To help tailor to the needs of individual students, it will be important for future researchers to directly examine possible interactions between students’ level of vocabulary knowledge and their response to vocabulary intervention. As mentioned, current results highlight that even brief vocabulary instruction may be an efficient way to foster reading comprehension for students with extremely limited vocabularies, which has important implications for current practice. Since fluency gains were similar in all intervention conditions, it may be worthwhile for practitioners to implement no more than 3 repeated readings during reading interventions (Therrien, 2004) and spend additional time on vocabulary activities, particularly for those students with the most limited vocabularies. According to the lexical quality hypothesis, strengthening the depth of students’ word knowledge will enhance both their automaticity of word reading and their comprehension (Perfetti & Hart, 2002), suggesting that spending time on such vocabulary activities will help further build their reading skills.

Given that previous studies have demonstrated that intensive, interactive vocabulary interventions have successfully improved comprehension in classroom settings, it will also important for researchers to work to develop individual and small-group intervention procedures that focus exclusively on interactive vocabulary building. In the current research, vocabulary instructional procedures were secondary to fluency-building activities, and the limited time spent on vocabulary activities was likely too brief to enable meaningful processing and sufficient engagement with vocabulary words. In some classrooms, there may not be a widespread need to focus instructional time on vocabulary intervention, but select students within those classrooms may benefit greatly from targeted vocabulary intervention.
Conclusions

Neither of the two vocabulary intervention strategies examined in this study greatly enhanced ELLs’ reading comprehension, making it difficult to demonstrate a clear link between vocabulary instruction and reading comprehension in light of mixed results from previous research. Varying methodologies used across previous studies also make it difficult to identify which students will benefit from vocabulary instruction, and which combination of intervention components will be most effective. Despite these limitations, the current research highlights the existing need to investigate ways that effective vocabulary instructional strategies can be adapted to individualized interventions. Intensive vocabulary instructional strategies that foster active engagement with words have been successful in long-term, classroom-wide interventions, yet such large-group interventions may not be practical when only a select number of students require intensive vocabulary instruction. For these students, one-on-one or small group instruction is ideal, and it would be prudent to embed vocabulary strategies into broader reading interventions in order to target their overall literacy skills. In the meantime, current findings do suggest that adding vocabulary procedures to repeated reading trials does not result in costs to fluency-building, and even brief vocabulary strategies may be worthwhile for students with extremely limited levels of vocabulary knowledge. Finally, although students’ language status is an efficient means of approximating vocabulary knowledge, future research should also focus on directly measuring students’ vocabulary knowledge as a possible predictor of their response to vocabulary intervention. Ultimately, this will enable practitioners to more effectively tailor intervention strategies to the needs of individual students and meet the instructional needs of both ELLs and native English speakers.
References


Kieffer, M. J., & Lesaux, N. K. (2012). Knowledge of words, knowledge about words:


doi: 10.1177/07419325040250040801

APPENDIX A: Critical Steps for Intervention Conditions

A. Simple Vocabulary Instruction Condition

1. Introduce session by telling student how many times they will read story that day, then tell them they are going to talk about some words.

2. Present student 5 words on flashcards, one at a time: “This word is _______. What does ______ mean?”
   a. [Word 1]
   b. [Word 2]
   c. [Word 3]
   d. [Word 4]
   e. [Word 5]

3. Select 3 words to teach. Give definition of word and example.
   WORD 1: ___ means [definition]. An example of a sentence with the word ___ is [sentence].
   a. “What is the word? What does it mean?”
   b. If they do not give correct definition, tell them definition once more. Ask them “What is the word? What does it mean?” and move on. If they still get definition wrong, give definition one more time and then move on.

4. WORD 2: Definition & example
   a. What is the word? What does it mean?
   b. Repeat teaching if they don’t give correct definition

5. WORD 3: Definition & example
   a. What is the word? What does it mean?
   b. Repeat teaching if they don’t give correct definition

6. Model passage for student by reading it aloud once.

7. Ask student to read the story aloud & have them read entire story

8. After first reading, put a sticker on card for “Reading 1”

9. After first reading, do a phrase drill error correction procedure with any errors. Point out error words & have them read sentence/phrase containing error words 3x.

10. READING 2: Student reads story again [no error correction]

11. Put second sticker on sheet after reading

12. READING 3: Student reads story once more [no error correction]
13. Put third sticker on sheet after reading

14. On final read, record time & WCPM.

15. Ask 8 comprehension questions. Record student’s answers. Do not prompt or give feedback.

16. Give student AIMSweb Maze passage to complete. Allow student up to 3 minutes to complete task. Time with stopwatch.

B. Complex Vocabulary Instruction Condition

1. Tell student they will read story 3x that day, then tell them they are going to talk about some words.

2. Present student 5 words on flashcards, one at a time: [“This word is _______. What does _______ mean?”][Word 1]
   a. [Word 2]
   b. [Word 3]
   c. [Word 4]
   d. [Word 5]

3. Select words to teach. Teaching procedure: [WORD 1]
   a. “In the story you are about to read, [word in context of story]. [Word] means [definition]. Another example of a sentence with the word ___ is [sentence].”
      b. Ask student: what is the word? What does it mean?
         i. If they do not give correct definition, tell them definition once more. Ask them “What is the word? What does it mean?” and move on. If they continue to get definition wrong, give definition one more time and then move on.
      c. Ask 3 processing questions
         i. If they get answer wrong, correct them & explain why using the definition of the word, then ask them to try it again, repeating question.

4. WORD 2:
   a. Word in context, Definition, Example
   b. What is the word? What does it mean?
      i. Repeat teaching if they don’t give correct definition
   c. 3 processing questions
      i. Error correct if necessary

5. WORD 3:
   a. Word in context, Definition, Example
   b. What is the word? What does it mean?
      i. Repeat teaching if they don’t give correct definition
   c. 3 processing questions
      i. Error correct if necessary
6. Model passage for student by reading it aloud once

7. Ask student to read the story aloud & have them read entire story

8. After first reading, put a sticker on card for “Reading 1”

9. After first reading, do a phrase drill error correction procedure with any errors. Point out error words & have them read sentence/phrase containing error words 3x.

10. READING 2: Student reads story again [no error correction]

11. Put second sticker on sheet after reading

12. READING 3: Student reads story once more [no error correction]

13. Put third sticker on sheet after reading

14. On final read, record time & WCPM.

15. Word 1 - Ask two more processing questions about each word, following same procedure as 3c.
   i. 2 questions – error correct if necessary

16. Word 2
   i. 2 questions – error correct if necessary

17. Word 3
   i. 2 questions – error correct if necessary

18. Ask 8 comprehension questions related to passage. Record student’s answers. Do not prompt or give feedback.

19. Give student AIMSweb Maze passage. Allow student up to 3 minutes to complete task. Time with stopwatch.

   **C. Fluency-Only Condition**

1. Tell student they will read story 4x that day.

2. Model passage for student by reading it aloud once.

3. Ask student to read the story aloud. Have them read entire story.

4. Put sticker on chart following reading.

5. After they read passage once, do a phrase drill error correction procedure with any errors:
Point out error words & have them read sentence/phrase containing error words 3x.

6. READING 2: student reads story again [no error correction].

7. Put second sticker on chart following 2nd reading.

8. READING 3: student reads story again [no error correction].

9. Put third sticker on chart following 3rd reading.

10. READING 4: student reads story again [no error correction].

11. Put sticker on chart following fourth reading.

12. On final read, record time & WCPM.

13. Ask 8 comprehension questions related to passage. Record student’s answers. Do not prompt or give feedback.

14. Give student AIMSweb Maze passage to complete. Allow student up to 3 minutes to complete task. Time with stopwatch.
APPENDIX B: Sample Instructional Materials

1. Simple Vocabulary Instruction Condition

DIBELS Next Progress Monitoring (Grade 4): “An Island Festival” (Good & Kaminski, 2011a)

Everyone on the island helped get the village ready for the big festival. Working together was part of the island way. Kiri and her family helped to sweep the walkways of the village. Other families picked up litter and groomed gardens. Some repaired old buildings around town. They all wanted their island to look its best for the guests who would soon arrive from all over the Pacific.

Kiri was happy that the place looked so nice, but she was even more excited about the festival to come. Her island had been chosen to host the big event. People were eager to share their island home and to treat their guests to wonderful feasts. Kiri’s mouth watered when she thought of the big platters of food they would serve. There would be tables piled high with fruit, seaweed, fish, and coconuts. The best part of the festival would be the show when dancers from each country would perform in traditional costumes. Kiri was in a group that was to dance on the first night. Her costume was made of a special cloth that was made from the bark of mulberry trees. It had flowers and leaves painted on it and she knew she would treasure the beautiful dress long after the dance was over.

On opening night, a huge crowd came to see the show. Dancers from each country paraded into the stadium and sat on the ground around the stage. Kiri’s group went on first and performed a spirited song and dance. The crowd stood and cheered so loudly that Kiri couldn’t stop smiling. Her group left the stage and then other dancers performed. As the other groups danced, she admired their colorful costumes and lively rhythms. Everyone cheered happily for each of the dancing groups. People from many different places chatted and laughed with one another. Kiri beamed with happiness. She knew she would remember this night always.

Teach three of the five potential words:

Festival means “a group of shows or special activities usually planned around a type of food, a season, or a kind of art or music.”
An example of a sentence with the word festival is We tried maple syrup at the maple festival.
**Groom** means “to make clean and neat in appearance.”

An example of a sentence with the word groom is *He went upstairs to groom himself before dinner.*

A **Host** is “a person who takes care of guests in a home.”

A sentence with the word host is *Our host served pizza and drinks at his party.*

A **Platter** is “a large shallow dish used for serving food.”

A sentence with the word platter is *Platters were filled with meat and cheese at Sandy’s party.*

A **Stadium** is “a place used for sports events and other outdoor activities. Stadiums have rows of seats that rise up around an open field.”

A sentence with the word stadium is *Our seats were high up in the stadium at the baseball game.*

**Comprehension Questions:**

1. Why were guests arriving from all over the Pacific to go the island that Kiri lives on?
2. Who helped get the Island ready for the festival?
3. Why was Kiri getting dressed up in a costume?
4. What kinds of food were being served at the festival?
5. What was Kiri’s costume made out of?
6. Where did the festival show take place?
7. What was the crowd cheering for?
8. Why do you think people from all different places around the Pacific were so happy to be chatting with one another?

**2. Complex Vocabulary Instruction Condition**

**DIBELS Next Progress Monitoring (Grade 4): “A Gift From the Past”** (Good & Kaminski, 2011a)

It was the middle of summer and too hot to play outside. Carmen tried to think of something interesting to do. Her mother suggested reading a book or starting a jigsaw puzzle. But Carmen wanted to do something new. Her mother thought for a minute and then disappeared down the hall. She returned with a long, slender box and explained that it held an heirloom that
had been in the family for many generations. Carmen removed the lid and found a thick stick with a row of holes carved into it. Her mother explained that it was a flute made from a piece of bamboo.

“Your ancestors played this flute long ago in the mountains of Peru,” she said. “It makes a sweet, haunting sound unlike that of any other flute.”

Carmen felt how smooth and worn the flute was from being held and played by many different hands. It made her wish she could have known the ancestors who played it. Her mother demonstrated how to hold the flute. Carmen noted how she rested the end of the flute on her chin with its opening near her bottom lip. Her mother blew gently and raised and lowered her fingers, creating a beautiful melody. Carmen loved the sound so much she couldn’t wait to try it herself. She blew and blew but couldn’t make any sound come out. With her mother’s coaching, she learned to tighten her lips into a little half smile and to blow more gently. After a few more attempts, she was able to blow one clear note.

Carmen spent the rest of the summer playing her flute. She practiced covering and uncovering different holes to create different notes. When she could play all the notes clearly, her mother taught her a short song. After days of practice, Carmen could finally play it through smoothly. As she played, she imagined herself in the mountains making music with her ancestors. “Did they ever imagine someone like me, playing this flute far in the future?” she wondered. It made her smile to think that maybe they had.

Teach three of the five potential words:

In this story, Carmen’s mother brings Carmen a long, slender box. **Slender** means “narrow, or small in width.”

Another example of a sentence with the word slender is “There is only enough room for a slender book on the shelf.”

Could you call someone who is very thin slender? [yes]

Is a mouse more slender than a snake? [no]

Would a pencil be more likely to be slender, or giant? [slender]

In this story, Carmen’s mother shows her a family heirloom. An **Heirloom** is “an object passed down through generations of a family.”

Another example of a sentence with the word heirloom is “These pearls are an heirloom passed down from my great grandmother.”
If you got a watch from your mother that was originally your great-great-grandmother’s, would that be an heirloom? [yes]
Would you call a watch that your mother or father bought you for your birthday an heirloom? [no]
Which is more likely to be older: an heirloom, or a pair of your mother’s shoes? [heirloom]

In this story, Carmen’s mother makes a beautiful melody with the flute. Melody means “musical sounds in a pleasant order and arrangement.”
Another sentence with the word melody is “Our national anthem has a beautiful melody.”

Does your favorite song have a melody? [yes]
Does a fire alarm have a melody? [no]
Does a piano teacher know more about melodies, or paintings? [melodies]

In this story, the heirloom had been in the family for many generations. Generation means the entire group of people who were born around the same time.
Another sentence with the word generation is “People of my grandmother’s generation did not have television.”

Is your teacher part of your generation? [no]
Is your best friend part of your generation? [yes]
Are your parents, aunts, uncles, and grandparents part of your generation, or part of your family? [family]

In this story, Carmen makes several attempts to make the flute play music. Attempt means to try.
Another sentence with the word attempt is “He attempted to help the woman stand up after she fell.”

Would you attempt to stand on your head for a month straight? [no]
Would you attempt to win a hockey game with your team? [yes]
If you practiced playing a song every day on the piano but still couldn’t play it correctly, did you attempt to learn the song, or did you avoid learning the song? [attempt]

Additional forced-choice questions to be asked after repeated readings [Ask for the three targeted words]

a. Is an apple slender? [no]
   Is a flat screen television slender? [yes]

b. Would your brother’s favorite book be an heirloom? [no]
   Would a ring passed on through generations of your family be an heirloom? [yes]

c. Can a dog make a melody? [no]
Can a saxophone make a melody? [yes]

d. Is everyone in your class part of a generation? [yes]
   Are plants in a garden part of your generation? [no]

e. Can you attempt to turn 100 years old next year? [no]
   Can you attempt to learn to play an instrument next year? [yes]

Comprehension Questions:

1. What is the “gift from the past” the title refers to?
2. Why didn’t Carmen want to read a book or start a jigsaw puzzle?
3. Where were Carmen’s ancestors from?
4. What was the flute made out of?
5. Why was the flute smooth and worn?
6. Why didn’t any sound come out when Carmen first tried to play the flute?
7. Why is the flute an heirloom?
8. What did Carmen imagine herself doing with her ancestors?