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Leslie Craigo
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TEACHING COMMUNITY COLLEGE STUDENTS STRATEGIES FOR LEARNING UNKNOWN WORDS AS THEY READ EXPOSITORY TEXT

by

Leslie Craigo

A dissertation submitted to the Graduate Faculty in Educational Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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This manuscript has been read and accepted by the Graduate Faculty in Educational Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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THE CITY UNIVERSITY OF NEW YORK
Abstract

TEACHING COMMUNITY COLLEGE STUDENTS STRATEGIES FOR LEARNING UNKNOWN WORDS AS THEY READ EXPOSITORY TEXT

by

Leslie Craigo

Advisor: Professor Linnea Ehri

The study reported here investigated methods that enable college students to learn the meaning of unknown words as they read discipline specific academic text. The ability to read and comprehend text is known to be positively correlated with academic success. However that ability is challenging to college students in part because of the sophisticated vocabulary encountered in academic text. The study reported here utilized an experimental design. Forty one participants read specific passages aloud during three sessions. Participants were randomly assigned to one of four intervention groups to investigate alternative methods of learning the meaning of unknown words. In the Strategies group, participants learned the use of context cues, morphological cues, and syntactic cues. Participants in the Definition group learned to use researcher supplied definitions. In the Strategies plus Definition group, participants learned to use both the strategies and definitions. Using a constructivist framework to create meaning while interacting with text, these three groups had time for practice and received feedback. Participants in the fourth group, the Control group, engaged in discussion of the passages. Intervention and outcome measures examined word learning and comprehension. All participants completed a transfer task to investigate the effects of treatment on independent text reading. It was expected that participants in the intervention groups would outperform participants in the Control group, and that participants in the Strategies plus Definition group would outperform participants in the
other two intervention groups. Results were mixed. Analyses of data revealed that participants in all three intervention groups demonstrated significantly better word learning and comprehension as measured by definition recall, CLOZE and response to comprehension questions than participants in the Control group. Other measures did not support these hypotheses. There were also interaction effects involving time with treatment groups performing differently on intervention and outcome measures than on transfer task measures. In general participants in the intervention groups performed better during the first three training texts than during the final transfer task. Additionally, participants in the intervention groups did not perform significantly better on the transfer task than participants in the control group. Thus the word learning treatments and their impact on comprehension did not generalize to a novel task as was hypothesized. Results of this study contribute to the research by helping us understand the benefit of methods that enable college students to access academic text. Use of definitions and to a lesser extent, use of strategies, appear to have a positive impact on word learning and comprehension. The use of a combination of strategies and definitions also appears to have a positive impact but, with mixed results, this awaits further study.
Dedication

This dissertation is dedicated to my sons, Christopher Phillipps, Daniel Phillipps and Norbert Phillipps III. My dear sons, you inspire me to fulfill my dreams and you encourage me to live a life filled with curiosity, wonder and joy. Throughout this long process each of you has provided your unique forms of love and support. I am so grateful that you have shared this journey with me, so proud to be your mom and thrilled to be sharing this accomplishment with you!
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Many thanks to Dr. Julie Rosenthal, committee member whose attention to detail enabled this to be a rigorous study. Additionally, I would like to thank my outside readers Dr. Alpana Bhattachayra and Dr. Astrid Rodriguez, their close reading of this study added valuable insights. Along with my committee, the other professors at the Graduate Center in the Educational Psychology Department have encouraged me and have always been willing to offer timely and wise advice. Ms. Rhonda Palant, assistant program officer has provided professional and moral support; just knowing that she would be willing to answer any question, and offer a smile made this process manageable.

There are many other people who have provided support in so many ways. My colleagues at Borough of Manhattan Community College provided insight into readings to be used, proof
reading, technical assistance and methods of recruiting students. The students at the Graduate Center with whom I studied shared the joys and struggles of research and rewrites. My research assistant Manijeh Hart spent countless hours transcribing audio tapes, rescoring pretests and posttests, and cheering me on. The editing skills of Teresa Ober accomplished what my eyes could not accomplish; in addition, Ms. Ober brought a sense of ease to the completion of this project.

To my students, I offer gratitude, your desire to succeed prompted this study. To those students who participated in the study, well it would not have been completed had you not participated. I learned so much from you as you interacted with the reading passages. To my future students, may you continue to inspire me with your willingness to work for yourselves and for the children you will teach.

Finally, I would like to acknowledge and thank Dr. Karen Starr for always being here for me and Flan my guide dog for being my faithful companion.
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CHAPTER 1. Introduction

This research investigated methods to help community college students become independent word learners as they read expository text related to their discipline. Many of the students who attend community colleges are non-traditional students: they may be first-generation college students, students of low socio-economic status, minorities, immigrants, students needing remedial help, older students desiring to upgrade their employment opportunities, and students with learning disabilities (Dougherty & Townsend, 2006). As these nontraditional community college students embark on reaching their goals, one of the challenges they face is comprehension of reading material in textbooks. Datta and McDonald-Ross (2002) found a strong correlation between reading ability and course completion. However, approximately 20% of first-year college students at community colleges enter with less than adequate reading skills (Falk-Ross, 2001). Without the ability to read and comprehend text, success can be difficult. Thus, in order to be successful, community college students must read and understand what they read. One necessary component is word reading skill. As Nagy (1988) stated, people cannot comprehend what they read, if they do not know the words. The need for college students to succeed prompted this research. Its purpose was to explore one method of enabling college students to reach their goals – the ability to learn the meaning of unknown words as they read. Reading is differentiated for specific disciplines (Shanahan, Shanahan, & Misichia, 2006), and this study focused on college students enrolled in teacher education programs. It was expected that the ability to learn unknown words while reading would positively impact reading comprehension.

There are many theories that explain the reading process. Gough and Tumner’s (1986) theory is quite simplistic and leaves unspecified many components of the reading process. The
theories of Chall (1983), Ehri (1998a, 1998b), Pressley and Afflerbach (1995), and Scarborough (2001) offer more detailed analyses of the components contributing to skilled reading. Components of particular interest to the study reported here are drawn from Scarborough’s theory include the importance of vocabulary, background knowledge, and genre. Students need to become proficient with discipline-specific academic vocabulary, and they need to be proficient with the genre of expository text. Scarborough’s emphasis on the need for strategic use of language components and automatic word-level skills informs some of the assessment measures. Although Scarborough used her strands of literacy to explain processes in early literacy, those foundations are still fundamental for college students. The need for the language comprehension strands to become increasingly more strategic, for the word level strands to become increasingly more automatic, and for both of these strands to become tightly interwoven is essential for college students as they encounter challenging text.

The central processing space theorized in Ehri’s interactive model of reading theory (1998b.) provides an explanation of the operation of the strategic and automatic strands in Scarborough’s theory. A central processing space allows readers to construct meaning as they use background knowledge, linguistic knowledge, metacognitive knowledge, memory for text, their personal lexicon that includes vocabulary knowledge, and knowledge of the letters and sounds. Vocabulary and background knowledge were focal elements for the study reported here. Other elements from Ehri’s theory that informed the work of this study include the need for metacognitive monitoring, syntactic knowledge, and knowledge of the grapho-phoneme system. Students evaluated their understanding of target words as they used syntax to read. A syntactic strategy would help students learn the meaning of unknown words. Knowledge of the grapho-
phoneme system was included in assessment of word learning being that spelling is a measure of word learning.

Research by Pressley and Afflerbach (1995) provided a window on the processes that expert readers use as they read text. Through the use of protocol analysis, in which students are instructed to think aloud as they read text, Pressley and Afflerbach showed that expert readers consciously construct meaning as they engage with text. The processes that emerged from their research were consistent with the theories of Ehri (1998a, 1998b) and Scarborough (2001). Pressley and Afflerbach also offered some considerations for vocabulary development, and the study presented here made use of them. These included use of context, morphology, syntax, and definitions; identification of domain specific words and unknown words; and meaning generation and evaluation.

Chall’s (1983) stage theory of reading suggested that college students need to have passed through the beginning level stage of the reading-to-learn stage so that they are competent in understanding multiple viewpoints and in critically analyzing what they read. In the beginning of the reading-to-learn stage, readers first start to read for knowledge, especially in the content areas. Readers in this stage use prior knowledge to relate print to procedural knowledge, concrete information, and abstract ideas. Readers in this stage also need to focus on the meaning of words, specifically academic vocabulary and abstract words. With the ability to integrate prior knowledge with ideas in print and the ability to understand domain specific vocabulary, readers possess some necessary tools to become critical and analytical readers.

An important justification for this study of vocabulary development for post-secondary students is the lack of quality research in this area (Carlisle, 2010; Kelly, Lesaux, Kiefer, & Faller, 2010; Nist & Holschuh, 2002; Nist & Olejnik, 1995; Simpson & Randall, 2000). The
National Reading Panel (2000) was unable to conduct a meta-analysis on this topic for all age groups due to the lack of quality research. In its search for studies, the National Reading Panel frequently found surveys, case studies, and designs lacking control groups and random assignment. There were few quality studies. Some of the research that exists is briefly summarized below. A full review of the research appears in Chapter 2.

Taraban, Rynearson and Kerr (2004) surveyed 1,149 college freshmen about their strategic reading skills. Two findings of interest to the study reported here were that nearly half of the respondents reported use of independent word learning skills and that this ability correlated positively with scores on the ACT English exam.

Hadley, Eisenswine, and Sanders (2005) used a non-experimental design to investigate the effectiveness of an interactive reading intervention. The goal of their study was to increase the passing rate of college seniors on the Texas teacher certification exam. They hypothesized that students were having difficulty with the test because of poor reading skills, specifically lack of vocabulary. Using the constructivist framework of Pressley and Afflerbach (1995), the researchers guided 22 participants through word learning activities using naturalistic reading passages that were similar to passages on the exam. Upon completion of the intervention, students demonstrated increased ability to pass the exam.

Falk-Ross (2002) used a case study design to examine effective reading instruction for four college students. These students engaged in a variety of reading and writing activities using a social constructivist framework. Of importance to the study reported here was the qualitative data that supported use of morphemic analysis and teacher modeling.

Kelly, Lesaux, Kiefer, and Faller (2010) also provided support for morphemic analysis and for teacher modeling. Their evidence supported the use of discussion and context cues to
foster independent word learning. They conducted a quasi-experimental study to assess the impact of vocabulary instruction on comprehension in an urban middle school district. The study included 476 students in 19 classrooms. There was however, no random assignment to intervention or comparison group. Classroom teachers of 12 classrooms volunteered to be in the intervention group; the other 7 classrooms served as a comparison group. Students in the intervention group performed better than students in the control group on experimenter-designed tasks and a standardized test. Baumann, Edwards, Font, Tereshinksi, Kame’enui, and Olejnik (2002), and Baumann, Edwards, Boland, Olejnik, and Kame'enui (2003) also provided empirical support for the use of context, morphology, definitions, and teacher modeling. These studies were conducted with fifth-grade students.

Fukkink and De Glopper (1998) conducted a meta-analysis of 21 studies. They concluded that there is a significant, positive effect for students’ ability to learn unknown words when they were instructed to use context clues. In a meta-analysis by Stahl and Fairbanks (1986), significant mean effect sizes were reported on comprehension for words taught and on comprehension measures in general. Along with the Kelly, Lesaux, Kiefer, and Faller (2010) and studies conducted by Baumann and colleagues (2002, 2003), these aforementioned meta-analyses were two other examples of empirical research. The study reported here extended this research to college students.

The study reported here employed an experimental design in order to investigate methods which enabled readers to learn unknown words as they read expository text. Students majoring in teacher education at a community college in a northeast urban setting and who were at least 18 years old were recruited on campus. The participants needed to have demonstrated proficiency in English as measured by a passing grade on the College ACT Test (Compass
Reference Manual, 2006) in reading and writing or successful completion of all remedial reading and writing courses. Participants were randomly assigned to one of four groups: 1. Strategies, 2. Definition only, 3. Strategies plus Definitions, and 4. Control. There were 10 participants in each of the Strategies, Definition and Control groups and 11 participants in the Strategies plus Definition group. Each participant attended three individual sessions of one-on-one tutoring, lasting approximately 45 minutes apiece. Each session was audiotaped.

At the start of the first session, participants took the vocabulary subtest of the Nelson-Denny reading test as a pretest measure. They also reported number of courses taken, date of birth, ethnicity, languages spoken, major area of study, and gender. These measures provided descriptive information about the sample.

During each session, all participants read a selected passage aloud, engaged in intervention, and completed posttest measures. Passages selected for the study were taken from education textbooks and practitioner journals. Posttest measures in each session included detection of unknown words, spelling, fluency, pronunciation of target words, definition generation, CLOZE, and ability to answer researcher-developed comprehension questions. During the final session, participants also completed a transfer task. They read another selected passage silently, and then completed posttest measures to assess word learning, and reading comprehension.

As participants read aloud, decoding errors, prosody, and reading rate were recorded. After participants read each passage they were asked if there were any words that they did not know. The researcher recorded words that were unknown.
Participants in the Strategies group then engaged in strategic use of context, morphology, and syntax. Using written prompts and oral instruction, the researcher modeled the use of these strategies. Participants practiced these strategies while receiving feedback from the researcher.

After reading the text aloud, participants in the Definition group were presented with written definitions of target words. The researcher modeled use of the definition as an aid in understanding the target words. Participants practiced use of definition with researcher feedback.

Participants in the Strategies plus Definition group engaged in strategic use of context, morphology, syntax, and definitions. Using written prompts and oral instructions, the researcher modeled use of these strategies and demonstrated effective use of definitions in conjunction with use of strategies. Participants had the opportunity to practice these strategies while using definitions as an added resource. Participants received feedback from the researcher.

Participants in the Control group read the passage aloud. Then they engaged in discussion based on questions that were tangential to each reading passage. For example for the reading about play, participants were asked to recall their experience of play when they were in preschool. These questions equated time spent in intervention for the control group with time spent in intervention for the intervention groups. Participants in the control group did not receive feedback based on word learning or comprehension from the researcher.

After the first reading and intervention, or discussion for the Control group, participants in all groups then read the passage aloud a second time. After finishing the second reading of each passage, participants completed the posttest tasks.

During the second session each group read a second passage, and followed the same procedure. However, participants were encouraged to use the strategies and or definitions more independently with less researcher modeling and coaching.
During the third session, participants completed the reading, intervention, and posttests of a third selected text. Then they were given a transfer task. During the transfer task, participants did not receive any intervention. They had a maximum of five minutes to read and study a fourth text passage silently. They were prompted to read the passage so that they could understand it. After reading the passage, participants were asked to identify any words that they did not know and what they did about the words they did not know. Responses were recorded. Then they were directed to read the passage aloud. Reading rate, prosody, and decoding accuracy were recorded. After they had finished reading, participants in all groups answered comprehension questions based on the just read passage, completed a CLOZE task with target words deleted, spelled and defined target vocabulary words drawn from the passage. Pronunciation of target words was obtained from the oral reading of the passage.

**Research Questions**

The study reported here addressed the following research questions:

1. Will teaching students vocabulary learning strategies enable them to learn the meanings of unknown words encountered in expository texts more effectively than teaching them to apply definitions to interpret the words?

2. Will a combination of strategy and definition instruction be more effective for vocabulary learning than either form of instruction by itself?

3. Will these forms of instruction prove more effective for vocabulary learning and for comprehending the text than simply having students read and discuss the text?

4. Will differential effects of the treatments be evident in a transfer task when students read and comprehend an expository text without any instruction and feedback occurring during their
reading? That is, will students in the intervention groups show greater word learning and comprehension than students in the Control group on a transfer task?
CHAPTER 2. Literature Review

This chapter examines the literature that supports the study reported here. It begins with an overview of the setting in which the participants are situated – community colleges. Emphasis is placed on the challenges that community college students encounter. One of the challenges that students face is the ability to read discipline-specific academic text. A review of reading theory is provided as background for the research related to this study. This literature review explores the connection between vocabulary and comprehension, the complex nature of vocabulary, and the current state of vocabulary instruction. The need for readers to become strategic, independent word learners is explained with supporting research studies. This chapter details methods of assessment for vocabulary and comprehension and then provides a brief summary.

Overview of Community Colleges

Historically, community colleges have served those students who would not necessarily attend a four-year institution. First generation college students, minorities, and students needing remedial help have looked to community colleges to provide job training and/or the opportunity to transfer to four-year colleges and universities (Dougherty & Townsend, 2006). Currently, there is debate as to the effectiveness of community colleges. Are they adequately meeting the needs of the students they serve and preparing those students for work or transfer? With national graduation and transfer rates for community college students ranging from 21% to 43%, it could be argued that community colleges are not adequately fulfilling their mission of job-training and access to senior colleges and universities (Association of Community Colleges, 2010).

The study reported here was conducted in Borough of Manhattan Community College (BMCC). Students in the teacher education department were the participants. Students at this
college are representative of community college students in general. Many are first-time college students and/or students needing remedial work. The student population is diverse, comprising many minority and international students. Graduation rates at BMCC, however, are not representative of community colleges in general. They are lower, with rates ranging from 15% to 30% throughout the entire college—depending upon the department and the year—and 13% to 14% for students in the teacher education department. The lower graduation rates may be due to the fact that many students transfer to a senior college before they graduate (BMCC Factbook, 2009). In particular, the lower rates for students in teacher education may be due to the fact that this statistic includes full- and part-time students while the rate for the entire college is for full-time students only.

As with other community colleges, BMCC has experienced growth in enrollment, with an increase of 4,000 over a four-year period. The college was slated and designed to accommodate 19,000 students but, as of 2009 there were approximately 29,000 students enrolled. Class sizes are traditionally capped at 35 students generally and at 25 for writing-intensive courses, but overrides are often given. Thus, small classes with individual attention are not available. There are tutoring services available to students (BMCC Factbook, 2009). The study reported here examined the effectiveness of a one-on-one tutoring intervention.

While there are many factors that may contribute to the low success rate of community college students, one of the essential challenges that these students face is comprehension of reading material in textbooks. Without the ability to read and comprehend text, success can be difficult.

Caverly, Nicholson, and Radcliffe (2004) noted that undergraduate students are frequently required to read 150 - 200 pages of academic text per week. In a study with 35 college
freshmen enrolled in a developmental reading course, Caverly, Nicholson, and Radcliffe investigated the use of an examiner-developed, strategic reading program called PLAN. This program taught four comprehension strategies and self-regulatory techniques. Students demonstrated significant increases in their reading ability as measured by pretest to posttest gains on an examiner-constructed multiple choice and essay comprehension test as well as on a standardized measure, Texas Academic Skills Program – Reading (TASP-Rdg). The results on the examiner-made test showed significant improvement. Caverly, Nicholson, and Radcliffe noted, however, that the posttest mean score of 50 was below a 70 which is considered passing in most courses. Thus, although these results were statistically significant, they were not necessarily of practical significance. In contrast, the results on the TASP - Rdg were both statistically and practically significant. There was a statistical difference between pretest and posttest results, and the mean posttest score was above the score needed to pass the TASP – Rdg (i.e., posttest $M = 252$; passing score = 250). This was a non-experimental study with no control group. The study reported here used an experimental design with a control group and random assignment to all levels of the independent variables. One component lacking in the Caverly, Nicholson, and Radcliffe study was the importance of a vocabulary learning strategy. Because vocabulary is a primary factor in reading comprehension (Nagy, 1988), the study reported here investigated the impact of various strategies for learning unknown words on reading comprehension. Participants utilized instructor modeling and feedback to learn to independently regulate their interactions with text following the self-regulatory element in the Caverly, Nicholson, and Radcliffe study. Comprehension strategies were not utilized in the study reported here as the impact of comprehension was already explored in the Caverly, Nicholson, and Radcliffe study. The study
reported here explored the component that was not included in the Caverly, Nicholson, and Radcliffe study, vocabulary.

While completing the required reading has been seen as a challenge for community college students, it is also one factor that has been associated with success. The ability to comprehend and gain information from domain-specific text has been positively correlated with course completion (McDonald-Ross & Scott, 1997). In a correlational study conducted in the United Kingdom, McDonald-Ross and Scott assessed the reading skill of 2,046 students entering Open University. Reading was assessed with a CLOZE task involving three passages. There was also a vocabulary test. The three reading passages consisted of one that was purported to measure basic literacy skill; another passage was similar to text in “middlebrow popular newspapers” (p. 32); and the third was typical of reading required to complete and pass courses at Open University. Comprehension was assessed through the CLOZE procedure. The vocabulary test contained a list of 40 words of increasing infrequency of use and occurrence. Students were required to mark words that they were familiar with as they read through the list. They then needed to supply definitions for the last five words that they marked as familiar. The tests were mailed to students and the students completed the tests at home and mailed them back to the researchers.

Students in Open University completed an initial registration and, if they wanted to continue in their courses, they needed to complete a final registration toward the end of the semester. There were positive significant correlations between scores on the second passage and final registration, the third reading passages and final registration, and score on the vocabulary test and final registration. Those students receiving higher scores were more likely to complete final registration. It is noteworthy that only final registration was reported in this study and not
course completion or final grade. The authors stated that generally only students who expect to pass a course complete final registration. Also of concern is the lack of stated precautions to ensure that students completed the tests without assistance (tests were mailed to students and completed at home without supervision). However, the authors stated that the large number of participants adds reliability to this procedure and that the results support the correlation between vocabulary and reading skill to course completion. The study reported here used an experimental design instead of correlation to investigate the relationship between vocabulary and reading comprehension skill.

**Theoretical Overview of Reading Processes**

**The Simple View**

The simple view of reading holds that reading is the product of decoding and comprehension (Gough & Tunner, 1986). In the simple view decoding is seen as the ability to read words quickly and accurately. Decoding, according to Gough, is best measured by pseudoword reading tasks. Comprehension is the process by which information, sentences, and discourse is interpreted when given words; it is not necessarily reading comprehension only but linguistic comprehension as well. While this portrays the two basic components of the reading process, it may not be adequate to describe in detail the complexity of reading. In a chapter describing the elements necessary for academic literacy for college learners, Pugh, Pawan, and Antommarchi (2000, p. 25) contended that: “Reading…cannot be narrowly defined simply as the ability to decode and comprehend written language. Rather, literacy involves the ability to understand and make use of information provided in a variety of forms.” However, since decoding quickly and accurately is a basic component of reading, it was monitored in the study reported here and its effect on comprehension was analyzed.
Strands of Literacy Development

Scarborough (2001) described the reading process in much more detail than the simple view. Her view sees reading as a multifaceted process comprised of many strands that in skilled readers are woven tightly together. The strands are classified into two categories: language comprehension and word recognition. While they can be considered separately, they actually work together interactively. Scarborough’s categories of strands, language comprehension and word recognition, are an elaboration on the simple view of Gough and Tunmer (1986), which involves only comprehension and decoding. The strands delineate the components of language comprehension as involving background knowledge, vocabulary knowledge, language structures, verbal reasoning, and literary knowledge. Of particular interest for the study reported here is the fact that vocabulary is an important part of this theory. Scarborough’s view of vocabulary includes not just knowing what words mean but also having a precise understanding of words, i.e., both knowing which words are linked together and having a broad breadth of knowledge about many words. The components of word reading are phonemic awareness, decoding, and word recognition. While these skills are usually mastered early in the reading development process, the skills may still present challenges to less well prepared older students. Word reading skills are also an important component of learning new vocabulary, i.e., new words and academic vocabulary.

The Interactive Model of Reading

Ehri’s (1998a, 1998b) interactive model of reading offers further insight into the processes of reading. It considers how the reader interacts with written text to construct meaning in a central processing space. Similar to Scarborough’s (2001) word recognition strands, knowledge of the graphophonic system and the lexicon (sight words) enables readers to
recognize, to read, words. If a word is really known, its orthographic, phonological, and semantic identities are readily available. The orthographic form of the word is a powerful mnemonic such that, when the written form of the word is seen several times, an amalgam is formed. This amalgam allows the word to be automatically known in pronunciation, spelling, and meaning.

Many experimental studies provide support for this connectionist theory. Two experimental studies by Rosenthal and Ehri (2008) informed part of the rationale and design of the study reported here. In the first study, 20 second graders were taught two sets of low frequency CVC vocabulary words. Words were taught with pictures and embedded in contextual sentences read aloud to the children. One set was taught with spellings presented along with the pictures and the other set was taught without spellings, just the pictures were presented. Spellings were not present when word memory was tested. Results revealed significantly better memory for pronunciations and meanings when spellings had been part of the learning process. Using Cohen’s rule of thumb, effect sizes were moderate to large. Students who saw spellings were also able to better recall the vocabulary words and remember their spellings one day later. The amount of students’ orthographic knowledge was positively and significantly correlated with their ability to remember pronunciations.

The second study consisted of 32 fifth graders; their task was to learn two sets of multisyllabic words rather than CVC words. As in the first study, one set learned with spellings and the other without spellings. Results of this second experiment confirmed the first and extended the findings to older students. Both studies provide support for formation of the connections between pronunciations, spellings, and word meanings, and this connection is not just limited to one age group. The study reported here explored word learning through context, pronunciation, spelling, and meaning.
Knowledge of language and world knowledge enable readers to comprehend text. Metacognitive knowledge enables readers to monitor the quality of their comprehension. As readers continue to progress through the text, they hold in memory parts already read, creating and revising their understanding of the text as new information is gained from the text (Kintsch & Rawlings, 2005). Within Ehri’s (1998a, 1998b) theory vocabulary is also important. When words are encountered in print in their orthographic form, they are known because of their pronunciation link. If they are not known, readers use their knowledge of the orthographic system to decode the words and then match pronunciations to plausible word choices. Choices entail using background world knowledge, knowledge of the language system, and information in the written text. Thus, unknown words can be learned during the reading process. The study reported here examined students’ learning of unknown words as they read text.

Stages of Reading

Chall (1983) proposed a stage theory of reading in which individuals progress from pseudoreading among preschoolers to highly skilled and creative reading among adults. At each stage there are specific characteristics which readers demonstrate. Beginning college students need to be competent with at least Stage 4 - Multiple Viewpoints. The main characteristic of this stage is the ability to deal with more than one point of view. Chall noted that, in order to reach this stage, readers must have acquired the knowledge of Stage 3. This stage – Reading for Learning – ranges from the first attempts to read to learn new information through the ability to find and process information in text. Children typically enter Stage 3 during fourth grade. This is the time when the formal study of content area subjects begins through formal text. Chall noted that, among other characteristics of this stage, is the importance of word meanings; texts contain unfamiliar, abstract words. Learning to read is not just something that happens during the early
elementary years; it is an ongoing process that frequently requires instruction through adulthood. As students move into Stage 4, usually during high school, they need to continue using the skills learned in earlier stages (Falk-Ross, 2002). These skills enable students to read more challenging texts and consider multiple viewpoints. Pugh, Pawan and Antommarchi (2000, p. 25 – 26) noted that for college students “reading is the platform from which critical thinking, problem solving and effective expression are launched…Literacy is the means by which post-secondary students can attain academic success.” This platform hopefully leads readers to Stage 5 – Construction and Reconstruction – during which students read for specific purposes, to construct meaning, to deal with abstraction and reconstruction of a world view based on synthesis of multiple sources.

Reading in Stage 5 also requires the reader to assume different frameworks for specific disciplines. Shanahan, Shanahan, and Misischia (2006) used a think-aloud procedure in an exploratory study to assess the strategies that teacher educators and high school teachers used themselves when reading texts in one of three disciplines: math, history, and chemistry. They found that these experts brought an attitude of interest to their reading that focused their engagement with the text. “All of the experts in our study used interest and familiarity to guide the way in which they read the text” (Shanahan, Shanahan, & Misischia, p. 20). This interest was seen across the three disciplines. Other strategies were discipline specific. The history experts frequently considered multiple viewpoints and critiqued texts, author point of view, and references. Science experts used visualization to aid in comprehension. Mathematicians found that the many graphics, figures, and alpha-numeric expressions which were embedded in the texts were especially useful in achieving comprehension. As part of this study, the researchers engaged experts in focus groups to discuss the needs of high school students as they read discipline-specific text. The consensus from those discussions yielded the need for orientation to
the discipline, the need for focus and purpose in reading text, and the need for students to understand the importance of vocabulary. The study reported here focused on the discipline of teacher education. As participants were teacher education majors, it was hoped that the reading passages drawn from their discipline would spark their interest. The study reported here explored the importance of vocabulary through word learning strategies.

**Consciously Constructive Readers**

The work of Pressley and Afflerbach (1995) has contributed a great deal to the theoretical understanding of reading. Much of the currently available information about the processes that successful readers use comes from their research on verbal protocol analysis. This analysis provides a window on the processes which constructively responsive readers use as they process text. Pugh, Pawan, and Antommarchi (2000) described readers as being engaged with text when they focus on the construction of meaning rather than on the discovery of meaning. As protocol analysis provides a view of the processes that experts use, it also allows consideration of the processes which will help struggling readers. As this proposal is concerned with vocabulary, the following were important considerations for vocabulary development drawn from Pressley and Afflerbach:

- Identifying domain-specific words
- Inferring the meaning of words from context cues
- Using internal structural cues – e.g., root words, affixes
- Relating words in current text to words/ideas in other texts
- Using linguistic, syntactic, semantic, and morphological characteristics
- Noting failure to understand word meaning
- Skipping
• Reading forward and backward to clarify word meaning
• Meaning generation – i.e., guessing
• Evaluation
• Use of a dictionary

A main theme in Pressley and Afflerbach’s (1995) discussion of vocabulary is the importance of individual words in comprehension and the benefit to comprehension which flagging and highlighting specific words can produce.

In their think-aloud study, Shanahan, Shanahan, and Misichia (2006) noted that vocabulary can be discipline specific. There are general and unique vocabulary considerations for each discipline. In general, technical vocabulary can be problematic because it is unfamiliar or because words may be used in a novel manner. The mathematicians in the Shanahan, Shanahan, and Misichia study noted that a prime number was not the same as a prime steak. One of the readings in the study reported here asks students to consider the needs of young children as they learn to write in manuscript. The reference is to printing, not to the manuscript of a book or paper (Graham, 2010). The experts in the Shanahan, Shanahan, and Misichia study emphasized that vocabulary is essential to comprehending text and that misinterpretation of technical vocabulary could lead to comprehension failure. Specific words in the readings of the study reported here will be highlighted as participants engage in using strategies and or definitions to learn these words.

Thus it is evident that some of the major theorists in reading such as Scarborough, Ehri, Chall, and Pressley and Afflerbach have all noted the importance of vocabulary when considering the components of reading. While there are many other important components to reading, vocabulary is an essential component that is deserving of study.
Vocabulary and Comprehension

The literature has made considerable mention of the connection between vocabulary and reading comprehension. This section will examine that connection. Stahl and Nagy (2006) noted that the relationship between comprehension and vocabulary has been known for a long time. They cited the work of Davis in 1944 and of Anderson and Freebody in 1981. These researchers provided evidence for the link between the size of an individual’s vocabulary and their comprehension ability. Stahl and Nagy suggested that teachers’ interest in teaching vocabulary stems from the knowledge of the important vocabulary-comprehension connection.

In a chapter describing what comprehension instruction should contain, Pressley’s first recommendation is that instruction “should be aimed at improving word level competencies” (Pressley, 2000, p. 545). Pressley described word level competencies as both decoding ability and vocabulary. Even with successful decoding, if the word is not in the reader’s lexicon, meaning is hindered. Vocabulary is, of course, only one source of knowledge that is required for comprehension, but Pressley emphasized that the impact of vocabulary is especially important. Biemiller (2006) added to Pressley’s understanding of the impact of word-level skills and vocabulary on reading comprehension. Biemiller (p. 41) stated that the “presence of these two accomplishments does not guarantee a high level of reading comprehension, but the absence of either word level skill or adequate vocabulary ensures a low level of comprehension.” In a discussion of vocabulary development at the college level, Simpson and Randall (2000, p. 43) agreed that college students must understand “discipline specific, general and technical words that they read in their assigned texts.” In discussions with students about assigned reading, Simpson and Randall noted that students reported that their greatest difficulty was with technical vocabulary. While other comprehension strategies are deserving of study, given the primacy of
vocabulary, the study reported here investigated the impact of independent word learning on comprehension.

In a study aimed at increasing the passing rate of preservice teachers on a state licensing exam, Hadley, Eisenswine and Sanders (2005) noted that many students fail this exam on their first attempt and then sink into a downward spiral of continued failure on subsequent examinations. While examining the reasons for failure, Hadley, Eisenswine, and Sanders discovered that these students did not have the targeted comprehension skills necessary to navigate the “labyrinth of verbiage” (p. 66) in the test questions and answers. Limited reading ability was suspected as the main impediment to passing the exam. The researchers emphasized the importance of vocabulary in the literature and noted the vocabulary-comprehension connection. They used an interactive model to provide intervention for 22 college seniors who had failed the pretest for the Texas state licensing exam and who volunteered to participate in the intervention. A Passage Comprehension Subtest of the Woodcock Diagnostic Reading Battery was administered to all participants as a pretest measure. Grade equivalents on this measure ranged from 6.9 to 16.9 with 77% of students reading below expected grade level. The interactive model of intervention used in this study had students engage in a series of constructivists activities that engaged them in the reading process. The theoretical framework was based in part on the work of Pressley and Afflerbach (1995) mentioned above. The study used practice materials that were similar to the actual task the participants needed to master. Thus the passages were not examiner constructed; they were naturalistic passages. The activities consisted of self-regulated monitoring of strategy use, condensing of content, highlighting of important phrases, summarizing, and vocabulary work. The intervention took place during a “seminar type course” (Hadley, Eisenswine, & Sanders, 2005, p. 66) which students take while
completing their student teaching. Vocabulary work consisted of having students highlight and define unfamiliar words. The words that the students highlighted were content specific and general vocabulary words. The researchers noted that the students’ definitions were not specific enough to aid in comprehension, so the researchers created definitions for the words which students highlighted. As the students engaged in the activities, the researchers used a think-aloud method to model strategic use of the activities during test taking: how to use condensed content, summarizing, and vocabulary knowledge to answer test questions. Upon retaking the licensing pretest after the intervention, student scores rose 14% on average. Of the 22 students who took the licensing pretest, 15 went on to take the actual licensing exam. Of the 15 who took that exam, 73% passed, even though only 23% were able to read at their expected grade level. Although this was a non-experimental study with no control group, the study does provide support for the importance of learning unfamiliar words, researcher generated definitions, and modeling via think-aloud. The use of a pretest allowed for documentation of change in ability. The study reported here incorporated those components. The study reported here also focused on giving students tools to become independent word detectives so that they will be able to engage in critical reading of discipline-specific text. It did not simply focus on helping students pass a test.

In a case study of four students enrolled in a college developmental reading course, qualitative analysis highlighted the vocabulary comprehension connection (Falk-Ross, 2002). The students were enrolled in an inner-city, urban college and were interested in careers in the fine arts. They participated in reading and writing assignments, independent and shared reading, and direct instruction in five reading comprehension strategies. The strategies included: identifying the purpose for and focus of college reading, identification of genre, prereading in order to skim for important information, morphemic analysis, and note taking. The intervention
occurred over one semester during a developmental reading course. The focus of the intervention was social constructivism. Thus, the activities were centered on the interactions between teacher and students as they interacted with the text. The teacher acted as a facilitator, modeling the strategies and offering feedback as needed. The intervention intended to shift the control and learning of literacy activities from the teacher to the students. An important element of strategy development was the integration of instruction that had been utilized with younger students but was still seen as necessary for college reading. Results of qualitative coded data indicated that students used the reading comprehension strategies to be more focused in their reading, more critical in their thinking, and more productive during discussions.

One strategy that students found particularly useful was morphemic analysis which included discussion of vocabulary words and the specific connotation and use of individual words. Attention to root words and morphemic analysis was an integral part of vocabulary discussions, and students found this helpful for developing vocabulary. One student specifically stated that, in addition to morphemic analysis, he needed to “start looking up words that I don’t understand.” (p. 284). Students’ use of standard academic English and content-specific vocabulary in writing and speaking also increased. The four students in this study showed gains of at least three grade levels in reading achievement from pretest to posttest as measured by the Test of Adult Basic Education. Thus, this case study showed impressive gains in just one semester. Although five strategies were taught and used, vocabulary development appeared to be an important strategy. The study reported here focused on vocabulary in an experimental study.

Kelly, Lesaux, Kiefer, and Faller (2010) noted that short pieces of engaging texts which are of interest to readers provide the opportunity for learning academic vocabulary. They conducted a quasi-experimental study to assess the impact of vocabulary instruction on
comprehension in an urban middle school district with 476 students in 19 classes. Twelve of the classroom teachers volunteered to implement a vocabulary program. The other seven classrooms received their regular instruction and served as a comparison. Intervention lasted for 18 weeks with 45-minute sessions four days per week. Sessions consisted of discussion of target words, morphological analysis, and use of context cues. Teachers modeled word learning strategies and prompted students to become independent word learners. Students in the intervention classes demonstrated higher scores on multiple choice vocabulary tests of target words and were able to comprehend passages that contained words they were taught better than students in the comparison classes. Students in the intervention group also scored better on the Gates MacGinitie reading test compared to students in comparison classes. Students in the intervention group showed reading improvement equal to approximately eight months’ growth in the 18 weeks. The experimental study reported here focused on the impact of vocabulary intervention on community college students as they read brief, engaging text specific to the discipline of their major, teacher education. Modeling, prompts, and target words were utilized during intervention. Random assignment to groups and inclusion of a control group elevated the study reported here to an experimental design.

In a meta-analysis of vocabulary instruction and its effect on comprehension, Stahl and Fairbanks (1986) noted that effective instruction involved multiple strategies with definitional and contextual information being most effective when there was active processing by students, and instruction that was discipline specific. In passages containing words that were taught, there was a mean effect size of 0.97 on comprehension. There was a mean effect size of 0.30 on global comprehension measures; vocabulary instruction in general increased comprehension. Both of
these effect sizes were statistically significant. The study reported here focused on multiple strategies that were supported by the literature.

**Possible Explanations for the Vocabulary Comprehension Connection**

In the introduction to their edited volume on vocabulary acquisition, McKeown and Curtis (1987) noted the general agreement of the contributing authors on the substantial correlation between vocabulary and comprehension. The authors viewed improvement in comprehension as the primary goal of vocabulary instruction. The authors did have varying perspectives on the nature of that relationship. These perspectives may derive from the various hypotheses that try to explain the vocabulary-comprehension connection. These hypotheses are discussed briefly in the following section.

While researchers and practitioners (teachers) agree that there is a strong relationship between vocabulary and comprehension, there are competing hypotheses that attempt to explain the nature of that relationship. Stahl and Nagy (2006) offered a brief review of those hypotheses. One hypothesis, the instrumentalist hypothesis, states that people who have a large vocabulary are better readers because they know more words. The knowledge hypothesis states that it is not necessarily the fact that a person knows more words, but it is really that such a person has more background knowledge. That prior knowledge, the hypothesis posits, enables better comprehension. A third hypothesis proposes that vocabulary and comprehension are related not because one caused the other but because they both are indicative of general verbal ability or aptitude; hence, this is known as the aptitude hypothesis. The access hypothesis assumes that it is the automaticity and flexibility with which words are known that aids comprehension. The reciprocal hypothesis views the relationship as circular: The more words an individual knows, the more that person reads; the more a person reads, the more words are learned; and learning
more words leads to more reading. Stahl and Nagy suggested that all of these hypotheses offer insight into the nature of the vocabulary-comprehension connection. Ruddell (1994) felt that the knowledge hypothesis could subsume the aptitude, instrumentalist, and access hypotheses, because, if a person has deep knowledge in general and in particular of a specific word, then that person has all of the other three. The study reported here investigated methods to increase specific word knowledge.

Evidence for the vocabulary-comprehension connection has a long history. It includes the work of Freebody and Anderson in 1981 and of Davis in 1944, as cited by Stahl and Nagy (2006). Ruddell (1994) cited many other researchers who have provided evidence for this connection from Thorndike in 1917 through Beck, McKeown, and Omanson in 1987. While there is strong support for this relationship, the nature of the relationship is unclear. In fact, Ruddell noted that efforts to establish a causal link between vocabulary development and comprehension have sometimes been inconclusive. This ambiguity may be due to factors such as quality of vocabulary instruction, learner characteristics, how vocabulary and comprehension are defined and measured, and the complex nature of the relationship between vocabulary and comprehension.

The Complex Nature of Vocabulary

Not only is the relationship of vocabulary and comprehension complex, but the nature of vocabulary itself is complex as well. Nagy (1998) noted that reading vocabulary is more than just learning to decode words already in a person’s oral vocabulary. Reading vocabulary involves learning new words and learning new meanings to known words. An encounter with a new word is not just a matter of relating it to a known word or creating a new label for a known word. Rather, it may actually be a new concept or an extension of a known concept. In developing
vocabulary and defining words, Nagy suggested that trying to define words with synonyms may not be adequate. For example, the word *obese* is neither a new label nor a synonym for *fat* (Nagy). The two words are related, but they are distinctly different as is the distinction between *ancient* and *old*. To say that someone who is obese is really, really fat obscures the implications of obesity. When thinking of vocabulary, the aspects of incrementality, polysemy, multi-dimensionality, interrelatedness, and heterogeneity elucidate its complexity (Nagy & Scott, 2000).

**Incrementality.**

What it means to know a word was a concern of Simpson and Randall (2000), as they offered suggestions for vocabulary research and intervention with college students. Nagy and Scott (2000) emphasized that word learning takes place in many steps; it is not an all or nothing process. It is not, either someone knows a word, or that person does not know it. Rather, the process is incremental; there are levels of word learning. Nagy and Scott summarized linear scales of word knowledge that have been proposed with levels from 1-5:

1. never saw it before,
2. heard it but don’t know what it means,
3. recognize it and sort of relate it to context,
4. know it well in one or several of its meanings,
5. know it well and can use it in a sentence.

Simpson and Randall suggested that research studies need to state which level of knowledge is to be acquired. For effective comprehension level 4 may be sufficient. Full conceptual knowledge is not always necessary for adequate comprehension. The study reported here assessed vocabulary knowledge of target words through CLOZE, spelling, pronunciation,
Polysemy.

Many words can have more than one meaning, and, in fact, the more frequent a word is the greater the probability that it has multiple meanings. In the study reported here one of the target words was *cast*. It occurs in the following sentence:

With a puzzled look on his face, the boy stared at the teacher, then *cast* his eyes on the children bunched there on the floor, whose limbs could not avoid touching. (Ayers, 1995, p.20)

In field testing this word in context, several students knew its meaning of *to throw away*. Even though the context does not support this definition, students did not see the inconsistency. Other target words in the study with multiple meaning are *exclusive, manuscript, nativists, and heritage*. Students need to use comprehension monitoring to ensure that they have activated the appropriate meaning of the word.

Multidimensionality.

Besides the continuum of incrementality, words have dimensions such as grammatical behavior, collocational behavior (words that a specific word usually occurs with), frequency, stylistic register, conceptual meaning, morphological relationships (affixes), semantic relationships, and affective qualities. The following examples of target words that were used in the study reported here illustrate some of these dimensions. The grammatical behavior of words such as *proffer* and *facilitate* is that they are action words – verbs; *entities* and *phenomena* are plural naming words; and *legibly* is a descriptive word. *Inanimate* is usually followed by the word *object(s)*; and *locus* is usually followed by the word *of*. The stylistic register of academic
text is formal. In one of the readings for this study, the conceptual meaning of *impediments* is different from the meaning of *barrier* with the former being something that can be overcome and the latter being something that separates. Morphological relationships aid in understanding of words such as *empowered, logistical,* and *reprimanded.* Semantic relationships underscore words such as *manuscript* and *cursive* and *alien* and *shun.* Affective quality is seen in words such as *shun, reprimanded* and *impediments* which usually have negative connotations whereas a word such as *advocated* has positive connotations. Understanding of these dimensions increases knowledge of specific words and word knowledge in general. Through modeling, think-aloud, and discussion the study reported here addressed some of these dimensions. Aspects of word knowledge are partially independent. Thus, since judgment of a person’s knowledge of a word cannot be based on only one aspect of it, this study will use multiple measures.

**Interrelatedness.**

Words are not isolated units of knowledge; what someone knows about a specific word is influenced by what that individual knows about words and concepts related to that specific word. In the study reported here the reading on handwriting provided an example in the following sentence (Graham, 2010, p.21): “Some advocates call for the exclusive use of one instructional method for handwriting.” Someone who has knowledge of concepts such as inclusion and exclusion would have a stronger understanding of the rigid nature of “the exclusive use of one method.”

**Heterogeneity.**

What it means to know a word depends on the kind of word in question. It means different things to know different words such as function words, nouns, verbs, adjectives, etc. In
the passage about play (Honig, 2007), knowing that the word *sociodramatic* is an adjective and not a noun informs the reader that the word is describing something, in this case a type of play.

**Current State of Vocabulary Research and Instruction**

**Vocabulary research.**

There have been studies that have investigated literacy for post-secondary students; however those studies have rarely investigated the impact of vocabulary. In fact, the research on vocabulary studies in general is so limited that the National Reading Panel (2002) was unable to conduct a meta-analysis on vocabulary studies because of the limited number of qualifying studies. The Caverly, Nicholson, and Radcliff (2004) study mentioned above is a prime example; the study was non-experimental and lacked vocabulary intervention. Nist and Olejnik (1995) commented on the limited amount of research pertaining to vocabulary development for students past middle school. Without a supportive research base, implementation of vocabulary interventions is problematic. In a synopsis of the research aimed at increasing vocabulary by learning definitions and synonyms, Simpson and Randall (2000) found that this intervention had no effect. They described the most prevalent state of word learning in secondary and post-secondary education as follows. Students are expected to learn definitions or synonyms for lists of words that are devoid of context. Some of the word lists are not even related words. In experimental studies (Simpson & Randall, 2000) students in intervention groups were instructed either to learn words with definitions given or to consult a dictionary for definitions. Students in control groups received no instructions. Both groups were assessed using standardized measures. Analysis of results yielded no benefit for the intervention groups, yet this method of instruction still persists. While definitions were seen as one necessary step in word learning, there also needs to be more than just rote learning. Word learning needs to move beyond definitions and
synonyms to a deeper level of word knowledge and usage. Students need to be able to understand and use words effectively in academic contexts, not just memorize definitions. Teaching students new words by giving them definitions to learn is passive; it is the antithesis of constructivism (Nagy & Scott, 2000).

Echoing the sentiments of Simpson and Randall (2000), Beck et al. (2002) stated that the synonym approach is a “bankrupt way to teach word meaning” (p. 88). Words need to be known in all their complexity: How they are similar to other words; how they are different from those same words; and the precise roles the words play.

Taraban, Rynearson, and Kerr (2004) reported on the strategy use of college students as they read course-related materials. In this study the Metacognitive Reading Strategies Questionnaire was completed by two samples of college freshman, 575 in the first sample and 574 in the second. The two samples were compared to provide evidence of validity and reliability for the questionnaire. Students completed the questionnaire as part of a getting-to-know-you exercise. This questionnaire consisted of 43 reading strategies that were drawn from the work of Nist and Holschuh (2000), Nist and Simpson (1996), and Pressley and Afflerbach (1995). Questions were presented as items using Likert scales. Confirmatory factor analysis revealed that the questionnaire does present evidence of validity and reliability as a measure of strategies that students use. One of the items on the questionnaire was: “While I am reading, I try to determine the meaning of unknown words that seem critical to the meaning of the text” (Taraban, Rynearson, & Kerr, 2004, p. 75). Nearly half of the students responded positively to this item. In a previous study Taraban, Rynearson, and Kerr (2002) found that this item was positively correlated with high scores on the ACT English test, GPA, and SAT; those who reported use of this item had higher scores on these measures than students who did not use this
strategy. This study provided support for the need to learn the meaning of unknown words as readers process text.

**Vocabulary instruction.**

Because “vocabulary knowledge is strongly related to reading proficiency in particular, and school achievement in general” vocabulary instruction needs to be robust (Beck et al., 2002, p.1). Beck, Mckeown, and Kucan stated that not much vocabulary instruction is occurring in schools. The typical vocabulary instruction that does exist has frequently consisted of students copying definitions; memorization; writing sentences; and assessments such as multiple choice tests, matching, or supplying a definition (Philips, Foote, & Harper, 2008; Nagy, 1998). Beck, McKeown, and Kucan contend that vocabulary work for older students should move beyond synonyms and definitions. It needs to allow students to delve deeply into the meaning of words, to explore language, to understand “how language gives meaning and how words mean what they mean.” (p. 88).

The knowledge hypothesis proposes that the background knowledge which a person possesses has an impact on reading comprehension. The more a person knows, the better that person is able to understand what has been read. The wider the breadth of an individual’s background knowledge the greater the support for word learning while a person reads for information and for learning new concepts. The knowledge hypothesis “suggests that vocabulary should be taught within the context of learning new concepts so that new words can be related to one another and to prior knowledge” (Simpson & Randall, 2000, p. 55). This approach argues against teaching words from lists; it proposes learning specific words that are essential for passage comprehension. Simpson and Randall noted that the literature on vocabulary instruction for postsecondary learners is limited. However, they suggested the following as some necessary
components of a vocabulary learning program: 1. Students need to be actively engaged in the process. 2. Vocabulary needs to be learned in context. 3. Students need to be interested in the concepts to be learned. 4. Definitional and contextual knowledge is important.

In reviewing the literature on postsecondary literacy instruction, Nist and Holschuh (2002) concurred with Simpson and Randall (2000) about the limited amount of research. Nist and Holschuh added that the work that had occurred was not strategic and generative, two necessary components if students are to become independent learners. They defined strategic as a “purposive and deliberate selection from a repertoire of strategies” (p. 75). This implies that students would be able to select and use the strategies to generate needed information and understanding. Attention to task, motivation, metacognitive monitoring, and evaluation are the elements that students need to develop for successful vocabulary learning and reading comprehension.

Kelly, Lesaux, Kiefer, and Faller (2010) and Graves (1987) advocated for the use of a multipronged approach to help students learn the meaning of unknown words as they read. Kelly, Lesaux, Kiefer, and Faller noted that not much vocabulary instruction had occurred in schools. Literacy instruction for middle school and beyond mainly consists of literacy analysis rather than direct instruction in comprehension strategies and vocabulary. In one district they found that only 10% of literacy instruction was devoted to vocabulary development. These researchers advocated systematic and direct instruction in academic vocabulary, selection of a small set of target words, use of authentic texts with rich contexts, and an emphasis on helping students to become independent word learners. Graves’s suggestions included: (1) recognizing that a word is unknown, (2) using context, (3) using word parts (morphology), (4) hypothesizing meaning, (5) evaluating hypothesized meaning, and (6) using a dictionary or other resources.
Whitt (1993) suggested that vocabulary instruction include the study of the semantic history of words, morphemic analysis, the use of vocabulary in context, and dictionary study of multiple meanings. Whitt also noted that corrective feedback is an important component of vocabulary instruction.

The study reported here had word learning occur as a strategically active process with students engaged in word learning during authentic reading tasks not isolated lists. Students read texts pertaining to their major, which sparked interest and motivation. A variety of strategies, context, morphology, syntax, and definitions, was available for students in one intervention group so that they can flexibly regulate their use. Other conditions allowed investigation of the impact of strategies alone and definitions alone.

Researchers have noted that effective instruction identifies words that are crucial and teaches those words (Nagy, 1988; Beck et al., 2002; Kelly, Lesaux, Kiefer, & Faller, 2010). More importantly, effective instruction teaches students to learn to recognize those crucial words.

For this study experts in the field of teacher education were consulted for their input on words that were crucial. Professors of early childhood education and developmental reading reviewed the texts and noted words that may be problematic but needed to be understood. For the study reported here, these words were chosen as targeted words. Students were asked to identify any unknown words. The ability to recognize these crucial target words as unknown were monitored as students progressed through the sessions. Not only the ability to recognize unknown words but also the ability to learn those words independently was investigated.
The Need for Independent, Intentional Word Learning

An important goal of vocabulary instruction is to enable students to become independent word learners. In typical vocabulary programs children may learn about 300 words per year (Fukkink & de Glopper, 1998), but they may need to learn more words than that to keep up with the demands of school. “…no vocabulary teaching program alone can produce the vocabulary growth that is necessary to become a proficient reader, and incidental word learning should therefore be promoted.” (Fukkink & de Glopper, p. 50-51). In addition, not only do students need to be able to learn words independently because there are too many words to teach, but they also need this skill because they need strategies “…for coping with unfamiliar words encountered while reading.” (Fukkink & de Glopper, p. 51). Other researchers who have supported encouraging independent word learning include Beck et al. (2002); Kelly, Lesaux, Kiefer, and Faller (2010); Nagy (1988); and Philips, Foote, and Harper (2008).

Effective learning also focuses on words that are partially known but need to be known more fully for effective comprehension. Nagy (1988) strongly stated his position on the need to promote and foster incidental and independent word learning. Incidental word learning occurs when readers learn the meaning of words as they read text. Nagy refers to independent word learning as the purposeful use of strategies to learn words as one reads text.

There are more words to be learned than can be covered in even the most ambitious program of vocabulary instruction, and there is more to be learned about each word than can be covered in even the most intensive instruction. To promote large scale, long term vocabulary growth, teachers must aim at increasing students’… word learning. (p. 37)
Nagy continued in his support for independent word learning suggesting that two crucial elements were context and structural analysis. He noted the need for much research in the best methods to teach the use of context clues and structural analysis. A good direction to proceed is that of helping students to become independent word learners and to realize that educators can become free of the notion that they need to teach all unknown words. Instructors need to teach word learning. Swanborn and de Glopper (1999) offered a further distinction of word learning, noting that incidental word learning simply happens incidentally as readers read. Incidental word learning is different from intentional word learning. Intentional word learning happens when readers are directed to use strategies to derive the meaning of unknown words. Swanborn and de Glopper seem to have used intentional word learning in the way that Nagy used independent word learning. The use of the term intentional word learning may be a more accurate description than the term independent word learning. Both incidental and intentional word learning can happen independently; however, if intentional word learning strategies are taught, there may be the potential for increased independent and incidental word learning. The studies noted above conceptualized the notion of vocabulary as a complex, multifaceted concept that requires the use of intentional strategies to learn new words while reading. The study reported here did the same. The aim of the study reported here was to teach students to learn to identify and derive the meaning of unknown words as they read text.

The role of modeling and feedback in teaching intentional word learning.

Instructor modeling and feedback were components in several studies. Simpson, Stahl, and Frances (2004) noted that instructor modeling, explicit instruction, and guided practice enabled students to transfer learned strategies to novel situations. Further support and specific steps for instructor modeling came from Beck et al. (2002). They proposed that teachers use a
five-step process that teachers would model for students and then coach the students to use. The method should help students focus on the process and not just the ultimate goal of deriving word meaning. This process emphasized the utilization of context. The sequence of steps is as follows: First, have the participant read and paraphrase the passage with emphasis on the unfamiliar word. Second, establish the meaning of the context so that students focus on the whole passage and not just the word or on their own experience, both of which might lead to the derivation of erroneous meanings. Third, ask the student to provide an initial assessment of what the word might mean and a rationale for that assessment. If the student fails to generate an initial assessment, the teacher reviews the second step and uses that as a prompt. Fourth, ask the student to consider other possibilities so that the student does not get stuck in limited assumptions. This step also emphasizes the process nature of deriving word meaning. Fifth, summarize the information that has been generated about the unknown word and evaluate the meaning in light of the context. In a study with low ability readers, Beck, McKeown, and Kucan reported that students were able to demonstrate significant gains in ability to derive meaning from context after seven sessions using the above five steps. This method focused on one strategy. The study reported here used multiple strategies. Therefore modeling was used but the method was modified to include the use of the other strategies.

Modeling as a method for vocabulary training has received significant support in the literature from other researchers including Falk-Ross (2002); Fukkink & de Glopper (1998); Graves (2006); Hadley, Eisenwine, and Sanders, (2005); and Nagy (1998). Ruddell (1994) noted that teacher modeling provided students with procedural knowledge for learning new words as they read. Kelly, Lesaux, Kiefer, and Faller (2010) reported on the use of teacher modeling as students struggled with limited background knowledge and lack of practice in independent word
learning. The teacher modeling enabled the students to learn to use context and morphological cues. A study by Baumann et al. (2002) used teacher modeling and feedback of context and morphological cues; students demonstrated ability to use those skills on examiner-constructed posttest measures. A study by Baumann et al. (2003) extended the 2002 study to include the investigation of context and morphology as compared to the use of definitions. Analysis of qualitative data in both Baumann studies also supported the use of strategic learning. (The Baumann studies are discussed further in the section on use of context and morphology.) The instructor modeling in the study reported here was process oriented and provided time for student practice and instructor feedback.

Additional support for modeling comes from the review of research by Nist and Holschuh (2002). Research has shown that one of the best ways for students to learn strategies is through teacher/instructor modeling. As instructors think aloud, they show students how a mature, expert reader solves problems or thinks through ideas. Modeling is seen as good instruction. The modeling occurs during use of concrete examples and allows students time to practice the strategies. Feedback to students on their use of strategies enables them to gain confidence in their own ability to evaluate their strategy use. Intervention in the study reported here began with the researcher using the think-aloud procedure to model use of the word learning strategies. Students practiced word learning with texts similar to texts that they would encounter in a college course. The researcher provided feedback as needed.

**Intentional, Strategic, Independent, Word Learning**

In summarizing research updates since the initial report of the National Reading Panel, Mathes (2008) noted that there is a growing consensus that the focus of vocabulary instruction must be on teaching students how to infer the meaning of words they read. To accomplish this,
this consensus favors the use of two strategies, context clues and morphographs—the use of word parts to help students tease out meaning. Nagy (1988) urged that vocabulary instruction be embedded in content with an emphasis on strategies for figuring out the meaning of unknown words. Other recommendations from the National Reading Panel Progress Report (1999) include the need for continued literacy instruction for students past the primary grades. While that instruction needs to include more complex decoding, comprehension, background knowledge, and fluency, rich vocabulary development is essential for all the other skills. The Report emphasized literacy instruction that creates motivated, self-regulated learners.

**Use of Context**

Some studies used context that was specifically created to assist students in word learning; the context provided sufficient clues for word learning (Ellison & Boykin, 1994; Baumann et al. (2002); Rosenthal & Ehri, 2008). These studies lend support for the value of word learning from context. The study reported here extended that research to naturalistic texts that readers might encounter as they read. Researchers have advocated for and other studies have used naturalistic texts (Falk-Ross, 2002; Hadley, Eisenswine & Sanders, 2005; Kelly, Lesaux, Kiefer, & Faller, 2010). Baumann et al. (2003) used slightly modified text.

Support for the use of context comes from a meta-analysis by Fukkink & de Glopper (1998). They reviewed 21 studies and concluded that, when students are instructed to derive words from context, there is a positive effect on their ability to learn new words. The effect size was 0.43. The authors stated that this is moderate according to Cohen (1998). These results were seen in studies using different methods and different age groups, 8 to 18 years old, and, of low, medium, and high ability. Group size ranged from a single individual to classes of 28 students. Some interventions were very short (three sessions totaling 90 minutes), but there was still a
positive effect. The larger effect sizes with short duration were seen with individuals. There were middle school students who received 2.5 hours of strategy instruction in groups of 23 who demonstrated positive results; these gains, however, were not significant. The difficulties with these studies are their use of instructor assessments and contrived materials (as opposed to natural texts). Fukkink and de Glopper (1998) suggested that what is needed is more research based on a cognitive process model that points to specific strategic instruction. The study reported here used passages from textbooks and journals similar to the materials which students use during their courses. Students engaged in strategic cognitive processes as they learned to derive the meaning of unknown words.

Some studies in the Fukkink & de Glopper (1998) meta-analysis focused on developing the ability to infer word meanings using various types of context clues: definition, synonym, contrast, experience, illustration, purpose, and sensory aspects. Other studies proceeded without reference to clue type. There is an assumption that readers are able to exploit context. Think-aloud procedures reveal that students who have not been instructed in clue type are able to infer word meaning using context alone (Fukkink & de Glopper, 1998). A prompt used in one of the studies in the Fukkink and de Glupper study was as follows: “When there is a hard word in the sentence, look for other words in the [text] that tell you more about the word.” (Carmine et al., as quoted in Fukkink & de Glopper, 1998, p. 458). This prompt does not involve clue type; the focus is on context alone. For the study reported here, instruction in use of context involved a modification of the above mentioned prompt: “Find other words in the text that help you understand this word.” The prompt was modified to allow for ease in learning each individual target word.
Cooperative learning has been shown to be useful for learning words from context. McKeown, and Kucan (2002) noted that from their experience group instruction is helpful for trying to figure out the meaning of a word from context. The processes for deriving words from context are enriched when groups are and even the whole class is engaged in discussion about word meaning and context.

In a study of 96 African American college women, Ellison and Boykin (1994) found that cooperative learning was more effective in enabling participants to learn vocabulary words than individual studying. The task required either groups of students or individual students to learn words with the assistance of cues. Students were pretested to ensure that they did not know the words; words that students knew were eliminated from the study. Participants were given 40 cards. Each card had a word printed on the front with four possible definitions. On the back of the card was a sentence which provided context for the word. Participants were randomly assigned to group or individual study for one 30-minute session. After the session students were tested on the words. Not only did students in the cooperative groups outperform students who studied individually, but they also had a more positive learning experience, demonstrated greater perceived ability, and spent more time on-task than students in the individual group as measured by a posttest questionnaire. In the study reported here intervention occurred on a one-on-one basis, but the students worked with the researcher, so they were not working alone. Students also engaged in three sessions to learn words, not just one session, as in the Ellison and Boykin study.

Problems with use of context.

There have been some criticisms of the use of context. In an article that reviewed research on vocabulary instruction and made recommendations for teachers, Philips, Foote, and Harper (2008) initially stated that using context to learn word meanings is “highly unlikely to
lead to true understanding, learning or transfer to new situations.” (p. 63). They maintained that using context is only a little more efficient than use of a dictionary and is at best a guessing strategy that affords engagement only at the lower levels of cognitive processing according to Bloom’s taxonomy of cognitive processes. However, later in the article, Philips, Foote, and Harper seem to have contradicted themselves. They suggested that students should predict the meaning of words using context as a guide. The second guideline that they offered to teachers was to help students become independent word learners through use of context and dictionary skills. (The first guideline was to create a word-rich environment.) The authors offered this as a guideline after stating that dictionary and context use are not very effective. Bloom’s Taxonomy classifies the lower cognitive processes as knowledge and understanding. Knowledge includes the ability to define, relate to, recognize, reproduce, and duplicate. Comprehension involves classifying, describing, selecting, and explaining. (Officeport, 2011). These processes may be sufficient to allow for use of context to learn new words. Thus, while Philips, Foote, and Harper stated that they were lower processes, they may be sufficient for the purpose of word learning. They are not high level cognitive processes like analysis and evaluation, but those processes may not be necessary for word learning to positively impact comprehension.

Nagy (1988) also offered insight into the fact that context alone is not sufficient for word learning because it can lead readers to false understandings of words. “Context often gives only partial, if not misleading, clues to the meaning of a new word.” (p.38.) He did note that context is useful to help students “develop word learning strategies to use on their own” (p. 8). Beck et al., 2002) noted that readers need to know the different types of clues that context provides, in contradiction to Fukkink and de Glopper (1998). Many natural contexts do not provide enough information to derive unknown word meanings because the author’s purpose is to tell a story,
explain phenomena, or convey opinion, not necessarily to derive word meanings. So readers need to be aware that some clues can be misdirective, non-directive, and or general as well as directive. (For further description see Beck et al., 2002, p. 4-5.)

Beck et al. (2002) stated that, when context is used, a simple directive such as “See if you can figure it out from the context,” may not be adequate. For example, when a student read: “They decided to rendezvous at the cave” (p. 102), and the student did not know the meaning of rendezvous, the student was prompted to use the context. With this prompt, the student thought rendezvous meant eat because it came from a Hardy Boys story where the boys were planning a picnic. Beck et al. (p.103) noted that context has been taught as a process of looking for contrast: “Unlike Sara who was elegant and graceful, Tina was clumsy” and looking for synonyms: “The strongest of the group, all people of height, athletic ability and stamina, were dispatched to protect the camp.” Obvious problems here include, would students know the meaning of elegant and graceful? Would students relate stamina with height or athletic ability instead of strength? Another difficulty is that, in order to have text that includes contrast or synonyms, contrived texts are sometimes used in research studies. These contrived texts do not allow readers to transfer their skill to the use of context when they are confronted with natural texts.

In addition to the above mentioned difficulties with context, Beck et al. (2002) identified another concern, going beyond the context and creating a scenario that is inconsistent with the text. This is often based upon the reader’s own experience that is not relevant to the text. For example, in a study using pseudowords the following statement was presented in a passage: “Because I like corn, I like to steen some” (Beck et al., p. 105). One student assumed that steen must mean sell, because the student reasoned that you could make money by selling corn and this student was interested in making money. That fact that the context could have supported
steem as meaning eating did not occur to this student because this student was going beyond the context.

**Use of morphology.**

Nagy (1988) referred to morphemic analysis as structural analysis, noting that skilled word learners use their knowledge of roots and affixes to learn unknown words. Ruddell (1994) viewed morphemic analysis as assembling word parts to create meaning. Carlisle (2010) noted that, in order for readers to understand the morphological structure of words, they must process phonological, syntactic, semantic, and orthographic information. When readers are able to access this information, it positively impacts their lexical ability, including the ability to learn new words as they read. Morphological awareness is a developmental process that increases as readers mature. Eighth graders perform better than sixth graders on tasks of morphological awareness; and sixth graders perform better than fourth graders (Carlisle, 2010). The study reported here examined morphology with college students.

Of the strategies used in the study conducted by Kelly, Lesaux, Kiefer, and Faller (2010), use of morphological awareness was one of the highlighted strategies. Students were interested in and excited about learning word parts. They were able to make connections. They even made their own words to demonstrate their knowledge of roots and affixes (a pigger is a person who takes care of pigs). The authors stated that the results of their study indicate that regular blocks of time should be devoted to instruction and study of morphology.

In an integrative review of 16 studies that assessed the effectiveness of morphological awareness on literacy development, Carlisle (2010) found that morphological awareness had the potential to impact four key areas of literacy: phonology, orthography, word meaning, and comprehension and comprehension monitoring. Carlisle did not conduct a meta-analysis,
because some of the studies were exploratory in nature and the diversity of the studies did not lend itself to the criteria of meta-analysis. The studies were grouped into categories such as morphology and pronunciation, morphology and orthography, morphology and word learning, and morphology and comprehension.

Of the studies on morphology and word learning, the one by Baumann et al. (2002) is of interest to the study reported here because students were able to use context and morphology to learn words. In that study however, there was no effect on comprehension. In 2003, Baumann et al. (2003) conducted another study with a larger sample size and in addition to context and morphology, the use of glossary definitions was also investigated. Calisle (2010) did not review the Baumann et al. (2003) study. Other studies reviewed by Carlisle (2010) used dialogic reading or were conducted with English-language learners. While the dialogic approach and English-language learners were not pertinent to the study reported here, the results of all the studies in the morphology and word learning category indicate the usefulness of morphological awareness to word learning. Results involving the impact of morphological awareness on reading comprehension were not as conclusive as the study by Bauman et al. (2002), but the trend did indicate potential usefulness.

In reviewing all the studies, Carlisle noted four instructional approaches to implement morphological awareness. These included: 1. heightening student awareness of morphology, 2. learning lists of affixes and root words, 3. morphological problem solving, and 4. strategic “morphological analysis intended to help students learn the meaning of unfamiliar words as they read” (p. 479). While the first approach might help focus attention on morphological awareness, it is not likely to impact word learning and comprehension. The second approach is passive and the problem with learning lists has already been discussed under instructional approaches above.
The second and third approaches lack the necessary context of word learning while reading. It is the fourth approach that warrants further investigation. Carlisle suggested that future studies need to incorporate the following: adequate description of subject characteristics, detailed description of implementation of intervention, random assignment, and use of appropriate measures. The study reported here included these elements.

**Problems with use of morphology.**

If students are to successfully use morphemic analysis, they need to know the meanings of affixes. In a synopsis of the research aimed at increasing vocabulary through morphemic analysis, Simpson and Randall (2000) found that students who had knowledge of root words and affixes could use that knowledge to learn the meaning of 80% of the words presented. They recommended that students be taught to learn the meaning of root words from context in addition to being provided with instruction in the meaning of common affixes.

**Combination of Context and Morphology**

Baumann et al. (2003) defined morphemic analysis as unlocking a word’s meaning by examining its morphemes, i.e., its meaningful parts such as base words, prefixes and suffixes, inflected endings, and Latin or Greek roots. Baumann et al. (2003) also provided information on contextual analysis noting that contextual analysis involves inferring a word’s meaning by scrutinizing surrounding text including syntactic and semantic cues. They argued for the instruction and use of both contextual and morphemic analysis because “Contextual and morphemic cues constitute the primary information facing readers when they encounter unfamiliar words…readers skilled in applying morphemic and contextual analysis have the potential to acquire the meanings of numerous unfamiliar words in an independent manner (p. 452).” Baumann et al. (2003) further explained that both context and morphology are important
because natural text may contain insufficient context or students may not have the particular morphological knowledge needed for any given word. With the use of both strategies, students can learn to exercise control over which strategy or combination of strategies to use for each specific word.

Baumann et al. (2002) conducted a study with four fifth grade classes. Three classes received intervention in one of three methods, morphemic analysis, use of contextual clues, or a combination of morphemic analysis and contextual clues. The fourth class was a control group that discussed a fifth grade text with no vocabulary instruction. Students in the intervention groups outperformed students in the control group on immediate and delayed word learning. There was no difference between intervention groups on word learning and none of the intervention groups demonstrated superior reading comprehension as compared to the control group. The authors stated that support for word learning, be it morphemic analysis, contextual clues or a combination of both, did enable students to learn words, but that the word learning did not impact reading comprehension.

Baumann et al. (2003) conducted an extension of the 2002 study with 157 fifth-grade public school students in a large southeastern city. There were eight classrooms in total; all classrooms were racially and ethnically diverse. All teachers were licensed with 10 to 22 years of teaching experience. The purpose of the study was to investigate the effects of integrated contextual and morphemic analysis instruction on the word learning and comprehension ability of fifth-grade students. Students received either instruction in the use of morphemic and contextual analysis or instruction in textbook vocabulary. After classrooms were matched for SES, method of instruction was randomly assigned to classrooms, but students were not randomly assigned to classrooms. Rather than a no-intervention control group, the authors chose
to use the textbook vocabulary instruction group as a means to explore the effects of explicit word instruction. Students participated in thirty 45-minute sessions. All students completed two pretests: Degrees of Word Meaning (a standardized test) and a researcher-constructed test of content words. There was no statistical difference between groups on these measures.

The material used was a slightly modified version of the social studies textbook in use by the district. The Context Morphology group received instruction clues with teacher modeling and feedback. Students had ample opportunity for practice and were encouraged to use the strategies in an integrated fashion. Students in the Text Book Vocabulary intervention did not receive instruction in independent word learning. They were directed to use definitions from textbook glossaries or dictionaries. Sometimes semantic maps and compare contrast charts were used.

To assess word learning, students completed multiple choice and written-definition tasks for morphologically and contextually decipherable words in context, for morphologically decipherable words in isolation, and for textbook vocabulary. As an assessment of comprehension, students completed multiple choice items. There was also an immediate and a delayed vocabulary test using decipherable words in context. The classroom was usually the unit of analysis, and, even though the pretests were not significant, they were used as a covariate. Students in the Text Book Vocabulary group performed significantly better on the textbook vocabulary posttest. Average classroom performance was 7.68 points higher for the Text Book Vocabulary classrooms. Students in the Context Morphology group performed significantly better on decipherable words in isolation and on immediate transfer of decipherable words in context, when students were the unit of analysis instead of classroom. There was no significant difference between groups on a delayed transfer task or comprehension task. However students in both groups did learn the social studies subject matter of the readings. While this study does
not provide strong quantitative support for the use of context and morphology to learn words in all situations, it does indicate that students did learn and use the strategies and that learning had some impact on word learning skill for the type of skill taught. The fact that students in the Text Book Vocabulary group did use that instruction to learn words also provides support for glossary and dictionary use.

Baumann et al. (2003) suggested that the lack of effect on comprehension may be due to the short-term nature of the project. They stated that students may need a long period of time to internalize the process of using morphology and context. It is also necessary to consider the goal of instruction. If the goal is comprehension of text, then it may be necessary to teach specific words needed for comprehension, to teach other comprehension strategies, and to promote wide reading. If the goal is independent word learning, then it is necessary to teach word learning strategies. Because the nature of the vocabulary comprehension connection is so complex, it is difficult to assess both in a short-term, narrowly-focused study. Transfer effects may have been limited by the morphology instruction which only focused on affixes. The authors suggested that future studies include more instruction in analyzing affixes along with their roots. The lack of a control group in this study also does not provide the opportunity to investigate the impact of comprehension. If there had been a control group, then comprehension of both interventions could have been compared to the control group. It may also be helpful to assess learning via more complex tasks instead of multiple choice items (Beck et al., 2002).

Bauman et al. (2003) also collected qualitative data using teacher and student questionnaires. Results indicated that students did use strategies; teachers and students were enthusiastic about both interventions. Some teachers did feel that they did not have enough time
to teach vocabulary and content. Most teachers reported that their understanding of the importance of vocabulary increased as a result of the intervention.

In their conclusion the authors noted that, while direct instruction of words to be learned may be effective, contextual and morphemic analysis may equip learners with the potential to infer the meaning of numerous words so that they become independent word learners. A vocabulary program needs many components. The Baumann et al. (2003) study did not provide conclusive evidence for the value of morphemic and contextual analyses, as compared to use of definitions, but the authors felt that more study is needed in the area of integrated strategy use in order to determine how best to enable readers to be independent word learners. It should be noted again, that the Baumann et al. (2002) study did provide support for the use of context and morphology in word learning, so while context and morphology were not differentiated from definitions in word learning, these strategies are deserving of further study. The study reported here examined the impact of multiple strategy use and glossary definitions. The use of a control group as in the Baumann et al. (2002) study allowed for comparison of intervention versus no intervention.

**Use of Syntax**

By examining not only the context and morphology of unknown words but also the syntactic and semantic environment, readers have increased potential to determine the meaning of those unknown words (Baumann et al., 2003). The syntactic environment gives readers clues and constraints to possible meaning. Use of syntactic awareness may help determine how a word is pronounced and therefore what word it is; more importantly, syntax gives cues to the possible meaning of the word (Nagy & Scott, 2000). In the study reported here, syntactic cues such as the
role of the word in the sentence were modeled for participants in the strategies group and the strategies plus definitions group. These participants also were coached in the use of these cues.

**Use of Definitions**

The Baumann et al. (2003) study used textbook glossary definitions, dictionary definitions, semantic mapping, Venn diagrams, and interactive discussions of words to be learned. So, in a sense this study was not just about learning by definition; it provided expanded meanings of words in context. There was an expectation that students would be engaged in learning. Hadley, Eisenwine, and Sanders (2005) also created definitions that students used as they engaged in a variety of comprehension strategies. In the case study by Falk–Ross (2002), the need to look up words in the dictionary was specifically mentioned by one student as a strategy that he would need to include in his repertoire. Simpson and Randall (2000), and Graves (1987) felt that use of definitions should be one part of a multipronged vocabulary learning program.

**Problems with dictionary use.**

Definitions provide explicit understanding of the word’s meaning, but do not necessarily provide information about usage. Students need metalinguistic awareness to use definitions and frequently fail to take into account the syntax of definitions (Nagy & Scott 2000).

In an experimental study Nist and Olejnik (1995) found that dictionary definitions were often problematic. Students had difficulty learning vocabulary from dictionary definitions because definitions were too brief, focused too much on word features, were vague and disjointed, and did not present students with enough information to understand multiple meanings. Nist and Olejnik did find that researcher-generated and researcher-supplied definitions did positively impact vocabulary learning. They found that context did allow students to identify
vocabulary exemplars. The study reported here used researcher modified definitions that are specific to the meaning of the word as it is used in the passage.

**Synthesis of Strategies**

As a possible remedy to the confusion regarding which strategies to use to enable students to become independent intentional word learners, Graves (1987) advocated the use of a multipronged approach to help students learn the meaning of unknown words as they read. His suggestions included: recognizing that a word is unknown, using context, using word parts (morphology), hypothesizing meaning, evaluating hypothesized meaning, and using a dictionary or other resources. In 2009 Willington and Price echoed these same recommendations with the addition of instructor coaching. With consideration of the research, the study reported here explored the use of the following strategies: identification of unknown words, context cues, morphology, linguistic/syntactic cues, meaning generation, and glossary definitions. In addition, supportive and corrective feedback will be provided by the researcher.

**Assessment of Vocabulary Learning**

Writing about vocabulary development for college students, Simpson and Randall (2000) advocated for vocabulary assessment that captures the type of word knowledge deemed to be adequate for assessment (level 4 – know a word well in one or several of its meanings). They argued that multiple choice tests do not capture that knowledge. Having the learner fill in the blanks as in CLOZE exercises is one suggested method of assessing word learning and comprehension. Ability to use newly-learned words in answers to questions is another suggestion.

To assess vocabulary learning, Frances and Simpson (2003) noted that students need to be able to recognize a definition of the word or supply an example or definition of the word.
Beck et al. (2002) also provided support for defining words in context. In the study reported here, learning of target words was assessed through CLOZE, and definition recall.

Pronunciation and orthographic knowledge are two additional measures supported by the research discussed above (Carlise, 2010; Ehri, 1998a, 1998b; Rosenthall & Ehri, 2008). Multiple choice tests were ruled out because of the possibility of correct answers based on guessing. Distractors, if not well constructed, allow students to ascertain the answer by the process of elimination. Even if multiple choice tests are well constructed, they may only tap surface word knowledge (Beck et al., 2002).

Assessment of Reading Comprehension

Simpson and Randall (2000) and Mezynski (1983) proposed that comprehension assessment is an active process. As multiple choice questions are inadequate for word learning assessment, they are also inadequate for comprehension assessment. Generative activities such as producing answers to questions were suggested as a more adequate measure. The study reported here used open ended researcher generated comprehension questions as one measure of comprehension.

The ability to read with fluency has been noted as a measure of comprehension (Kuhn & Stahl, 2003). The components of fluency include accuracy in decoding; reading with automaticity; and reading with proper prosodic features such as text phrasing, pitch, and stress. It is important to note that this ability is but one indicator of comprehension. At times it may be a misleading measure. Kelly, Lesaux, Kiefer, and Faller (2010) described “word callers” as those students who read words, some with good fluency but do not gain a deep understanding of what they are reading. They noted that in one urban middle school district there were children who had good word reading skills but vocabulary and comprehension scores around the 20th
percentile. The theoretical claim is that expert, competent, comprehending readers are able to read fluently (Pressley & Afflerbach, 1995; Chall, 1983). However, fluency may be necessary but not sufficient; it is one component of reading ability. Valencia, Smith, Reece, Li, Wixson, and Newman (2010) contended that the ability to read with fluency reflects the ability to decode and read with comprehension simultaneously. Therefore, the study reported here examined fluency – decoding, reading rate, and prosody - as another measure of comprehension.

**Summary**

Jenkins, Matlock, and Slocum (1998, p.217) noted that “With each year of schooling, texts take on a larger role in instruction, and factors that may inhibit comprehension of these texts, such as lack of vocabulary knowledge, can be expected to have increasingly detrimental effects on achievement.” In order to comprehend text, readers must understand the words. Nagy (1988, p.1) put this very succinctly: “…one cannot understand text without knowing what most of the words mean.” Students report the greatest difficulties in college literacy with technical and academic vocabulary (Simpson & Randall, 2004). Approximately 20% of first-year college students at community colleges enter with less than adequate reading skills (Falk-Ross, 2001). Therefore, this study explored methods to enable college students to become independent intentional word learners while reading academic text.
CHAPTER 3. Rationale

This chapter provides a rationale for the study. The challenges faced by the population to be studied are identified. A brief synopsis of the theoretical framework, research base, and limitations is provided. There is a summary of the pilot study and the implications for the present study. The chapter concludes with the hypotheses tested.

Rationale

Because community college students experience academic challenges, interventions that can enable them to succeed need to be identified (Dougherty & Townsend, 2006). The ability to read and comprehend academic text is one factor that has an impact on academic progress (McDonald-Ross & Scott, 1997; Pugh, Pawan, & Antommarchi, 2000; Caverly, Nicholson, & Radcliffe, 2004). Theories of reading provide insight into the elements necessary for effective comprehension and one of those elements is the word-level competency of adequate vocabulary (Chall, 1983; Ehri, 1998a; Ehri, 1998b; Nagy, 1988; Pressley & Afflerbach, 1995; Scarborough, 2001). Since no vocabulary program would be able to teach readers all the words that they need to know in order to comprehend text, what is needed is a method to enable readers to become independent word learners as they read text (Nagy, 1988; Fukkink & de Glopper, 1998).

Use of modeling and feedback to provide interventions such as strategic contextual and morphemic word analysis and use of definitions is supported by the research of Falk-Ross (2002); Hadley, Eisenwine, and Sanders (2005); Kelly, Lesaux, Kiefer, and Faller (2010); and Shanahan, Shanahan, and Misischia (2006). Other studies provided support for various components such as context or morphemic analysis. These researchers and the National Reading Panel (2000) suggested that there is a lack of quality research on methods to enhance vocabulary learning. The study reported here was intended to build on the research base with an
experimental study. Scripts and a review of audio tapes were used to promote and verify treatment fidelity. Students’ ability to identify unknown words, use strategies, and use definitions accurately was monitored and recorded. Multiple assessment measures allowed for in-depth evaluation of treatment. Word learning was assessed through pronunciation, spelling, CLOZE, and definition generation tasks. Comprehension was assessed through researcher-generated questions, CLOZE, and fluency of oral reading. It was expected that this study would address the lack of experimental research and provide evidence for strategies that enable college students to become more strategic as they read expository text. It was also expected that at least one form of this intervention would positively impact comprehension.

Because this study was conducted in an urban area with community college students majoring in teacher education, results may be limited to this specific population but have the potential to inform future research with different populations.

**Pilot Study**

Prior to the current study, the researcher conducted a pilot study on a population similar to the one used here. This experiment investigated a multiple strategy approach to teach community college students how to derive the meaning of unknown words as they read expository text. The two main research questions of interest were as follows. Can students learn to use strategies to become independent word learners as they read expository text? That is, will students who use a chart with scripted strategies to learn words outperform a control group that uses a note taking chart? Will this word learning transfer and improve their reading comprehension as measured by a CLOZE test and a written summary? Will students who used specific strategies outperform students who use a note taking chart?
The participants were students enrolled in two sections of the same course. One section was used as the intervention group and the other section as a control group. Both courses were taught by the same professor. He had agreed to cooperate with the researcher and allow class time to be used for the study. There were 25 students in each section. Only those students who signed consent forms and attended all research sessions were part of the study; 15 students in one class, 13 in the other. All participants were female. Participants were not randomly assigned to groups as they had already registered for the course sections. However, results of a \( t \) test of groups means, revealed no significant differences between groups based on age, ethnicity, financial aid status, and scores on the Compass Reading Placement test. This information was supplied by participants.

The experiment involved three 45-minute sessions of reading, vocabulary training, and discussion of the reading for the intervention group. Strategies to learn words consisted of use of context cues, morphological cues, syntactic cues, meaning generation, evaluation, sentence generation, help seeking and instructor feedback. A word learning chart prompted students to use these cues. The control group participated in reading, note taking, and discussion. A fourth session was used for the posttest. The texts used in the study were short passages from the textbook used for the course: *Exceptional Children and Youth* (Hunt & Marshall, 2004).

During the first session, as a pretest, students in both groups read the first passage (an introduction to terms and definitions used in special education), wrote a summary of the text, and answered two questions about their word learning strategies as they read. The pretest passage was then used as the first training passage.

The experimental group was instructed to follow along as the researcher read part of the passage. After the section was read, students were asked if there were any words that they did
not know. There were three words that were unknown. The researcher demonstrated how to use
the prompts of the word learning chart to learn the meaning of the first unknown word. During
whole class instruction, the researcher guided the students in use of the chart for the next word.
As a whole group, students were prompted to use the chart more independently for the third
word. The instructor then read another part of the passage. Unknown words were elicited and
students practiced using the chart with researcher guidance. Students were then instructed to
break into small groups. Each student was given several word learning charts and students were
prompted to read the rest of the passage and use the chart to learn the unknown words. The
researcher circulated among groups to monitor strategy use and offer feedback. Following that,
the whole group came together to discuss what they had learned.

In the control group the researcher read part of the passage aloud and modeled how to
take notes on important points. A note taking chart was used to make this process easy to
remember and to provide materials that were somewhat equivalent to those in the treatment
group. The treatment group used a chart to help them learn the meaning of words; the note taking
chart was introduced so that both groups performed a writing task related to the reading. The
group next heard the second part of the passage read aloud. The researcher prompted students to
state important points that they would note in their own words. Then class broke into small
groups to discuss important points to note in the rest of the passage. As with the intervention
group, the researcher circulated among groups monitoring progress and offering feedback. At the
conclusion of the session, the students returned to the whole class format and discussed what
they had learned.

During the second and third sessions each group participated in reading a second and a
third text. The intervention group reviewed the strategies for word learning and continued
practicing the strategies in small groups. The researcher monitored strategy use and provided feedback as needed. The control group continued with note taking, researcher monitoring and feedback. Both groups reconvened in the whole class format to discuss what they had learned from the reading.

The fourth session was a posttest using a fourth passage. Here students in both groups read the passage independently. They then completed posttest measures which included a written summary, a CLOZE exercise of the just read passage, spelling of target words from the passage, generation of target words when given a definition, definition generation when given the target word, and sentence generation that embedded target words. Words deleted in the CLOZE passage were target words that were not known by students during field testing. Definition and spelling tasks used those same target words from the passage.

Scores on the summary pretest were low, ranging from 0 to 3 out of five. Most scores clustered around 1. Scores on the posttest summary were equally low. There were no significant differences between groups on any of the posttest measures. However during training, the researcher did observe students in the intervention group using the word learning strategies. Students in the intervention group engaged in more meaningful discussions about the text and were able to come to deeper understanding of the content as compared to students in the control group. Students in the intervention group also reported that they used the word learning strategies in other situations. So while the pilot study did not provide statistically significant findings supporting the use of word learning strategies to facilitate word learning and comprehension, it did provide anecdotal evidence. It also needs to be noted that there were various circumstances that made the conduct of this study less than ideal. The students seemed confused at having two instructors (the researcher and the class’s regular professor). Knowing
that they were not being graded for the exercises in the research sessions could have affected the students’ motivation to work on the tasks provided at posttest. In addition, at the time of the posttest, participants were preparing for midterm exams and seemed distracted. In order to produce a reliable and controlled study, the need for research in a more controlled setting such as the study proposed here was evident.

This dissertation investigated methods to enable students to learn the meaning of unknown words as they read expository text related to their major. Intervention occurred on an individual basis for three sessions. Students were randomly assigned to one of four groups: strategies only, definitions only, strategies plus definition, and a control group. The four groups allowed for comparison of the merits of each condition and the possible additive effect of strategies plus definition.

One concern about the design of this study was that time spent was greater in some interventions than others and hence was a confounding variable. Participants receiving some treatments spent more time with the text because of the time needed for the intervention. Strategy and definition use required more time than definition use or strategy use alone. All of the intervention treatments may require more time than the Control group’s discussion time. Time spent in each session was monitored.

Rather than viewing time as a confounding variable we can view it as an essential part of effective instruction. Time spent receiving instruction is a requirement for becoming an independent word learner. Kelly, Lesaux, Kiefer, and Faller (2010) noted that teachers commented on the time required to assist their students in using strategies to learn the meaning of unknown words. Baumann et al. (2003) noted that teachers were concerned about how to
accommodate content learning and vocabulary learning within instructional time constraints.

Time to learn words is a necessary component of instruction.

Another concern was that of researcher bias as the researcher provided the interventions to all groups. The researcher used scripts to guide interactions with participants. Sessions were audiotaped and transcribed by a research assistant. The review of audio tapes and their transcriptions by the research assistant, a developmental reading specialist, served as a check on fidelity to treatment. The interactions that occurred between the participants and the researcher in the intervention groups were also based on the framework of social constructivist activities cited in the literature review (Ellison & Boykin, 1994; Hadley, Eisenwine, & Sanders, 2005). So rather than viewing the interactions as a possible source of bias, the interactions may be viewed as a component of the intervention.

At the beginning of the first training session, participants completed pretests and answered demographic questions. This provided information about group characteristics. During the three training sessions, participants in all groups read a passage aloud twice. After the first reading, they were asked if there were any words that they did not know. Ability to detect unknown words after reading the passage for the first time was recorded for all three sessions. The ability to detect unknown words was monitored because it was expected that as students progressed through the study, focus on unknown words in earlier passages would increase their sensitivity to unknown words in subsequent passages. The ability to identify a word as unknown is the first step in being able to learn that word (Nagy, 1988), therefore detecting unknown words was an important part of this study. Miscues, reading rate, and prosody were recorded during the first and second reading. In between the first and second readings, participants engaged in activities specific to their intervention treatment.
Participants in the strategies group strategically used context, morphology, and syntax to learn the meaning of unknown words. They used a modified version of the word learning chart that was used in the pilot study. The strategies word learning chart for the study reported here was shortened to three prompts because students in the pilot study seemed to have difficulty with eight steps. Participants in the definition group were provided with researcher constructed definitions. They learned to use these definitions to understand unknown words in the context of the reading passage. Participants in the strategies plus definition group learned to use the strategies and then compare their learning to the definitions. The definitions served as an additional learning aid. Participant use of strategies and or definitions was recorded. Participants in all intervention groups received instructor modeling, coaching and feedback.

Participants in the control group were prompted to respond to tangential questions related to each passage. While note taking was used for the control group in the pilot study, it was not used for the control group in the current study. The intervention groups for the study reported here did not participate in writing tasks as part of their intervention, but only in oral activities. To equate treatment method, and possibly time, discussion was used with the control group.

After participants in all groups read the passage a second time, they completed posttest measures of spelling, and definition recall as word learning measures. Response to researcher comprehension questions, and level of prosody served as comprehension measures. CLOZE was a posttest that measured word learning and comprehension. Sentence generation and written summary tasks were particularly difficult for participants in the pilot study. Response to questions replaced summary. Sentence generation is a level of word knowledge that is not necessarily needed for adequate comprehension (see Nagy and Scott’s discussion of incrementality, 2000).
After they completed the intervention and posttest measures in the third sessions, all participants completed a transfer task. They read an additional passage silently and independently as they would if they were reading for a course. They were prompted to read for understanding. Then they read the same passage aloud. Prosody level, reading rate, and miscues were recorded for that passage. During the transfer task, participants did not receive modeling, coaching, or feedback. After they finished the reading, participants completed transfer posttest measures of response to researcher developed questions, CLOZE, definition, and spelling. In the training sessions and for the transfer task, pronunciation of target words as a measure of word learning was gleaned from the second reading. Data were analyzed to test for differences between groups.

**Hypotheses**

1. Participants in the Strategies plus Definition group will exhibit higher word learning and reading comprehension than participants in the other three groups. Participants in all three intervention groups will outperform the Control group in word learning and reading comprehension.

2. Participants in the three intervention groups will be able to identify increasingly more unknown words in the second and third text passages than participants in the Control group.

3. Participants in the Strategy plus Definition group and the Strategies only group will demonstrate increasingly more independent strategy use in the second session and in the third session; participants in the Strategy plus Definition group and the Definition only group will demonstrate increasingly more independent definition use in the second session and in the third session.
4. Participants in the intervention groups will perform significantly better on transfer tasks than participants in the control group. Specifically, they will identify more unknown words, obtain a higher score on CLOZE, spell more words correctly, pronounce more words correctly, recall more definitions, receive a higher score on response to comprehension questions, and demonstrate a higher level of fluency.
CHAPTER 4. Methods

This chapter describes the methods that were used to investigate the effectiveness of three different interventions on the ability of college students to learn the meaning of unknown words as they read expository text. The interventions involved 1. strategy training alone, 2. use of definitions alone, and 3. strategy training plus use of definitions. There was also a control group. Subjects were randomly assigned to groups in this experimental study.

Participants

Approval from the IRB was granted for this study. Participants were recruited from the teacher education department of a public community college in a large northeastern city of the United States. I visited courses, attended teacher education club meetings, and explained the study to potential participants. The use of a recruitment script ensured that potential participants received adequate information. I also asked fellow colleagues to announce the study in their courses and solicit participants using the recruitment script. The recruitment script briefly explained the study and requirements for participation. Requirements for participation are outlined below, and the script appears in Appendix A. Flyers were posted in teacher education offices and distributed to students in courses and during advisement. The flyer let students know that they could participate in a research study and be rewarded with an incentive, a $20 gift certificate to Barnes and Noble bookstores. The flyer also noted that participants would attend three individual sessions with a literacy specialist. The complete flyer can be seen in Appendix B.

Participants had to be exempt from or have completed all necessary remedial courses in writing, academic and critical reading, and English as a second language. All participants were at least 18 years of age, enrolled in a community college, and were able and willing to participate in
three 45-minute sessions. The initial contact was in person during class, advisement, club visits, via email, or phone call. When students expressed interest in the study, the criteria were explained to them. If they met the criteria, a mutually agreed upon date was set for the first session. Before beginning active participation in the study, each participant read a consent form at the start of the first session. The consent form explained the study and the rights of the participant. A copy of the consent form is in Appendix C. Participants had the opportunity to ask questions, and, before they signed the form, I orally asked them if they understood the study and the consent form. After answering any questions, I asked them if they agreed to participate in the study. If they agreed, then I asked them to sign two copies of the form. They kept one copy, and I filed the other copy. Participants were assigned a number to protect their privacy.

There was a total of 48 participants who began the study and 41 participants completed all sessions. The 7 participants who did not complete all sessions were all female. One was assigned to the Strategies plus Definition group, and two were from each of the other groups. The participant assigned to the Strategies plus Definition group saw me a few times on campus and said she wanted to complete the study, but she never responded to phone calls. The other participants did not respond to their preferred method of contact.

The characteristics of those who completed all three sessions are as follows. There were 36 females and 5 males. Participants ranged in age from 18.9 years to 60 years with a mean age for all participants of 28.5 years. The mean number of college credits that students had taken was 33.6 with a range from 3 to 65 credits. When asked their ethnicity, participants self-identified as follows: 5 black, 13 white, 10 Latino/Hispanic, 8 Asian Pacific Islander, and 5 in two or more categories. There were no prompts for ethnicity. Participants could supply whichever label they
preferred. In terms of bilingualisms, 18 participants were bilingual and 23 were monolingual.

Characteristics by group are summarized in Table 4.1.

Table 4.1

*Group Characteristics as a Function of Strategies plus Definition (S + D), Strategies (S) Only, Definition Only (D), and Control Groups*

<table>
<thead>
<tr>
<th></th>
<th>S + D</th>
<th>S</th>
<th>D</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age*</td>
<td>32.69 (11.4)</td>
<td>24.36 (4.5)</td>
<td>24.44 (4.3)</td>
<td>31.99 (10.7)</td>
</tr>
<tr>
<td>Number of College Credits*</td>
<td>37.27 (20.1)</td>
<td>38.30 (14.0)</td>
<td>25.10 (14.0)</td>
<td>33.40 (22.0)</td>
</tr>
<tr>
<td>Gender (F/M)</td>
<td>10/1</td>
<td>9/1</td>
<td>9/1</td>
<td>8/2</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Latino/Hispanic</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Two or more categories</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Monolingual/Bilingual</td>
<td>8/3</td>
<td>5/5</td>
<td>4/6</td>
<td>6/4</td>
</tr>
</tbody>
</table>

*Means and (Standard Deviations) are given for Age and College Credits.  
S+D = Strategies plus definition group (N=11)  
S = Strategies only group (N=10)  
D = Definition only group (N=10)  
Control = Control group (N=10)
Materials and Procedures

Overview of study.

The study reported here used an experimental design with random assignment of participants to one of four groups: strategy training, use of definitions, strategy training plus use of definitions, and a control group. Participants were trained and tested individually. They received pretests, an intervention and posttests. They participated in three sessions lasting approximately 45 minutes each. Sessions were timed so that time spent in each session could be compared across groups. During session one, participants completed pretests, received initial training specific to their treatment, and completed posttest measures. During sessions two and three, participants continued to receive training with an emphasis on independent use of the intervention method. Participants also completed posttest measures during sessions two and three. During session three, participants also completed a transfer task and posttest measures.

Beginning Procedures

After participants were recruited, they were randomly assigned to one of the four groups: strategy training only, definitions only, strategy training plus use of definitions, or control. Random assignment was accomplished in the following manner. When 20 participants were recruited, their names were put into a container. Another container contained four disks; each disk was numbered with one of the numbers 1 through 4. Four names were pulled out of the name container and then a number was pulled out of the number container for each name. The groups were assigned to the participants as follows: 1 = strategy group plus definition, 2 = strategy group, 3 = definition group, and 4 = control group. This procedure was completed with the second set of 28 participants. (Seven participants did not complete the study.) When students agreed to participate, contact information was obtained and a date was set for the first session.
Participants were informed that they would be reminded about the session date and time one or two days prior to the session. They were asked their preferred method of contact – phone call, text or email. Two days prior to their scheduled first session, participants received a phone call, text, or an email from the researcher. The call, text, or email reminded them of the day, date, time, and place of their first session. All sessions took place in a quiet area of the college, either the researcher’s office, or the tutoring center. Participants were seated at a large table and had ample room for materials. The researcher was seated next to the participant with ample room for her materials. There was an individual data collection sheet for each participant that had his/her identification number at the top. The sheet recorded signing of consent, dates of attendance, pretest scores, intervention information, demographic data, and posttest scores. Starting time, ending time and duration of session to the nearest minute for each session were also recorded on the individual data collection sheet. A copy of this form can be seen in Appendix D.

An address/date book was used to store participants’ names, emails, and phone numbers. The calendar section of the date book was used to schedule and record meeting times. Details of the materials and tasks for each group by session are explained below.

**Participants’ introduction to the study.**

As participants sat down at the table for session one, start time (using a mobile phone) was recorded on the individual data collection sheet. All participants were given a copy of the informed consent form and asked to sign it as described above. Each participant was then asked if they were remedial free in reading and writing, how many courses they had taken, languages spoken, native language, dominant language, bilingual ability, date of birth, ethnicity, and gender.
The researcher thanked the participants for their participation. They were encouraged to relax, try their best and remember that when they had completed all three sessions they would receive a gift certificate to Barnes and Noble Bookstore. The importance of reading to their college success and the learning opportunity afforded by participation in the study was emphasized. The researcher also explained that she would be using her mobile phone for recording time and a smart pen for recording audio. All participants then completed the Vocabulary part of the Nelson Denny Reading Test.

**Pretest.**

Part 1, the vocabulary subtest of The Nelson Denny Reading Test Form G, was administered to all participants during session one (after they signed the consent form). This is an 80-item, multiple choice vocabulary test. It is normed on high school and college students. According to the Technical Report for this test, reliability for college students in the first two years is .94. Reliability was obtained using the KR-20 formula (Brown, Fishco & Hanna, 1993). The vocabulary subtest were administered and scored according to the publisher’s manual. Participants completed two practice items and then had 15 minutes to complete the 80 item test. Participants used self scoring answer sheets that were published in accordance with the test designers and purchased from Pro Ed Inc. Items consisted of sentences which students completed by choosing one of five alternatives. Target words in each item are in italics. Choices were signaled by bolded uppercase letters. The items did not provide contextual cues to the target word. The students’ scores were recorded on their individual data collection sheets.

The Nelson Denny vocabulary test was administered to assess equality of groups. Even though participants were randomly assigned, there was an analysis of variance conducted on the group means of the Nelson Denny scores as a check on equality of groups in vocabulary
knowledge. Scores on the Nelson Denny test were not used as a criterion for participation in the study. The criteria were that students be remedial free as noted above. Scores were also not used to form groups. Assignment to group was random. If group mean scores of the Nelson Denny were significantly different, then those scores would have been used as a covariate for all measures. Because of differences between groups in attrition and some demographics, the vocabulary pretest was used as a covariate in supplemental analyses as will be explained in the section on data analysis.

**Interventions**

**Reading texts.**

Text passages for students to read were presented on typed, double-spaced 8 ½ by 11 inch paper. The stop watch feature of the researcher’s Android phone was used to record the amount of time it took students to read each passage orally. A Smart Pen was used to record performance during the interventions. These recordings and transcriptions were analyzed for reliability of scoring and fidelity to treatment. This analysis is described in the section on additional scoring procedures. The reading passages were natural texts representative of the types of text that education majors are expected to read and comprehend. In education courses, students read textbooks, articles from practitioner journals such as *Young Child*, and readings from a variety of sources. The texts were chosen from sources that the participants are not likely to have seen, as they were not used in the courses that the students enrolled in. The texts that were chosen also contained a variety of challenging words, and were able to be read as stand alone passages without the support of the rest of the passage from which they were taken.

Each of the text passages contained a number of target words that were found to be unknown by students during field testing. As I identified passages that I was considering using, I
would introduce the passages to students during courses that I taught. I would introduce an excerpt from the passage containing one or more target words and ask students to define the words. Words that could be defined by at least one student were not used as target words. All participants read four texts over the three sessions, one text for each session and one used at the end of the third session for a transfer task which concluded the third and final session.

Readability and word count for the passages were obtained from the features in Word 2007.

The first text was published in the practitioner journal *Young Children* and focused on the importance of play for young children (Honig, 2007). The first text had 160 words and a readability of 10.3. There were 5 target words in this text. It was short in order to allow time for the Nelson Denny test. Each target word appeared only once in this text.

The second text was obtained from a trade book published by Teachers’ College Press and concerned the primacy of children’s needs in curriculum planning (Ayers, 1995). The second reading had 408 words and a readability of 10.8. This text had 7 target words. The longer length allowed opportunity for more intervention. Each target word appeared once in this text.

The third text provided information about children’s handwriting and was published in *The American Educator* (Graham, 2010). This text had 297 words, and a readability of 13. There were 7 target words in this text. Five of the target words in this passage appeared only once, two of the other words appeared multiple times. The word *manuscript* appeared eight times and the word *cursive* appeared five times. The higher readability allowed for more challenging strategy training.

The fourth text, the one for the posttest, discussed scientific knowledge and was taken from *Observing Children and their Development* (McDevitt & Omrod, 2009). This text had 343 words, 7 target words. Six of the target words in this passage appeared once and the word
phenomena appeared twice. This passage had a readability of 16.3. The text reading passages appear in Appendix E. Target words are printed in bold. Across the four texts there were a total of 26 words. The passages that were presented to the participants did not contain the target words in bold. The target words are only highlighted in the appendix for identification by readers of this research.

Readabilities for the passages were also obtained using Cometrix and Online-Utility Readability Calculator. Those analyses yielded readabilities for the passages that were different from the readabilities provided by Word 2007. Cometrix yielded grade equivalent readabilities for passages 1 through 4 as 9.4, 7.7, 13, and 11.6, respectively. Online-Utility yielded grade equivalents as 13.7, 11.8, 11.9 and 12.5. It is apparent that there is no consensus on the relative difficulty of the passages. In fact, they may be somewhat similar with all requiring participants to be reading at least at a secondary grade-equivalent level.

The researcher utilized two copies of each text for each participant. On the researcher’s copy a running record of the participants’ responses was recorded. There was space to record participant identification, date of session, first or second reading of text, scores, strategy use, and use of definitions. A sample researcher running record data collection sheet can be seen in Appendix F.

In each session and for all groups, the participant was presented with the chosen text and then asked to read it aloud. The specific instructions for all participants was: “Please read this passage aloud.” When the participant began to read, the researcher unobtrusively started the stop watch as the first word was pronounced. As the participant read, the researcher followed along on her copy. Miscues were marked as follows: Any word that was omitted was circled and had an o written in the circle for omitted. Any word that was mispronounced or pronounced
unintelligibly was circled, and an e for error was written in the circle. Substituted words were circled, and an s was written in the circle. If students could not decode a word and asked for help, the researcher stated the word, circled it on her copy, and wrote nh for needed help in the circle. If students could not decode the word or decoded it incorrectly, the researcher did not give assistance or correction. Help was only given if the participant asked for help. When the session was over, after the participant left, the research assistant scored the accuracy of the reading of the text by calculating the percentage of words decoded correctly using errors and the total numbers of words in the passage.

Reading time, prosody level, and identification of unknown words were recorded on the data collection sheet. When the participant finished pronouncing the last word of the text, the researcher stopped the stop watch and recorded the time to the nearest second. Level of prosody was recorded at this time. Prosody was measured by the following elements: 1) phrasing of groups of words, as indicated by appropriate intonation, stress and pauses, 2) adherence to author’s syntax and sentence structure, and 3) expressiveness. The prosody scoring rubric was taken from the National Assessment of Education Progress, Oral Reading Study (NAEP, 2002); it can be seen in Table 4.2.
Table 4.2

*Prosody Scoring Rubric*

**Level 4:** Reads primarily in larger, meaningful phrase groups. Although some regressions, repetitions, and deviations from text may be present, these do not appear to detract from the overall structure of the story. Preservation of the author’s syntax is consistent. Some or most of the story is read with expressive interpretation.

**Level 3:** Reads primarily in three- or four-word phrase groups. Some small groupings may be present. However, the majority of phrasing seems appropriate and preserves the syntax of the author. Little or no expressive interpretation is present.

**Level 2:** Reads primarily in two-word phrases with some three- or four-word groupings. Some word-by-word reading may be present. Word groupings may seem awkward and unrelated to larger context of sentence or passage.

**Level 1:** Reads primarily word-by-word. Occasional two-word or three-word phrases may occur—but these are infrequent and/or they do not preserve meaningful syntax.

After participants in all groups had finished reading each passage out loud for the first time, they were asked: “Are there any words that you do not know in this passage? Point to the words you do not know.” The researcher recorded the words that the student pointed to or said. Any words that the student pointed to that were not among the target words were recorded. On the first reading of each passage, reading time, prosody level and miscues were recorded. It was expected that the ability to identify unknown words would increase over sessions for students in the intervention groups as compared to students in the control group across successively read passages. Collecting data on ability to identify unknown words allowed for analysis of this
ability. The score was the number of unknown words that the participant identified. After this point, methods for the groups differed and are described below.

**Strategies only treatment group.**

*Session one.*

After completing the text about play for the first time and identifying any unknown words, the researcher used a script to guide the participants through use of the strategies to learn words from text. The words to be learned were the target words, even if the participant had not identified them as unknown. The researcher also presented the participant with a chart that prompted the participant to use specific strategies. The chart appears in Appendix G. The chart displayed a title: “Use These Clues to Figure Out the Meaning of Unknown Words”. Below the title were prompts for the use of context, morphology, and syntax. The prompt for context was: “Find other words in the text that help you understand this word.” The prompt for morphology was: “How is this word or part of this word similar to other words you know?” The prompt for syntax was: “What is the function of this word in the sentence? Does this word name something, is it a noun, describe something, is it an adjective, or is it an action, a verb?” The researcher modeled how to use the chart by thinking aloud, using each of the strategies. The researcher pointed to the first target word and said “Let’s figure out what this word means.” The following illustrates the modeling of strategy use for the first target word in the first reading. The target word is underlined here.

*Some children are slow and cautious in temperament while others tend to be more impulsive.*

The researcher then stated the following: “The first clue listed here, Context Clues, says: ‘Find other words in the text that help you understand this word.’ The words that may
help are: Some children are slow ... while others tend to be more impulsive. The word temperament can be seen as labeling the way children may respond or react. Reacting slowly and thoughtfully is one way. Reacting quickly and impulsively without thinking it through is another way.

The second clue, Similar Words, asks: ‘How is this word or part of this word similar to other words you know?’ The word temperament has two parts, temper and ment. Temper is similar to temper, as in what kind of temper does the child have? Tempera is also similar to temperature as in a measurement of heat. I know other words that end with ment. Let’s see how they work. For example, take the word enjoyment. Enjoy is an action. When you add ment, the word becomes a label that names the state (enjoy - happy) that results from the action. Ment gives a name to an action. For temperament, temper refers to the action, and ment refers to the state in a person that results from the action.

The third clue, Function Clues asks: ‘What is the function of this word in the sentence? Does this word name something - is it a noun, describe something – is it an adjective, or is it an action - verb?’ As we figured out in the Similar Words clue, words that end in ment are words that give a name to the action, they are nouns.

So using these cues, we can figure out that temperament describes the way that children respond to events; they may respond slowly or impulsively.

We came to an understanding of the word temperament from the Context Clues. Using the other clues helped confirm our understanding. When we use the Clues, remember that they can be used separately or together. Sometimes some clues will be more helpful than other clues.”
As participants were directed to each subsequent target word, they were prompted to use the strategies to uncover the various sources revealing the meaning of the target word. They were prompted to use the strategies chart to find context clues, related words and their parts (morphological clues), and to consider the function of the word in the sentence. After using these clues, they were prompted to deduce the meaning of the word. During this task, they were asked to speak aloud what they were thinking – similar to a think aloud procedure, as they used the clues to deduce meaning (Pressley & Afflerbach, 1995). If they were silent, the researcher asked them to say what they were thinking.

If students were having difficulty with any of the steps, the researcher verbally modeled use of the strategies. If students had difficulty with a particular word or strategy, the researcher offered suggestions. If erroneous statements were made, the researcher provided corrections. If incomplete conclusions were drawn, the researcher supplied missing information. When participants had used strategies correctly and/or come to adequate understanding of the word, the researcher offered specific encouragement such as, “Yes, those words are related to the word we are trying to learn”. Positive feedback was provided for the first few words, then on an intermittent basis. If any non-target words were identified as being unknown, the participant was prompted to use the strategies to learn those words.

Strategy use for target words by participants was recorded on the data sheet. Target words were written at the bottom of each passage. If the participant needed assistance, the researcher placed an a on the data collection sheet next to the specific word. Words where the participant used strategies independently and accurately to determine meaning were marked with an i. Proportion of target words analyzed independently and correctly, and used in demonstrating understanding of the meaning of the word in the passage provided the score for independent
strategy use. Independent strategy use was monitored across the three sessions. Strategies that were useful for each word appear in the Word Learning Chart in Appendix H. Participants did not have access to this chart. It was developed by the researcher to assist in any needed modeling of strategies. The chart provided the context clues, morphemes and related words, and the function of each word in the sentence. The meanings of morphemes were based on standard usage. For example, re means again, im and ex mean not, ible means able, and com means with.

When the participant finished the intervention with all of the target and unknown words, posttest measures for this session were administered. Participants in all groups completed the same posttest measures. These are described below.

Session two

Participants were welcomed to the session and reminded that they were participating in important work to help us understand how college students read. They were then presented with the text on curriculum. They were asked to read the text aloud. As they pronounced the first word, the stop watch feature on the cell phone was started. As they read aloud, the researcher recorded any miscues, the reading rate, and prosody using the same methods as in session one. Then the participant was asked to identify any unknown words and their responses were recorded.

The use of a script guided the researcher’s interaction with the participant. The script offered alternatives that were dependent upon each participant’s response. The script began with the researcher reminding the participants that we have been using strategies to learn the meaning of unknown words. The researcher presented the strategy chart to the participant. Then the researcher pointed to the first target word and asked: “Can you figure out what this word means?” If the participant was struggling, prompts were provided. The researcher pointed to the
prompt for use of context (Find other words in the text that help you understand this word.) and said: “Try this.” If the participant still struggled, the researcher pointed to the additional prompts as needed. Verbal prompts would consist of saying: “Look at the other words in the sentence, or in other sentences.” Physical prompts included pointing to helpful words. If that was not sufficient, the researcher provided additional scaffolding and modeled use of the strategies, guiding the participant to the correct meaning. If necessary, feedback also consisted of supplying specific information from the cues that the participant may not have identified independently. When the participant used strategies independently to deduce meaning, the researcher provided positive feedback. The participant was directed to each target word and was encouraged to continue using the strategies. Use of strategies to uncover the meaning of the target words was recorded as in session one. At this point, posttest measures began; they are described below.

*Session three*

Participants were again welcomed to the session and reminded that this was the last session. They read the text on handwriting aloud. Audio taping, reading rate, miscues, prosody, and unknown words were recorded as in sessions one and two.

The strategies chart was on the table, off to the side of the participant. The researcher pointed to each target and unknown word and prompted the participant to use the strategies to figure out the meaning of the word. The prompt was: “We have been using strategies to figure out what words mean. Use those strategies to figure out what this word means.” If the participant struggled, the researcher encouraged the participant to use the strategies independently. Prompts included: “Think about what we did last session.” “What clues can you use to help you figure out the words?” If the participant still struggled, the researcher pointed to the strategies on the strategy chart. If that was not sufficient then assistance was provided as in session two. Positive
feedback was provided for independent strategy use on an intermittent basis. The participant’s use of strategies for each word was recorded. Posttest measures were administered at this point.

**Definitions only treatment group.**

*Session one.*

The basic structure of the session for this group was similar to that of the strategies only group. However, rather than discuss strategies after the participant had read the respective text the first time and identified any unknown words, the researcher provided the participant with definitions of the target words in the passage. The definitions were presented as a chart on an 8 ½ by 11 inch paper. Each target word was on one side of the page and the definition was on the other side for ease in reading. Definitions were researcher generated in combination with dictionary definitions. There was enough space between the rows so that the word and definition could be presented one at a time. A sample definition chart can be seen in Table 4.3.

Table 4.3

<table>
<thead>
<tr>
<th><strong>Sample Definition Chart</strong></th>
<th>Temerament</th>
<th>Proffer</th>
<th>Legibly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>inborn patterns of response, the way a person might typically respond to situations</td>
<td>offer, to give, a proposal offered for acceptance or rejection</td>
<td>describes handwriting that is neat and clear enough for others to read</td>
</tr>
</tbody>
</table>

When the participant had finished the text on Play and had identified unknown words the researcher pointed to the first target word and said: “We can use definitions to learn the meaning of unknown words.” The researcher modeled use of the first definition for the participant.
Modeling consisted of using the definition to restate the sentence using words that demonstrated understanding of the target word. The researcher said:

What does temperament mean? The definition tells us that temperament means inborn patterns of response, the way a person usually responds to situations. So in the sentence:

*Some children are slow and cautious in temperament while others tend to be more impulsive.* Temperament means that some children have an inborn response in that they may be slow and cautious when responding to situations. This is how they respond in general to lots of situations. It is their typical reaction. Other children respond more quickly, more impulsively. This is their typical reaction. These are the words that I would use to help me understand the word temperament and to help me understand this sentence.

The researcher then pointed to the next target word in the passage. Participants were prompted to use the definition from the definition chart to help them understand the word and the sentence. The prompt was: “Use the definition, what does this sentence mean?” If the participant did not verbalize their thoughts, they were asked to say aloud what they were thinking. If the participant struggled or provided an erroneous answer, the researcher provided corrective feedback, supplying an appropriate sentence. If the participant came to an adequate understanding, positive verbal feedback was provided for the first few words, then on an intermittent basis (“Good use of definition.” “Yes, that is what this sentence means.”) Adequate responses were those that used the definition to demonstrate understanding of the sentence. The following quote exemplified an adequate response from one participant for proffer: “so the person who wrote this is offering this solution to you and you can agree with it or not agree, accept it or not.” An inadequate response was: “This is a solution offered by the author.” That
response was inadequate because it did not capture the full meaning of the word proffer because it did not include the understanding that the author was offering the solution for the reader’s consideration, acceptance or rejection. This distinction is important in that it invites readers to be constructive participants with the text.

The researcher pointed to subsequent target words, and prompted the participant to use the definition to come to an understanding of each word and the sentence. Corrective feedback continued to be provided as needed. Participant ability to use each definition was compared to the definitions in the definition scoring rubric and the context of the passage. The rubric appears in Appendix J. Target words are at the bottom of the data sheet. If the participant accurately and independently used the definition to demonstrate understanding of each target word, an I was placed on the data sheet next to that target word. An H was placed next to the word if the participant needed help. Any words that were identified as unknown but were not target words were defined by the researcher. Participants were not directed to use the researcher provided definition for non target words to demonstrate understanding of those words. None of the participants volunteered to do so. The number of times that the participant could adequately and independently use the supplied definitions of target words to demonstrate understanding of meaning was recorded. When all of the target and unknown words had been defined, posttest measures began.

Session two, Session three.

At the beginning of session two, participants were welcomed to the session and reminded that they were participating in important work that would help us understand how college students read. At the beginning of session three, participants again were welcomed and reminded that this was the last session. The procedure for sessions two and three was the same as in
session one except that the examiner did not initially model the use of the definitions. Instead, after the participant read the text for each session aloud and identified unknown words, the researcher pointed to each target word and presented each definition. The researcher asked the participant to use the definitions as in the previous session. The participant was asked to use the definitions to demonstrate understanding of the target word as it was used in the sentence. If participants struggled, then the researcher modeled use of the definition to create meaning.

Positive feedback was provided intermittently. Ability to use definitions independently and the need for help was recorded. Number of words successfully understood was monitored from the first through the third session. Posttests began when all the words had been defined.

**Strategies plus Definition treatment group.**

*Session one.*

Session one for this group began as that of the strategies only group. The researcher used the clues in the strategies chart to model use of the strategies for the first word. This led the participant to understand that *temperament* described the way that children respond to events; that they may respond slowly or impulsively.

Then the researcher said: “We can also use definitions to help us learn the meaning of unknown words.” The researcher presented the definition chart to the participant and read the definition of temperament. The researcher also compared it to the meaning derived from strategy use. This group was directed to use both the strategies and the definition for each target word. The script continued as follows:

The target word is *temperament*. For *temperament* the definition is *inborn patterns of response, the way a person might typically respond to situations*. This is almost the same as the meaning we learned from the clues. The part that the definition adds is that the
response is an inborn pattern. Not only is temperament a typical pattern of response, but temperament is also something that children are born with. So from using the clues and the definition, we learn a lot about the word temperament and what it means in this sentence.

As participants were directed to each subsequent target word, they were prompted to continue using the strategies to uncover various sources that reveal the meaning of the target words. Next, participants were provided with the definition. They were prompted to use the definition in conjunction with the strategies, to understand the meaning of each target word as it is used in the sentence. If participants were able to use only strategies, or only the definition, then credit was only given for the method that they used. When participants used strategies and the definition both were marked as independently utilized. If participants did not verbalize their thought processes, they were prompted to say aloud what they were thinking. Use of strategies and definitions were recorded. Additional modeling and corrective feedback were provided as needed. Positive feedback was provided for the first few words and then on an intermittent basis. If any non-target words were identified as unknown, the participant was prompted to use the strategies to learn the meaning of those words and the researcher provided a verbal definition. Participants were not required to incorporate the definition of non-target words into their understanding of the sentence. Participant use of strategies and definitions for target words was recorded on the researcher’s data sheet. When participants finished the intervention with all unknown words, posttests were administered.

Session two.

Participants were welcomed to this session as in the strategies only and definition only group. After they had read the text for this session aloud and identified unknown words,
intervention began. The researcher reminded the participants that we had been using strategies and definitions to help us learn the meaning of unknown words. The researcher pointed to the first target word in the text, presented the participant with the strategies chart, and asked the participant to use the clues to figure out the meaning of the target word. The prompts and alternatives were the same as in the second session of the strategies only group. After the participant had come to an understanding of the word via use of the strategies, the researcher presented the definition for that word. The participant was prompted to compare their understanding of the word to the definition and then to state the meaning of the word as it was used in the specific sentence. Strategy and definition use were recorded. When intervention for all unknown words had been completed, posttest measures were administered.

Session three.

Session three for this group proceeded as did that for the strategies only group with the addition of supplied definitions. Participants were directed to each target word, prompted to use the strategies, supplied with the definition and prompted to compare it to their derived meaning. They also stated the meaning of the word as it was used in the sentence. Corrections and feedback were supplied as needed. Participant use of strategies and definition was recorded. As in the other two groups, this session concluded with posttest measures.

Control group.

Session one.

After participants had orally read the text on play and identified any unknown words, they engaged in discussion of the text based on three tangential questions orally posed by the researcher as the participant read along on a copy of the questions that was handed to them. The time spent in discussion was somewhat shorter, but not significantly different from the time
spent on intervention in the three intervention groups. Control sessions were on average 40 minutes as compared to the 45 to 48 minutes on average for the intervention groups. Discussion also introduced a delay between the first reading of the text and posttest measures that existed in the intervention groups due to time spent on intervention. Questions for the first text (Play) were as follows. 1. What do you remember about play when you were a young child in school? 2. Tell me some of your favorite memories from your early school days. 3. What kinds of activities do adults do when they want to have fun that are similar to what they did for fun as children? After the discussion, posttest measures were administered.

Session two, Session three.

Participants were welcomed to these sessions. In session two they were reminded that they were participating in an important study that would help us learn how college students read. In session three they were informed that this was the last session. After reading the texts for each session, they participated in discussion based on the tangential questions. Tangential questions for the second text (Curriculum Planning) were as follows. 1. What are some things that you learned in your early years of school? 2. Tell me about some of the children in your classes when you were young. 3. What kinds of things do you do to help you learn new material now? Tangential questions for the third text (Handwriting) were as follows. 1. What kinds of things did you write about when you were a young child? 2. Tell me why you think children should learn to use a computer and why they should also use pens and pencils. 3. When you have to write papers for your college courses, what kinds of things do you do to help you write the papers? Posttests were administered after the discussion.
Posttest Measures

The researcher administered posttest measures after intervention for each text. Posttest measures were the same for all three texts and for all participants. The posttest measures were, however specific to each text. Answers to posttest measures were recorded by the researcher as noted for each posttest. Posttest measures for each session started with rereading of the text for that session. Using the specific texts for each session, the posttest measures for all three sessions were the same. They are described below.

**Reading fluency measures.**

After participants had finished the specific intervention for their group, they were asked to read the text a second time. The specific instruction was: “Please read this passage again.” A running record of miscues was recorded on the researcher data collection sheet. Reading start time and end time was recorded. After participants had left, time spent reading was calculated. Prosody level of the second reading was also recorded. When the session was over and the participant had left, the research assistant converted the reading time from the first reading and the second reading to reading rates. Number of words in the text was divided by the number of seconds needed to read the passage. The reading rate of the second reading of the text was the reading rate score. The percentage of words decoded correctly during the second reading was the decoding score. Level of prosody of the second reading was the prosody score. Reading rate, decoding and prosody are components of fluency. In general, good comprehenders demonstrate good fluency (Valencia, Smith, Reece, Li, Wixson, & Newman, 2010).

**Pronunciation.**

Pronunciation of target words was also scored for each text and consisted of the number of target words pronounced correctly during the second reading. Pronunciation was considered to
be one measure of word learning. According to Ehri (1998a, 1998b), if a written word is known, when it is seen, a reader is able to access its pronunciation immediately and automatically. The pronunciation score differed from the decoding score. Whereas the pronunciation measure entailed students’ accuracy in pronouncing only the target words, the decoding measure involved the number of words decoded accurately in the entire passage, calculated as the proportion of the total number of words in the passage.

**Comprehension questions.**

After participants had completed the second reading of each text, they received a copy of researcher-generated, open-ended comprehension questions. The questions were presented on 8½” by 11” paper. The researcher also had a copy of the questions with a rubric for acceptable answers. There were 4 questions for the first text with a maximum of 15 correct responses. For the second text there were 4 questions with a maximum of 13 correct responses. The third text and the transfer task each had 5 questions with a maximum of 12 correct responses. When the rubrics were completed, in total, over the four text passages, there were 18 questions with 40 possible correct responses. The researcher introduced the students to this activity by stating: “*Now that you have read this passage, I will ask you some questions about what you read. I would like you to recall as much information from the text as you can.*” The researcher read each question aloud. As the participant gave an oral answer, the researcher scored it on her scoring rubric. Each statement that the participant made that corresponded to an answer on the rubric scored one point. The researcher circled the corresponding answer on the rubric. For example, the researcher read the question: “*Tell me several ways that teachers can help children prolong play.*” One participant responded: “*Bring toys that interest them.*” The researcher circled the bullet next to “*Provide intriguing toys.*” The researcher also wrote the word “interesting”
underneath “intriguing” on the scoring rubric. While interesting is not the same as intriguing, it was judged to be an acceptable answer by the researcher and a developmental reading specialist. If a participant’s answers did not correspond to any of the answers on the rubric, the data sheet was marked for further review and the audio tape was reviewed after the participant had left. Scoring was determined as described below in the section on review of audio tapes.

After the session, the researcher added up the points for the score for each text passage. The score was entered on the individual data collection sheet. Erroneous answers were ignored. A professor of developmental reading read the passages and the comprehension questions to verify that the questions measured comprehension. The complete set of comprehension questions and the corresponding scoring rubrics are in Appendix I

**CLOZE.**

Next participants completed a CLOZE version of the text. The CLOZE text was presented on 8 ½” by 11” paper in 14 point font. Target words from each text were deleted and replaced with a 2 ½” long line. There were 26 target words, five in the first passage and seven in each of the subsequent passages. Most of the target words appeared only once in each passage. Three of the target words appeared more than once. If the target word appeared in the passage more than once, it was only deleted the first time it appeared. All lines were the same length so that length of line was not a cue to length of word. Target words are printed in bold in Appendix E. Text Reading Passages. The participant received the following instructions for this activity:

“This is the passage that you have just read. Some of the words have been deleted. Please write the missing word on the line.”

Words written on the lines needed to be the exact word deleted. This was regarded as a measure of word learning and comprehension. If the participant had learned and understood the
passage, then they should be able to supply the target words when they were deleted from the context (Greene, 2001; Simpson & Randall, 2000). Close approximations that preserve phonology were accepted. For example if the word was *temperament*, and the participant wrote *temperment*, that was considered an acceptable answer. The total number of words supplied was the score for each CLOZE text. Those scores were placed on each participant’s individual data collection sheet after the participants had left the session. The research assistant also checked scoring of CLOZE passages.

**Spelling.**

Next students were presented with a sheet of lined, numbered paper. They were informed that the next task would be to spell words. Students were not told that the words were the target words they had studied. Each word would be preceded by a number and the student was to write the word on the line with the corresponding number. The researcher reviewed the sheets when the participant finished to ensure that she could read all of the letters. She explained to participants that she wanted to make sure that she could read the participant’s handwriting. If a letter or letters were unclear, the researcher asked “what letter is this?” After the participants had left, the number of target words spelled correctly was entered on the individual data sheets as the spelling score. Spelling was a measure of word learning. If the meaning of a word had been learned when its spelling was seen and pronounced, then we would expect learners to remember its orthographic form as well (Ehri, 1998a).

**Definition recall.**

For the last task the participants defined the target words taken from the passage that they had read. The researcher had a scoring rubric for each participant that listed the word on one side and the definitions next to each word. There was space to score the definition that the participant
provided as accurate or inaccurate. The definition scoring rubric can be seen in Appendix J. The researcher presented the participants with each target word for the passage, one word at a time. The words were written on five inch by seven inch index cards. The researcher asked the participant to “Please define this word as it was used in the passage you just read.” Participants defined the words orally. Responses were recorded as accurate or inaccurate on the definition scoring rubric. Total number of words defined accurately was the score entered on the individual data sheet after the participant had left. If a determination of accuracy could not be made during the session, the data sheet was marked for further review. Scoring proceeded as described in the section below on additional scoring procedures. Definition was a measure of word learning. If a word is known, when it is seen, a reader should be to access its meaning automatically (Ehri, 1998a, 1998b).

Feedback was not given during posttests. The entire length of the session was recorded. At the end of the session, the researcher thanked the participants for participating, reminded them of the next meeting date, and recorded the ending time of the session.

**Transfer Task**

After participants had completed the final intervention and posttests during session three, they were presented with the fourth text, the one on scientific knowledge. Participants were directed to read this text silently so that they could understand it. Time spent reading silently was recorded. Next the participant was asked to read the text aloud. Reading time, errors and prosody were recorded on the researcher’s data sheet. Reading time was converted to reading rate after the participant had left. Reading rate, decoding and prosody (components of fluency) were some of the measures of comprehension for the transfer task.
There was no intervention or feedback during the transfer task. After participants had
read the text aloud, they completed measures similar to the intervention posttest measures. They
were asked to point to any unknown words. Participants were also asked what they did with the
unknown words. Participants were presented with researcher developed comprehension
questions as another measure of comprehension (in addition to fluency). The researcher had a
copy of the questions with a scoring rubric. The researcher read the questions aloud. Responses
were scored as in the posttest measures noted above.

Participants completed a CLOZE exercise to measure word learning and comprehension
on the text they had just read with seven target words deleted. Next, they spelled and defined the
target words in the same manner as the posttest tasks. Accuracy of pronunciation of target words
was gleaned from the oral reading of the text. Pronunciation, definition and spelling were
measures of word learning. All transfer task measures were assessed for reliability in scoring as
they were in the posttest tasks.

After participants had completed all transfer tasks, they were thanked for their
participation and reminded that if they would like further information, they could contact the
researcher. At this time, they were given the gift card to Barnes and Noble bookstores. End time
of session was recorded. The full script that was used with participants during all sessions for
each group appears in Appendix K. Table 4.4 provides a synopsis of tasks.

Table 4.4

Synopsis of Tasks

Session one, all groups

- Obtained signed consent
- Recorded demographic information
- Administered Nelson Denny Vocabulary subtest
- Participants read text on Play aloud as researcher recorded reading time, decoding and prosody – fluency
- Researcher asked participant to identify unknown words
- Specific intervention by group
- Posttest measures: rereading with fluency recorded, comprehension questions, CLOZE, spelling, and definition recall,
- Reminder of next session time, date and place

**Session two, all groups**

- Participants read text on Curriculum aloud as researcher recorded reading time, decoding and prosody – fluency, and identification of unknown words by participant
- Specific intervention by group
- Completion of posttest measures as in Session one
- Reminder of next session time, date and place

**Session three, all groups**

Participants read text on Handwriting aloud as researcher recorded reading time, decoding and prosody – fluency; unknown words identified by participant

- Specific intervention by group
- Completion of posttest measures as in Sessions one and two
- Transfer task
  - participants read text on Scientific Knowledge silently, no intervention
  - participants read text aloud, fluency measures were recorded, unknown words identified by participant
-participants answered comprehension questions, completed CLOZE, spelling, and definition recall
-participants were thanked for their participation, reminded of contact information if needed and gift cards were distributed

Specific Intervention by Group

Strategies group, Session one

- Researcher explained that there are strategies to help us learn the meaning of unknown words as we read
- Researcher presented strategies chart and modeled use of strategies to learn first target word
- Researcher prompted participant to use strategies chart to learn each additional target word and any other words identified as unknown
- If participant struggled the researcher modeled use of the strategies
- Feedback and correction were provided
- Use of strategies or need for assistance was recorded while participant used strategies

Strategies group, Session two

- Researcher reminded participant to use strategies to learn the meaning of unknown words and pointed to first target word
- If participant struggled, researcher provided graduated levels of assistance for successive target and unknown words
  - pointed to strategy clues on chart
  - pointed to areas in text that may be helpful
  - modeled use of strategies
• Feedback and correction was provided by researcher to participant
• Use of strategies or need for assistance was recorded

*Strategies group, Session three*

• Researcher reminded participant that we had been using strategies to figure out the
  meaning of unknown words and pointed to first target word
• Support was provided as needed as participant learned successive target and unknown
  words
  - reminder to use strategies
  - presented strategies chart
  - pointed to areas in text that are helpful
  - modeled use of strategies
• Use of strategies or need for assistance was recorded

*Definition group, Session one,*

• Researcher explained that definitions can help us understand the meaning of unknown
  words
• Researcher presented definition for first target word and modeled how to use the
  definition to restate the sentence demonstrating understanding of the word as it was used
  in the specific context
• Researcher pointed to subsequent target words, presented definition and prompted
  participant to use the definition to restate the sentence demonstrating understanding
• If participant struggled, the researcher modeled an appropriate response
• Feedback and correction were provided
• Any words that the participant identified as unknown, but were not target words were defined by the researcher

• Successful use of definition or need for assistance was recorded as participant engaged with each definition

**Definition group, Sessions two and three**

• Researcher pointed to each target word and presented the definition for each target word

• Participant was prompted to use the definition to understand the word and restate the sentence demonstrating understanding

• If participant struggled, researcher modeled use of definition

• Feedback and correction were provided, non-target words that were identified as unknown were defined by the researcher

• Successful use of definition or need for assistance was recorded

**Strategies plus Definition group, Session one**

• Researcher explained that there are strategies to help us learn the meaning of unknown words as we read

• Researcher presented strategies chart and modeled use of strategies to learn first target word

• Researcher explained that definitions can also help us learn the meaning of unknown words

• Researcher presented the definition of the first target word, read definition, compared it to the meaning derived from strategy use, and restated the sentence demonstrating understanding
• Participant was directed to each target word and prompted to use the strategies and the definition to generate personal meaning specific to the context
• Participant was prompted to use strategies to learn non-target words identified as unknown and the researcher provided a definition
• Feedback, corrections and additional modeling were provided as needed
• Strategy use and use of definitions were recorded

**Strategies plus Definition group, Session two**

• Researcher reminded participant that we can use strategies and definitions to learn the meaning of unknown words as we read
• Researcher pointed to each target word (one at a time) and prompted participant to use strategies, if participant struggled, support was provided as in the strategies only group
• Researcher presented the definition for target word and prompted the participant to compare definition to meaning derived from strategy use
• Researcher prompted participant to generate meaning using information derived from strategy use and definition
• Unknown non-target words were learned as in session one
• Feedback, corrections and modeling were provided as needed
• Strategy use and use of definitions was recorded

**Strategies plus Definition group, Session three**

• Researcher reminded participant that we have been using strategies and definitions to learn unknown words
• Researcher pointed to each target word and any unknown words and prompted participant to use strategies to learn each word
• Definitions were supplied for each word and participants were prompted to make comparisons and generate meaning using the information learned from strategy use and definition

• Feedback, correction and modeling was provided as needed

• Use of strategies and definitions was recorded

*Control group, Sessions one, two and three*

• Participant was prompted to engage in discussion based on tangential questions

• There was no correction or feedback

**Additional Scoring Procedures**

**Development of comprehension scoring rubric and definition scoring rubric.**

Participant answers to comprehension questions did not always correspond to answers on the original rubrics. The researcher reviewed audiotapes and written transcriptions of these answers to determine if the responses were adequate based on text content. The researcher added adequate responses to the scoring rubric with the intention of scoring similar responses as adequate. The additional responses were unique and did not recur. The researcher recorded inadequate responses in the inadequate section of the rubric so that subsequently encountered similar responses were also scored as inadequate. Thus, the researcher continued to develop the comprehension rubric as responses were reviewed. The research assistant reviewed the completed rubric to ensure that additional responses accepted as accurate were in fact accurate based on the content of passages. These rubrics were completed when all responses had been recorded and provided the basis for the 40 acceptable answers across the four text passages.
Review of audiotapes.

The researcher listened to random samples of audiotapes and rescored decoding, prosody level and pronunciation to compare these scores to those obtained during intervention. The research assistant listened to all audiotapes and when there was a discrepancy between what she heard and what the researcher recorded, those discrepancies were resolved by listening to the audiotape together and coming to consensus through close listening and discussion.

The research assistant transcribed audio tapes. The researcher used the written transcriptions for the following purposes. The researcher compared scoring done during the sessions with the actual responses. Strategy use of participants was reviewed. Ability to use definitions was also reviewed. The researcher and the research assistant reviewed the amount and type of feedback after the first five sessions to promote fidelity to treatment. There were a few instances where protocol was not followed. Once, the researcher forgot to ask the participant what they did with unknown words on the transfer task. Another time, the researcher forgot to read the line directing a student to remember as much information as she could for comprehension questions. When these lapses in protocol were brought to the researcher’s attention by the research assistant, closer attention was paid to the script. Review of fidelity to treatment occurred for 12 other random sessions during the course of the intervention. For these 12 sessions, feedback also was reviewed to monitor any bias that might occur based on intervention group. The reviewers used tally marks to record each instance of feedback. They placed the tally marks in columns marked instruction, generic comment, corrective feedback or positive reinforcement to specify type of feedback.
Hypotheses

1. Participants in the Strategies plus Definition group will exhibit higher word learning and reading comprehension than participants in the other three groups. Participants in all three intervention groups will outperform the Control group in word learning and reading comprehension.

2. Participants in the three intervention groups will be able to identify increasingly more unknown words in the second, third and fourth text passages than participants in the Control group.

3. Participants in the Strategy plus Definition group and the Strategies only group will demonstrate increasingly more independent strategy use in the second session and in the third session; Participants in the Strategy plus Definition group and the Definition only group will demonstrate increasingly more independent definition use in the second session and in the third session.

4. Participants in the intervention groups will perform significantly better on transfer tasks than participants in the control group. Specifically, they will identify more unknown words, obtain a higher score on CLOZE, spell more words correctly, pronounce more words correctly, recall more definitions, receive a higher score on response to comprehension questions, and demonstrate a higher level of fluency.

Data Analysis

To ensure equality of groups, ANOVAs were calculated on the mean scores of the four groups on the vocabulary subtest of the Nelson Denny Reading Test, the percent of words decoded correctly during the first reading of the first passage, reading rate on the first reading, prosody level on the first reading, and age. Also the groups were compared on languages spoken,
Two-way repeated measures ANOVAs, means, standard deviations, and effect sizes (difference between means divided by pooled standard deviations) were used to analyze performance during and following the reading of passages during the three treatment sessions. Treatment Group was the between subjects factor (4 levels) and Text Passage (treatment passages during Sessions 1, 2, 3, or transfer passage) was the within subjects factor.

Treatment group means were compared on several dependent measures, including fluency measures, response to comprehension questions, CLOZE, memory for the spellings of target vocabulary words, pronunciation of target words during text readings, and definition recall of target words. Performance was analyzed across text passages to determine whether performance improved as students received additional instruction and practice. Additional posttest measures consisted of greater sensitivity to words whose meanings were unknown as the sessions progressed, ability to use vocabulary learning strategies, and ability to use definitions to increase understanding of unknown words in the passage.

During the experiment, some of the subjects dropped out, one from the Strategies plus Definition group and two from each of the other groups. Because of this differential attrition rate, supplemental analyses were conducted. ANCOVAs were applied to the outcome measures. The vocabulary subtest of the Nelson Denny Reading Test was used as the covariate. Given that the focus of the study was on vocabulary learning, this measure served to level the groups in terms of general vocabulary knowledge. Some of the measures showed ceiling effects on individual passages. To address this problem, supplementary analyses were conducted on the sum of responses over text passages. This approach of combining ANOVAs with supplementary analyses was adopted to provide multiple confirmatory perspectives on the data.
Pearson Product Moment Correlations were calculated to determine the relationship between pretest measures and outcome measures. It was expected that students’ vocabulary knowledge as measured by the Nelson Denny test would be significantly correlated with the vocabulary learning outcome measures.
CHAPTER 5. Results

Quantitative Analysis

Pretests and Demographic Characteristics

Analyses of variance were applied to performance on the various pretests with treatment group as the independent variable. These pretest measures included the vocabulary subtest of the Nelson Denny Reading test, percent of words decoded correctly during the first reading of the first text passage, reading rate on the first reading of the first text, prosody level on the first reading of the first text, and number of words identified as unknown for the first reading of the first text. The purpose was to verify that the four treatment groups did not differ when the treatment began. Results revealed that there were no significant differences among the group means. Means and standard deviations for pretest measures are presented in Table 5.1. Mean vocabulary scores on the Nelson Denny test favored the Strategies plus Definition and the Control groups over the other groups, with large standard deviations creating substantial error variance.
Table 5.1

Means and Standard Deviations of Pretest Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>S + D&lt;sup&gt;a&lt;/sup&gt; M (SD)</th>
<th>S&lt;sup&gt;b&lt;/sup&gt; M (SD)</th>
<th>D&lt;sup&gt;c&lt;/sup&gt; M (SD)</th>
<th>C&lt;sup&gt;d&lt;/sup&gt; M (SD)</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years</td>
<td>32.69 (11.43)</td>
<td>24.36 (4.46)</td>
<td>24.44 (4.25)</td>
<td>31.99 (10.72)</td>
<td>2.99 &lt;sup&gt;*(p &lt; .04)&lt;/sup&gt;</td>
</tr>
<tr>
<td>Number of college credits</td>
<td>37.27 (20.06)</td>
<td>38.30 (14.04)</td>
<td>25.10 (13.97)</td>
<td>33.40 (22.00)</td>
<td>1.13 ns</td>
</tr>
<tr>
<td>Pretest Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nelson Denny Vocabulary Subtest</td>
<td>49.73 (20.48)</td>
<td>39.20 (21.32)</td>
<td>36.40 (14.06)</td>
<td>51.50 (21.10)</td>
<td>1.51 ns</td>
</tr>
<tr>
<td>Decoding Pretest&lt;sup&gt;e&lt;/sup&gt;</td>
<td>.98 ( .02)</td>
<td>.97 ( .02)</td>
<td>.97 ( .01)</td>
<td>.98 ( .04)</td>
<td>1.23 ns</td>
</tr>
<tr>
<td>Pretest Reading Rate</td>
<td>117.49 (23.80)</td>
<td>102.80 (26.27)</td>
<td>101.90 (25.17)</td>
<td>101.91 (33.41)</td>
<td>.84 ns</td>
</tr>
<tr>
<td>Pretest Prosody</td>
<td>3.64 ( .50)</td>
<td>3.30 ( .67)</td>
<td>3.20 ( .42)</td>
<td>3.40 ( .70)</td>
<td>1.08 ns</td>
</tr>
<tr>
<td>No. of Unknown Words</td>
<td>1.09 ( 1.38)</td>
<td>3.10 ( 2.73)</td>
<td>3.90 ( 4.68)</td>
<td>1.30 ( 2.16)</td>
<td>2.21 ns</td>
</tr>
</tbody>
</table>

<sup>a</sup> S+D = Strategies Plus Definition Group (N=11)
<sup>b</sup> S = Strategies Group (N=10)
<sup>c</sup> D = Definition Group (N=10)
<sup>d</sup> C = Control (N=10)
<sup>e</sup> Reported as a proportion
Analyses of variance were also applied to the demographic characteristics of age and number of college credits, with treatment group as the independent variable. Results revealed a significant effect on age (see Table 5.1). Pairwise comparisons, however, yielded no significant differences between groups. Examination of the means and standard deviations revealed that the Strategies plus Definition group and the Control group had higher mean ages and larger standard deviations compared to the Definition group and the Strategies group. However, correlations calculated between age and the pretests revealed no significant relationships, with all \( r \)'s < .28, \( p > .05 \). Thus, age differences were not considered to be a relevant factor distinguishing the groups. The mean age for all groups combined was 28.6 years with a standard deviation of 9.08.

Comparison of the mean number of college credits across treatment groups in the ANOVA yielded no significant main effect. Mean number of credits ranged from 25 to 37 credits. On average, the groups had completed slightly fewer or slightly more than two semesters of college. In terms of means and standard deviations, the groups were fairly similar.

Additional demographic characteristics of gender, ethnicity and language characteristics are presented in Table 4.1. All groups were mostly female with one or two males in each group. All groups had participants from at least three different ethnic categories. However the Definition group did not have any participants who self-identified as white, and did have five participants who self-identified as black. The other groups had 1 to 4 members who self-identified as black. In general, there was a variety of ethnicities represented in each group. The groups had a mix of participants who self-identified as monolingual and bilingual. The Strategies plus Definition group had the most monolingual participants (8) and the Definition group had the most bilingual participants (6).
The above comparisons indicate that the groups were less balanced on two of the assessments, the Nelson Denny vocabulary measure and the number of bilingual students. Examination of the correlation coefficient between students’ bilingual status and their vocabulary scores revealed a strong negative relationship, $r = -0.53, p < .001$, indicating that the bilingual students ($N = 18$) had lower vocabulary scores than the monolingual students ($N = 23$). To evaluate whether mean performance between treatment groups on relevant outcomes measures was influenced by these differences, supplementary ANCOVAs were conducted with vocabulary scores entered as a covariate.

**Intervention and Posttest Performance**

Several tasks were used to assess effects of interventions on outcome measures as training progressed. Performance on measures was subjected to analyses of variance. Intervention group was one independent variable with two or four levels (i.e., strategy treatment, definition treatment, strategy plus definition treatment, control no treatment) depending on whether the control group was included or whether only two of the treatment groups were compared. Text was another independent variable with four levels as repeated measures (three intervention texts plus a transfer text). When main effects of the intervention were detected, pairwise comparisons using a Bonferroni adjustment were conducted to localize the source of the difference with hypotheses tested at $p < .05$. Cohen’s $d$ (1988) effect sizes were examined to assess differences comparing each intervention group to the control group. ANOVA test statistics are reported in Table 5.2. Means scores for each group on outcome measures and effect sizes are reported in Table 5.3.
Table 5.2

Analyses of Variance as a Function of Treatment Group and Reading Text

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Partial Eta²</th>
<th>Paired Comparison&lt;sup&gt;c&lt;/sup&gt;</th>
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</thead>
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<tr>
<td><strong>Word Learning Tasks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Pronunciation&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment (T)</td>
<td>3</td>
<td>.04</td>
<td>1.15ns</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>37</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sessions (S)</td>
<td>2.22</td>
<td>.18</td>
<td>10.09***</td>
<td>.21</td>
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<tr>
<td>S x T</td>
<td>6.67</td>
<td>.04</td>
<td>2.34*</td>
<td>.16</td>
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<tr>
<td>Error</td>
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<td>.02</td>
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<tr>
<td><strong>Definition Recall&lt;sup&gt;a&lt;/sup&gt;</strong></td>
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<td>Treatment (T)</td>
<td>3</td>
<td>.89</td>
<td>6.98**</td>
<td>.84</td>
<td>S + D &gt; C; D &gt; C</td>
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<tr>
<td>Error</td>
<td>37</td>
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<td>6.597***</td>
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<td>Comprehension Response&lt;sup&gt;a&lt;/sup&gt;</td>
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Table 5.2 (cont’d)

*Analyses of Variance as a Function of Treatment Group and Reading Text*

<table>
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<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Partial Eta²</th>
<th>Paired Comparison&lt;sup&gt;c&lt;/sup&gt;</th>
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<td>During Intervention</td>
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<td>.25</td>
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*Note.* *p < .05, **p < .01, ***p < .001

<sup>a</sup> Proportions  
<sup>b</sup> Word learning and comprehension measure  
<sup>c</sup> S+D (Strategies and Definitions Group), S (Strategies Only Group), D (Definitions Only Group), C (Control Group)
Table 5.3

Means, Standard Deviations and Effect Sizes on Training Posttest Measures

<table>
<thead>
<tr>
<th>Posttests Measures</th>
<th>Session 1 M (SD)</th>
<th>Session 2 M (SD)</th>
<th>Session 3 M (SD)</th>
<th>Grand Mean M (SD)</th>
<th>ES (d)</th>
<th>Transfer M (SD)</th>
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<td><strong>Pronunciation of Target Words (%)</strong></td>
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<td>.97 (.05)</td>
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<td>.93 (.07)</td>
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<td>D</td>
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<td>.97 (.06)</td>
<td>.94 (.07)</td>
<td>.96 (.06)</td>
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<td>.71 (.24)</td>
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Table 5.3 (cont’d)

*Means, Standard Deviations and Effect Sizes on Training Posttest Measures*

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<th>Posttests Measures</th>
<th>Session 1 $M (SD)$</th>
<th>Session 2 $M (SD)$</th>
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### Table 5.3 (cont’d)

**Means, Standard Deviations and Effect Sizes on Training Posttest Measures**

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<td>98.64 (1.16)</td>
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<tr>
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<td>98.34 (2.46)</td>
<td>98.18 (0.73)</td>
<td>98.31 (1.54)</td>
<td>1.30</td>
<td>97.68 (2.52)</td>
<td>-0.48</td>
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<tr>
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<td>S + D</td>
<td>130 (24)</td>
<td>159 (28)</td>
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<td>0.46</td>
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<td>S</td>
<td>117 (28)</td>
<td>148 (35)</td>
<td>117 (29.28)</td>
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<td>116 (27)</td>
<td>-0.13</td>
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<tr>
<td>D</td>
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<td>150 (33)</td>
<td>117 (28.96)</td>
<td>127 (31)</td>
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<td>120 (26)</td>
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</table>

**Note:**
Numbers of students were: N=11 (S+D, Strategies plus Definition); N=10 (S, Strategies), N=10 (D, Definitions), N=10 (C. Control)

\(a\) = words per minute

\(b\) = proportion of times definitions were used independently and accurately

\(c\) = proportion of times strategies were used independently and accurately

\(d\) = includes time for transfer task

ES(d) = Effect Sizes calculated using Cohen’s \(d\); the grand mean of each treatment group was compared to the grand mean of the control group.
Identification of unknown words in text passages.

After reading each passage aloud for the first time, participants were asked if there were any words whose meanings they did not know. The number of words identified as unknown was recorded by the researcher and the audiotape was reviewed by the researcher and the research assistant. All words identified by participants as unknown, both target words (26 words) and other words, were included in this count. Table 5.4 shows that a number of students failed to identify any unknown words, particularly after reading the first passage. The number of words identified by each student was summed across the four passages. The mean was $M = 10.51$ ($SD = 10.4$), indicating that unexpectedly few words were identified as being unfamiliar and there was substantial variability among students. There are several possible reasons why participants identified fewer than half of the target words as unknown. Perhaps participants had some knowledge of the words. Perhaps they thought they knew the words. Perhaps they knew other meanings for polysemous words such as *cast*. It is also possible that a sense of knowing the words was created as a result of having just read them in the texts. Perhaps more sessions and more training are needed to sensitize students to unknown words. This puzzle awaits further research.
Table 5.4

Percentage of Participants Identifying Zero Words as Unknown by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control (C)) Treatment Groups, across Text

<table>
<thead>
<tr>
<th>Treatment Groups</th>
<th>Reading 1</th>
<th>Reading 2</th>
<th>Reading 3</th>
<th>Transfer Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + D</td>
<td>45%</td>
<td>9%</td>
<td>9%</td>
<td>27%</td>
</tr>
<tr>
<td>S</td>
<td>20%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>D</td>
<td>30%</td>
<td>0%</td>
<td>30%</td>
<td>10%</td>
</tr>
<tr>
<td>C</td>
<td>50%</td>
<td>30%</td>
<td>30%</td>
<td>0%</td>
</tr>
</tbody>
</table>

a = S+D (Strategies and Definitions Group), S (Strategies Only Group), D (Definitions Only Group), C (Control Group)

Because so few unfamiliar words were identified during each session and showed floor effects, the numbers were summed across sessions for each student, and this measure was compared across the groups. To determine whether the groups differed in identifying unknown words when vocabulary differences among the groups were controlled, an ANCOVA was conducted with treatment as the independent variable and total unknown words identified across the four passages as the dependent variable. The covariate was performance on the Nelson Denny vocabulary test to control for any differences between groups in the size of students’ vocabularies, given the possibility that those with smaller vocabularies might identify more unknown words. This possibility was confirmed by a significant effect of the covariate in the ANCOVA, $p < .01$, and a significant correlation between Nelson Denny vocabulary scores and the number of words identified as unknown: $r = -.53$, $p < .001$. Results of the ANCOVA revealed no significant main effect of treatment (see Table 5.5). These findings indicate that with vocabulary levels controlled, the groups did not differ in the number of words that students
identified as unknown, despite the fact that the interventions focused on figuring out the meanings of unknown words.

Table 5.5

Adjusted Means and Standard Deviations on Outcome Measures Reading Texts 1-4 for the Strategies plus Definition (S+D), Strategies Only (S), Definitions Only (C), and Control (D) Treatment Groups in the ANCOVAs

<table>
<thead>
<tr>
<th>Outcomea</th>
<th>S+D</th>
<th>S</th>
<th>D</th>
<th>C</th>
<th>F</th>
<th>Partial Eta²</th>
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<tbody>
<tr>
<td>Unknown Wordsd</td>
<td>8.42 (4.9)</td>
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<td>7.35 (6.7)</td>
<td>1.66 ns</td>
<td>.12</td>
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<tr>
<td>Comp. Qs (40)ac</td>
<td>13.23 (5.5)</td>
<td>12.97 (5.5)</td>
<td>12.87 (6.2)</td>
<td>6.01 (2.8)</td>
<td>5.20**</td>
<td>.30</td>
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<tr>
<td>CLOZE (19)a</td>
<td>16.37 (2.5)</td>
<td>16.64 (2.8)</td>
<td>16.33 (2.7)</td>
<td>9.22 (3.5)</td>
<td>18.18**</td>
<td>.60</td>
</tr>
<tr>
<td>Spelling (19)a</td>
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<td>16.97 (1.9)</td>
<td>17.22 (2.0)</td>
<td>15.42 (3.2)</td>
<td>2.26 ns</td>
<td>.16</td>
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<tr>
<td>Def. Recall (19)ab</td>
<td>12.08 (3.6)</td>
<td>7.36 (3.7)</td>
<td>12.16 (4.1)</td>
<td>3.29 (2.5)</td>
<td>16.78**</td>
<td>.58</td>
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</table>

Note. *p< .05; **p < .01; ns = not statistically significant.
a Maximum scores on outcomes are given in parentheses. Scores were summed across the three intervention passages.
b Definition Recall
c Response to Comprehension Questions
d Maximum score is 26 unknown target words plus any additional words identified by students. Scores were summed across the four intervention and transfer passages.

**Pronunciation of target words during text reading.**

Students read the text passages twice. As participants read the passage for the first time, the researcher conducted a running record during which errors, omissions and, substitutions were recorded. If participants asked for help during the first reading of each passage, the researcher pronounced the word and recorded that the participant needed help. As participants read each passage for the second time, the researcher again conducted a running record of student’s errors and miscues, that is, words they omitted, or mispronounced. No assistance was given during the second reading of each passage. The accuracy of their pronunciations of target words was culled from the running records during the second reading. The number of target words pronounced correctly was scored. The researcher and research assistant both reviewed audio tapes to provide
reliability of scoring. There were two discrepancies which were resolved by listening to the audiotape together and coming to consensus. Number of target words pronounced correctly was then converted to a proportion based on the total number of target words. From mean performance in Table 5.3 it is apparent participants pronounced most of the target words correctly. This is not surprising since incorrect pronunciations were corrected during the first reading of the text if participants asked for help, and the target words were pronounced by the researcher and participants during the interventions.

An ANOVA applied to scores revealed no significant main effect of treatment group (see Table 5.2), showing that the groups did not differ in their ability to pronounce the target words as they read the texts the second time. There was a significant effect for session and a significant interaction between session and treatment group. Mean performance in Figure 5.1 suggests that the treatment groups performed similarly during the first three readings of the texts following the interventions, but their mean scores diverged during the transfer task, with the Definition and Strategy groups declining more than the Strategies plus Definition Group. Also, the means of the intervention groups declined more from the first to the fourth readings than the means of the Control group. Carlisle (2010) has observed in her research that the ability to pronounce words correctly may or may not be indicative of word learning and comprehension. The fact that pronunciation of target words declined during transfer more for the intervention groups than for the Control group may be due to the fact that during the training sessions, the researcher discussed the target words with the intervention groups. During the transfer task, participants worked independently and did not interact with the researcher about words in the passage. This changed procedures more for the intervention than the control group.
Accurate Pronunciation of Target Words by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control Treatment Groups, across Sessions

Definition recall.

After participants had read each passage for the second time and had responded to the other posttests, the final posttest assessed students’ memory for definitions. The target vocabulary words from the passage were presented individually on index cards as the researcher said each word aloud. Participants verbally recalled the definitions of each word. The score was the number of correct responses. The researcher recorded participants’ responses as accurate or inaccurate according to the definition scoring rubric as the participants responded. The researcher demonstrated use of the definition scoring rubric to the research assistant and then the research assistant reviewed audiotapes of the participants’ responses providing additional scoring. Discrepancies were resolved through discussion based on the audiotapes and rubrics. Scores were converted to proportions of correct responses based on number of target words per passage. Internal consistency for all 26 words was acceptable; Cronbach’s Alpha was .84. This is
within the range (.606 to .927) reported as acceptable by Baumann et al. (2003) for their test measures. Mean performance of the groups and test statistics are reported in Tables 5.2 and 5.3.

Participants’ ability to recall definitions after the interventions provided partial support for the hypothesis that participants in the intervention groups would learn significantly more words than participants in the Control group. As shown in Table 5.2 there was a significant main effect for treatment group. Pairwise comparisons using the Bonferroni adjustment revealed that both the Strategies plus Definition group and the Definition group outperformed the Control group during intervention but not during the transfer task. However, the Strategies group did not differ significantly from any of the other groups, including the Control group. There was a significant main effect for session with participants recalling more definitions on later than earlier sessions. There was also a significant interaction between session and treatment group. As can be seen in Figure 5.2, the groups differed in their recall of definitions during the three treatment sessions but scores of all the groups dropped and were very similar on the transfer task.

Figure 5.2
Mean Proportion of Definitions Recalled by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control Treatment Groups across Sessions
These findings reveal that the two groups that studied definitions of target words outperformed the other two groups in their ability to define the words after completing each treatment session. However training in the use of definitions did not transfer to a text that they read on their own without any definitions present. As evidenced in Figure 5.2, performance of all groups was very similar to that of the Control group on the transfer task with very few unfamiliar words defined correctly.

A supplementary ANCOVA was conducted to verify performance differences found above on the treatment passages (Definition recall 1-3) when the vocabulary knowledge of students was controlled. The dependent variable was the sum of definitions recalled across the three passages. The independent variable was treatment group (4 groups). Results appear in Table 5.5. The Nelson Denny vocabulary covariate contributed significantly, $p < .05$. Pairwise comparisons using the Bonferroni adjustment revealed that the Strategies and Definition group and the Definition Only group performed equivalently and both outperformed the Strategies Only and the Control group ($ps < .05$) whose means did not differ significantly ($ps > .05$). These findings add to the differences detected above in the ANOVA by showing that the two definition groups recalled significantly more definitions than the Strategies Only group. These findings confirm that studying definitions was superior to attempting to figure out definitions by applying strategies to information in the text.

To review whether effects held across words as well as students, Table 5.6 shows the proportion of participants who recalled definitions correctly across groups. From this table the following can be observed. During Text Readings 1, 2, and 3, the proportion of participants who recalled definitions accurately is greater in the Strategies plus Definition group and the Definition group as compared to the Control groups across all words. In contrast, the Strategies
group outperformed the control group on only 68% of the words. Moreover, the two definition groups recalled more definitions than the Strategies group on 89%-100% of the words after reading the treatment passages. These results replicate findings reported above with students, both analyses showing superior performance learning vocabulary words by the groups who directly practiced meanings of the words.

On the transfer task, results were quite different (see Table 5.6). A greater proportion of participants in the control group outperformed participants in all treatment groups on three of the seven words, and there were three additional words that favored the control group over at least one of the intervention groups. These findings are consistent with those reported above showing no differences between groups on the transfer task. These proportions also reflect the weaker performance of the Strategies group in learning definitions compared to the other treatment groups.
Table 5.6

Proportion of Students Recalling Definitions Correctly for Each Word Across Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control (C) Treatment Groups

<table>
<thead>
<tr>
<th></th>
<th>S + D</th>
<th>S</th>
<th>D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Text Reading 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperament</td>
<td>.45</td>
<td>.10</td>
<td>.40</td>
<td>.10</td>
</tr>
<tr>
<td>Component</td>
<td>.55</td>
<td>.20</td>
<td>.50</td>
<td>.20</td>
</tr>
<tr>
<td>Empowered</td>
<td>.55</td>
<td>.00</td>
<td>.70</td>
<td>.20a</td>
</tr>
<tr>
<td>Logistical</td>
<td>.27</td>
<td>.10</td>
<td>.40</td>
<td>.00</td>
</tr>
<tr>
<td>Sociodramatic</td>
<td>.36</td>
<td>.10</td>
<td>.50</td>
<td>.00</td>
</tr>
<tr>
<td><strong>Text Reading 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shun</td>
<td>.64</td>
<td>.10</td>
<td>.50</td>
<td>.00</td>
</tr>
<tr>
<td>Impediments</td>
<td>.36</td>
<td>.00</td>
<td>.30</td>
<td>.10a</td>
</tr>
<tr>
<td>Urgency</td>
<td>.55</td>
<td>.40</td>
<td>.50</td>
<td>.40</td>
</tr>
<tr>
<td>Barrier</td>
<td>.91</td>
<td>.80</td>
<td>.80</td>
<td>.40</td>
</tr>
<tr>
<td>Cast</td>
<td>.73</td>
<td>.60</td>
<td>.80</td>
<td>.00</td>
</tr>
<tr>
<td>Reprimanded</td>
<td>.55</td>
<td>.50</td>
<td>.70</td>
<td>.30</td>
</tr>
<tr>
<td>Locus</td>
<td>.82</td>
<td>.70</td>
<td>.80</td>
<td>.20</td>
</tr>
<tr>
<td><strong>Text Reading 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manuscript</td>
<td>.82</td>
<td>.80</td>
<td>1.00</td>
<td>.30</td>
</tr>
<tr>
<td>Cursive</td>
<td>1.00</td>
<td>.50</td>
<td>1.00</td>
<td>.50</td>
</tr>
<tr>
<td>Advocated</td>
<td>1.00</td>
<td>.50</td>
<td>.60</td>
<td>.20</td>
</tr>
<tr>
<td>Exclusive</td>
<td>.82</td>
<td>.40</td>
<td>.60</td>
<td>.30</td>
</tr>
<tr>
<td>Proffer</td>
<td>.82</td>
<td>.30</td>
<td>.60</td>
<td>.00</td>
</tr>
<tr>
<td>Legibly</td>
<td>.64</td>
<td>.60</td>
<td>.60</td>
<td>.30</td>
</tr>
<tr>
<td>Facilitate</td>
<td>.73</td>
<td>.40</td>
<td>.50</td>
<td>.30</td>
</tr>
<tr>
<td><strong>Transfer Text</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenomena</td>
<td>.00</td>
<td>.30</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Nativists</td>
<td>.18</td>
<td>.30</td>
<td>.10</td>
<td>.40ab</td>
</tr>
<tr>
<td>Preliminary</td>
<td>.45</td>
<td>.10</td>
<td>.20</td>
<td>.30ab</td>
</tr>
<tr>
<td>Acuity</td>
<td>.09</td>
<td>.10</td>
<td>.00</td>
<td>.30ab</td>
</tr>
<tr>
<td>Entities</td>
<td>.09</td>
<td>.10</td>
<td>.10</td>
<td>.10b</td>
</tr>
<tr>
<td>Inanimate</td>
<td>.46</td>
<td>.60</td>
<td>.40</td>
<td>.70ab</td>
</tr>
<tr>
<td>heritage</td>
<td>.18</td>
<td>.30</td>
<td>.10</td>
<td>.20b</td>
</tr>
</tbody>
</table>

Note. S+D = Strategy plus Definition Treatment; S = Strategy Treatment; D = Definition Treatment; C = Control treatment.

a Control Group proportion exceeds that of Strategy Group proportion
b Control Group proportion exceeds that of at least one treatment group
Spelling.

After participants had read each passage for the second time and taken the comprehension question and CLOZE tests but before they had seen the target words in the definition test, they were asked to spell the target vocabulary words. The researcher stated each word aloud and asked the participants to write the word. After participants had written all of the target words, the researcher looked at the words to ensure that the writing was legible. The score was the number of words spelled correctly. The research assistant also reviewed the words to provide reliability in scoring. The research assistant and the researcher had the same scores for all but two participants. The disagreement was resolved by consensus to yield 100% agreement in scoring. Scores were converted to proportions of correctly spelled words based on number of target words per passage.

From the means in Table 5.3, it is evident that students spelled many words correctly after they read the treatment passages (1-3). In fact, many students spelled all the words correctly creating ceiling effects on the spelling measures for each passage. Table 5.7 displays the percentage of participants who reached ceiling for each group across texts. Because of ceiling effects, ANOVAs to compare the groups’ performance across sessions was not conducted. A supplementary analysis was conducted to reduce ceiling effects by summing spelling scores across sessions and to take account of possible differences in vocabulary knowledge among the groups. ANCOVAs were conducted with treatment as the independent variable, Nelson Denny vocabulary scores as the covariate, and spelling accuracy summed across both three and four texts as the dependent measure. Results revealed no significant effects of treatment group, either across the three texts (see Table 5.5), or across the four texts, $F(3,36) = 1.29, p > .05, M = 21.71, SD = 3.8$ (26 words maximum). The covariate contributed significantly with $ps < .01$. The
correlations between spelling scores and the Nelson Denny vocabulary measure were $r = .42 \ p < .01$ (3 sessions), and $r = .51, \ p < .01$ (4 sessions). Findings indicate that differences in memory for the spellings of words were not significantly influenced by the treatments that students received, despite the possibility that students in the treatment groups looked at the spellings of words more than students in the Control group. The significant relationship between vocabulary knowledge and spelling scores may be less surprising given that the Nelson Denny vocabulary test required students to respond by selecting the written forms of words.

Table 5.7

<table>
<thead>
<tr>
<th>Treatment Groups, across Text</th>
<th>Reading 1</th>
<th>Reading 2</th>
<th>Reading 3</th>
<th>Transfer Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + D(^a)</td>
<td>36%</td>
<td>73%</td>
<td>73%</td>
<td>36%</td>
</tr>
<tr>
<td>S(^a)</td>
<td>30%</td>
<td>50%</td>
<td>50%</td>
<td>10%</td>
</tr>
<tr>
<td>D(^a)</td>
<td>40%</td>
<td>50%</td>
<td>70%</td>
<td>0%</td>
</tr>
<tr>
<td>C(^a)</td>
<td>40%</td>
<td>40%</td>
<td>80%</td>
<td>40%</td>
</tr>
</tbody>
</table>

\(^a\) = S+D (Strategies and Definitions Group), S (Strategies Only Group), D (Definitions Only Group), C (Control Group)

**Response to comprehension questions.**

After participants had read each passage for the second time, the researcher presented participants with written, open ended comprehension questions. The researcher directed the participants to answer the questions based on the just read passage. The researcher read the
questions aloud as the participants viewed the written questions. The participants responded to
the questions orally. Each response that was accurate in accordance with the rubric received one
point. The responses were reviewed by the research assistant. Discrepancies in scoring were
resolved through conversation between the researcher and the research assistant. Review of
audiotapes and transcriptions guided these discussions. This provided reliability of scoring for
comprehension questions. Scores were then converted to proportions of correct responses based
on the total possible responses.

Results of the ANOVA revealed no main effect of treatment group (See Table 5.2). There
was a significant main effect of session with participants supplying more accurate responses in
later than in earlier sessions. This can be seen in Figure 5.3. While an interaction effect appears
in Figure 5.3, it is not significant as can be seen in Table 5.2. Mean performance across groups is
reported in Table 5.3. The increased ability to supply more correct responses across sessions may
have occurred because earlier exposure to the task enhanced students’ awareness that memory
would be tested and resulted in their paying increasingly closer attention to the information. This
increase in recall occurred despite the fact that latter passages were more difficult based on their
readability levels.

Although the main effect of treatment fell short of significance, the effect sizes
distinguishing treatment groups from the control group were large in the comparisons of
treatment vs. control means averaged across the three treatment passages for each group, with
Cohen’s $d$s ranging from .80 to 1.06 (see Table 5.3). A supplementary analysis was applied to
performance in this task. Raw comprehension scores were summed across the three treatment
passages and scores were subjected to an ANCOVA with Nelson Denny vocabulary scores as the
covariate to control for possible differences among the groups on this measure. Results revealed
a significant main effect of treatment (see Table 5.5). Also the covariate was significant, \( p < .01 \). Post hoc pairwise comparisons using the Bonferroni adjustment revealed that each of the treatment groups significantly outperformed the control group (all \( ps < .05 \)) but did not differ from each other (\( ps > .05 \)). These findings show that the treatment groups did comprehend the passages better than the control group during the intervention sessions, perhaps because there was more attention spent on the meanings of vocabulary words in relation to the passages. Although the overall mean comprehension score was low, Figure 5.3 shows that means of the intervention groups improved substantially over the sessions. The mean of the Control group did not improve until the transfer task.

![Figure 5.3](image-url)

**Figure 5.3**
*Mean Proportion of Accurate Responses to Comprehension Questions by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control (C))Treatment Groups, across Texts*

**Memory for missing target words in the CLOZE task.**

After the second reading of each passage and after students had answered the comprehension questions, they were handed a written copy of the passage with the target words deleted and replaced by blank lines. Participants were directed to write the missing words on the
lines. The number of correct target words written on the blank lines was scored. Slightly misspelled target words that preserved phonology were accepted as correct. The research assistant rescored all CLOZE tasks to provide reliability. There was 100% agreement in scoring. Scores were then converted to the proportion of correct responses based on the total possible correct responses.

An ANOVA was conducted on mean performance of the groups. A significant main effect of treatment group was detected (see Table 5.2). Mean performance is reported in Table 5.3 and displayed in Figure 5.4. Pairwise comparisons using a Bonferroni adjustment indicated that the three intervention groups were equally successful in completing CLOZE sentences, and each group inserted significantly more target words than the control group. These findings support the hypothesis that participants in the intervention groups would learn more unknown words than the control group and that their word learning would impact comprehension. This is based on the assumption that because the words omitted were the target vocabulary words, and because they were omitted in the context of the passage, CLOZE performance in this study can be regarded as both a measure of word learning and comprehension (Greene, 2001; Simpson & Randall, 2000).

The ANOVA also revealed a main effect for session and a significant interaction between treatment and session. From Figure 5.4 it is evident that the intervention groups outperformed the control group on the three passages that were studied during treatments. However their performance dropped on the transfer task to a level even below that of the control group. Results of this task resembled that on the definition recall task, with both tasks showing that the participants in the intervention groups outperformed control participants during training sessions but the vocabulary learning methods taught during training did not transfer when participants
read the passages by themselves without guidance from the experimenter. This may be less surprising in the case of the Definitions group because students were not provided with any definitions to help them as they were during the intervention. However, the groups taught strategies were expected to benefit on the transfer task by applying the strategies independently, but they did not. It may be that more practice using strategies was needed. It is also apparent from Figure 5.4 that while the intervention groups outperformed the Control group, the intervention groups did not continue to progress during the three training texts. For the Strategies plus Definition and the Strategies groups, performance was increased from the first to the second passage but then dropped slightly for the third passage. The Definition group performed similarly throughout the three training passages. The lack of steady improvement may have been suppressed by effects as scores were very high.

Figure 5.4
*Mean Proportion of Correct Vocabulary Words Inserted in the Treatment and Transfer CLOZE Passages by the Strategies plus Definition (S+ D), Strategy Only (S), Definition Only (D), and Control Groups*

A supplementary analysis using ANCOVA was conducted, with treatment group as the independent variable, scores on the CLOZE passages summed across the three treatment sessions
as the dependent variable, and Nelson Denny vocabulary as the covariate. Results are reported in Table 5.5. Vocabulary scores explained significant variance ($p < .005$). Bonferroni comparisons confirmed the above analysis showing that even with vocabulary differences among the groups controlled, the three treatment groups performed equivalently ($ps > .05$) and each outperformed the control group ($p < .001$) in completing the CLOZE tests.

**Definition use.**

During the Strategies plus Definition and Definition interventions, on text passages one to three, definitions of target words were provided. As each definition was presented, participants were prompted to use the definition to demonstrate understanding of the word in the sentence. The prompt was: “Use the definition. What does this sentence mean?” Participants needed to verbally use the definition to demonstrate adequate understanding of the word as it was used in the sentence. The use of the same scripted prompt provided consistency in eliciting responses. Participants were monitored in their use of these definitions to aid in understanding unknown words and their meanings in the text. Responses were recorded by the researcher as the participants spoke aloud their thought processes during the interventions. The proportion of definitions that participants used adequately and independently to correctly understand the words in the passage were calculated. Proportions were the correct number of definitions used divided by the total number of target words to be learned per passage. Participants’ responses were compared to the definitions on the Definition Scoring Rubric (Appendix J.) The definitions needed to incorporate all of the components of the definition detailed in the rubric. The audiotapes were reviewed by the researcher and the research assistant to ensure reliability of scoring and inclusion of all components of each definition. Any discrepancies were resolved by listening to the tapes and coming to consensus. The scores were then converted to proportion of
definitions used correctly based on the total number of definitions per passage. Mean scores are reported in Table 5.3.

An analysis of variance was conducted with treatment group (Strategies plus Definition vs. Definition only) and text passage (1-3) as the independent variables and definition use as the dependent measure. There was a significant main effect for treatment group (see Table 5.2). The Strategies plus Definition group was able to use significantly more definitions correctly to aid their understanding of target words than the Definition group. There was a main effect for session. There was also a significant interaction between treatment and session. From Figure 5.5 it is apparent that the Strategies plus Definition group showed an increase in the use of definitions from Passage 1 to Passage 2 whereas the Definition group did not show an increase until Passage 3. These results indicate that during the first two sessions, training in the use of strategies combined with definitions enabled participants to make earlier and better use of definitions compared to training in definitions alone. However, during the third session, the Definition group caught up to the other group, indicating that the Definition group took longer to learn how to apply definitions to explain the meanings of words in their sentence contexts. The Strategies plus Definition group may have benefited by the attention directed at combining context with the use of definitions and this is why learning occurred earlier during the sessions.
The above analysis was repeated as an ANCOVA to verify findings when vocabulary knowledge of the groups was controlled. This analysis included two independent variables, definition treatment group (S+D vs. D) and treatment session (1-3). The dependent measure was the proportion of definitions used accurately and completely. Results confirmed the above analysis. The adjusted means indicated that the Strategies plus Definitions group and the Definitions group performed similarly on both the first and third passages. They differed dramatically on the second passage with scores improving for the Strategies and Definitions group and scores declining slightly for the Definitions group. As suggested above, these findings indicate that the Strategies plus Definitions group learned to apply definitions in explaining the meanings of target words in context earlier during the intervention than the Definitions group did.

In an additional ANCOVA, again controlling for vocabulary knowledge, definition use was summed across the three passages instead of using proportions. Results of this ANCOVA confirmed the superior performance of the Strategies plus Definition group over the Definition
only group. Results are reported in Table 5.8. The vocabulary covariate explained significant variance in the analysis ($p < .05$).

Table 5.8

<table>
<thead>
<tr>
<th>Outcome*</th>
<th>S+D $M (SD)$</th>
<th>D $M (SD)$</th>
<th>S $M (SD)$</th>
<th>F</th>
<th>Partial Eta$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition Use</td>
<td>12.64 (2.30)</td>
<td>9.20 (1.75)</td>
<td>9.60*</td>
<td>9.60*</td>
<td>.35</td>
</tr>
<tr>
<td>Strategy Use</td>
<td>12.27 (3.26)</td>
<td>8.60 (3.53)</td>
<td>4.27**</td>
<td>4.27**</td>
<td>.19</td>
</tr>
</tbody>
</table>

Note. *$p < .001$; **$p = .053$.

Strategy use.

After reading the passage for the first time, participants were asked to identify any words that they did not know. During the interventions, two of the groups, Definition plus Strategies and the Strategy groups, were taught to use strategies to determine the meanings of the target words plus any additional words that the participant had identified as unknown. These strategies included using context clues, morphological cues and syntactic clues to determine meanings in the texts. Participants’ use of these strategies was monitored. The number of times that participants independently and correctly used strategies to learn unknown/target words was recorded by the researcher as the participants spoke aloud their thought processes. The score was not the number of strategies used but rather the number of words that were learned using strategies. Participants demonstrated use of strategies to learn words in the following manner. They were prompted to use the strategies chart to find context clues, related words and their parts (morphological clues), and to consider the function of the word in the sentence. After using these clues, participants were prompted to deduce the meaning of the word. During this task,
participants were asked to speak aloud what they were thinking as they used the clues to deduce meaning. If participants were silent, the researcher asked them to say what they were thinking. Participants’ responses were scored as accurate by comparing responses to the Word Learning Chart (Appendix H.) and the content of the passage.

The audiotapes were reviewed by the researcher and the research assistant to ensure reliability of scoring. Any discrepancies were resolved by listening to the tapes and coming to consensus. The scores were then converted to proportion of words whose meanings were figured out correctly by using strategies based on the total number of words identified as unknown.

An ANOVA was conducted with treatment (Strategies plus Definition vs. Strategies Only) and intervention session (1-3) as the independent variables. The dependent measure was the proportion of unknown words figured out correctly using at least one strategy. Test statistics and mean performance are reported in Tables 5.2 and 5.3. There was a significant main effect of treatment group. The Strategies plus Definition group accurately and independently applied strategies to learn more target words and words identified as unknown compared to the Strategies group. There was no significant effect for session and no significant interaction effect. This can be seen in Figure 5.6. These results indicate that training students to combine definitions with strategies to learn the meaning of unknown words was more effective for word learning than training students in the use of strategies alone. Perhaps definitions functioned as a scaffold to verify that participants were using the strategies correctly, or perhaps the definitions reinforced the learning that took place while the strategies were being used. Another possible explanation suggested by Graves (1987) is that word learning benefits more from a variety of methods rather than just one method.
A supplementary analysis was conducted on the strategy use measure. Mean proportions were compared in an ANCOVA with vocabulary knowledge as the covariate. The independent variables were and the two treatment groups (Strategies plus Definition and Strategies) and sessions (sessions 1 – 3). In contrast to the above analysis, the main effect of treatment fell short of significance, with \( p = .07 \). These findings indicate that when mean performance was adjusted to control for differences in group members’ vocabulary knowledge, the benefit of combining the two interventions was less apparent. An additional ANCOVA also controlling for vocabulary knowledge was performed summing strategy use across the three texts. In that analysis, the Strategies plus Definition group demonstrated overall greater use of strategies than the Strategies group demonstrating the benefit of strategies and definitions combined.

Figure 5.6
*Strategy Use by Strategies plus Definition (S + D) and Strategies (S) Treatment Groups, across Sessions*

**Feedback during sessions.**

After participants read the passage for the first time, they received intervention specific to their group. The Strategies group used specific strategies to learn words, the Definition group worked with definitions, the Strategies plus Definition group used a combination of strategies
and definitions, and the Control group responded to tangential questions as they discussed the passage. The intervention groups received modeling and coaching on the use of their specific treatments. Feedback was provided to all groups. To verify the types of feedback that were provided, a stratified random sample of 12 participants, 3 sessions from each group covering all three sessions, were reviewed to assess type of feedback. Each participant had one session sampled. Each instance of feedback was tallied according to type. Because the sample was small, the tallies were not subject to analysis of variance. Means, standard deviation and range were calculated. These results appear in Table 5.9

Table 5.9

<table>
<thead>
<tr>
<th>Outcome</th>
<th>S+D M (SD)</th>
<th>S M (SD)</th>
<th>D M (SD)</th>
<th>C M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrective Feedback Range</td>
<td>10.33 (6.66)</td>
<td>2.67 (2.52)</td>
<td>3.00 (1.00)</td>
<td>1.00 (1.00)</td>
</tr>
<tr>
<td>Positive Reinforcement Range</td>
<td>11.33 (3.51)</td>
<td>13.67 (9.01)</td>
<td>6.67 (1.52)</td>
<td>4.33 (1.15)</td>
</tr>
<tr>
<td>Instruction Range</td>
<td>28.00 (13.08)</td>
<td>22.67 (18.90)</td>
<td>9.00 (4.36)</td>
<td>4.00 (3.00)</td>
</tr>
<tr>
<td>Generic Comments Range</td>
<td>10.33 (7.57)</td>
<td>4.33 (3.21)</td>
<td>1.33 (1.15)</td>
<td>19.67 (17.47)</td>
</tr>
</tbody>
</table>

Note. Means reflect feedback received by three students randomly selected from each group across the three intervention sessions.

The three intervention groups received more corrective feedback, positive reinforcement and instruction than the control group while the control group received more generic comments than the intervention groups. This is evident in Table 5.9 and in Figure 5.7. Also the Strategies
and the Strategies plus Definition groups received more instructional comments than the Definition and the Control groups. Mean scores on other feedback measures were more similar across groups. That the Control group received more generic comments was expected because the instructor interacted with students about topics unrelated to the vocabulary learning treatments. It was also expected that the Strategies plus Definition and Strategy groups would need more instruction in the use of strategies. With three different strategies to learn and practice, and definitions to consider, it is understandable that participants in the Strategies plus Definition group would need scaffolding. The ranges do indicate that there is overlap in the types of feedback but in general, the above mentioned tendencies prevail. In terms of total amount of feedback the Strategies plus Definition group received the most instances of feedback (95), followed by the Strategies group (80), the Control group (60) and the Definition group received the least amount of feedback (27).

![Figure 5.7](image)

**Figure 5.7**

*Mean Amount of Feedback by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control Treatment Groups*
Analysis of Oral Reading Posttest Measures and Session Duration

Students’ text reading fluency was assessed on the second reading of the passages. Measures included decoding, prosody and reading rate. During the second reading of each passage, the researcher used a running record to record miscues, omissions, and words for which the participants needed help pronouncing.

Decoding words in passages. The decoding score for each passage was the percentage of words decoded correctly. To assess reliability, the audiotapes were reviewed by the researcher and the research assistant. Discrepancies were resolved through discussion while listening to the audiotapes. From means in Table 5.3, it is apparent that decoding scores were very high with grand means ranging from 95% to 99% accuracy, with some participants reading all of the words correctly, thus creating a ceiling effect on the decoding measure. This precluded the conducting of an ANOVA. The percentage of participants who decoded the entire passage correctly can be seen in Table 5.10. On three of the four passages, more participants in the Strategies plus Definition group decoded perfectly as compared to the other groups. Inspection of means across texts showed that accuracy scores declined from Sessions 2 to 4 in the treatment groups whereas mean scores increased from Sessions 3 to 4 in the control group. The decrease in decoding for the intervention groups is understandable as the passages increased in difficulty. The increase by the Control group however, does not support this explanation. It is unclear why the Control group was able to increase their decoding ability with the more difficult passages, although the number of participants in the Control group who were able to decode all words correctly did decline during the more difficult passages.
Table 5.10

*Percentage of Participants Decoding All Words Correctly by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control (C)) Treatment Groups, across Text*

<table>
<thead>
<tr>
<th>Treatment Groups</th>
<th>Reading 1</th>
<th>Reading 2</th>
<th>Reading 3</th>
<th>Transfer Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + D&lt;sup&gt;a&lt;/sup&gt;</td>
<td>36</td>
<td>18</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
<td>10</td>
<td>20</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>D&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>C&lt;sup&gt;a&lt;/sup&gt;</td>
<td>30</td>
<td>20</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

<sup>a</sup> = S+D (Strategies and Definitions Group), S (Strategies Only Group), D (Definitions Only Group), C (Control Group)

*Prosody.* Participants were assigned a prosody score after they had finished reading the passage for the second time. A rubric was applied by the researcher (Figure 4.1). Reliability for prosody level was assessed in the same manner as decoding. From mean scores across sessions in Table 5.3, it is apparent that scores were close to ceiling on the prosody measure, with means ranging from 3.5 to 3.9 (4 maximum). This precluded the conduct of an ANOVA. High prosody levels are not surprising since students were reading the passages for the second time. Many participants used proper phrasing, preserved author intent, and read with expression, thus scoring at the highest level of prosody. The percentage of participants with the highest level of prosody appears in Table 5.11. As on the decoding accuracy measure, more participants in the Strategies plus Definition Group achieved the highest level of prosody as compared to the other groups.

To reduce ceiling effects and to control for any differences in vocabulary knowledge between treatment groups, an ANCOVA was conducted on prosody scores that were summed
across the sessions with treatment as the independent variable and Nelson Denny vocabulary scores as the covariate. The main effect of treatment was not significant, $F(3,36) = 1.25$, $p > .05$, $M = 11.07$, $SD = 1.2$ (16 maximum). The covariate did contribute, $p < .001$. This indicates that the treatment conditions did not exert any differential influence on students’ ability to read the passages fluently.

Table 5.11

*Percentage of Achieving the Highest Level of Prosody by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control (C) Treatment Groups, across Text*

<table>
<thead>
<tr>
<th>Treatment Groups</th>
<th>Text 1</th>
<th>Text 2</th>
<th>Text 3</th>
<th>Transfer Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + D$^a$</td>
<td>82</td>
<td>100</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>S$^a$</td>
<td>80</td>
<td>70</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>D$^a$</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>C$^a$</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

$^a = S+D$ (Strategies and Definitions Group), S (Strategies Only Group), D (Definitions Only Group), C (Control Group)

**Reading Time and Session Duration.** Two measures of time were recorded, how long it took students to read the text passages orally the second time they read them, and the duration of each of the three sessions. Reading rate was calculated by dividing the number of words in each passage by the seconds taken to read the passage. Reliability of reading rate was assessed by comparing researcher noted time spent reading to the time spent reading on the Smart Pen. Discrepancies were resolved by listening to the audiotape and re-measuring time spent. Repeated
measures ANOVAs were conducted with treatment and text passage as independent variables and reading rate and session duration as the dependent measures.

Results of the ANOVA for reading rate revealed no main effect of treatment group (see Table 5.2). The treatment groups did not significantly differ from each other nor from the control group in the amount of time that they took to read the passages. This may be because they were reading the passage for the second time. As can be seen in Figure 5.8 there was a main effect for text passage with all groups reading the second passage more rapidly compared to the other passages (see Table 5.3). Faster reading of Passage 2 than Passage 1 may have resulted from prior oral reading practice on the first passage. Faster reading on Passage 2 than 3 and 4 may have resulted from the difference in readability favoring Passage 2 (10.8 readability grade equivalent) over Passage 3 (13 readability) and Passage 4 (16 readability). Thus the more difficult passages may have slowed down reading rate. There was no significant interaction effect for reading rate. Test statistics are reported in Table 5.2, and means and standard deviations appear in Table 5.3.
In order to determine whether the groups spent the same amount of time during the three treatment sessions, the time that each session started and ended was recorded. Elapsed time was the measure of session duration. Reliability for session duration was assessed in the same manner as reading rate but in this case results centered on the whole session, not just the second reading of the text.

Results of the ANOVA for session duration revealed no main effect for treatment group (see Table 5.12). The treatment groups did not significantly differ from each nor from the control group in the amount of elapsed time of sessions. This indicates that time spent in treatment was not a factor in participants’ ability to respond to posttest measures. Results of the ANOVA revealed a significant main effect for duration of session. It is evident from Figure 5.9 that Session 2 was shorter than both Sessions 1 and 3. These results are not surprising. During Session 1, participants needed to review and sign the consent form, respond to the demographic questions, complete the Vocabulary subtest of the Nelson Denny Reading Test, and then participate in the experimental tasks. During Session 2, students only completed the experimental
tasks. During Session 3, participants engaged in the experimental tasks and then completed the transfer task. There was no significant interaction between treatment and session. Test statistics are reported in Table 5.12, and means and standard deviations appear in Table 5.13.

![Figure 5.9](image)

*Figure 5.9*

*Session Duration in Proportion of One Hour by Strategies plus Definition (S + D), Strategies (S), Definition (D) and Control (C) Treatment Groups, across Session*

**Table 5.12**

*Analysis of Variance of Session Duration by Strategies plus Definition (S+D), Strategies Only (S), Definitions (D), and Control (C), Treatment Groups*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Partial Eta²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session Duration (in minutes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment (T)</td>
<td>3</td>
<td>1187427.58</td>
<td>1.57 ns</td>
<td>.11</td>
</tr>
<tr>
<td>Error</td>
<td>37</td>
<td>758799.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sessions (S)</td>
<td>1.78</td>
<td>8278200.64</td>
<td>35.24*</td>
<td>.49</td>
</tr>
<tr>
<td>S x T</td>
<td>5.31</td>
<td>177611.98</td>
<td>.76 ns</td>
<td>.06</td>
</tr>
<tr>
<td>Error</td>
<td>65.53</td>
<td>234900.51</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* *p < .001
Table 5.13

Means, Standard Deviations and Effect Sizes on Session Duration

<table>
<thead>
<tr>
<th>Session Duration (in minutes)</th>
<th>Session 1 M(SD)</th>
<th>Session 2 M(SD)</th>
<th>Session 3 M(SD)</th>
<th>Grand Mean M(SD)</th>
<th>ES (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + D</td>
<td>0:52 (0:08)</td>
<td>0:42 (0:10)</td>
<td>0:51 (0:11) a</td>
<td>0:48 (0:10)</td>
<td>.89</td>
</tr>
<tr>
<td>S</td>
<td>0:48 (0:08)</td>
<td>0:37 (0:09)</td>
<td>0:54 (0:10) a</td>
<td>0:46 (0:09)</td>
<td>.71</td>
</tr>
<tr>
<td>D</td>
<td>0:47 (0:09)</td>
<td>0:37 (0:12)</td>
<td>0:52 (0:15) a</td>
<td>0:45 (0:12)</td>
<td>1.00</td>
</tr>
<tr>
<td>Control</td>
<td>0:45 (0:04)</td>
<td>0:32 (0:07)</td>
<td>0:44 (0:12) a</td>
<td>0:40 (0:08)</td>
<td></td>
</tr>
</tbody>
</table>

Note. Numbers of students were: N=11 (S+D, Strategies plus Definition); N=10 (S, Strategies), N=10 (D, Definitions), N=10 (C, Control)

a Includes time for transfer task

Correlations between Selected Variables

Pearson product moment correlation coefficients were computed to assess relationships between the following measures: pretests (Nelson Denny vocabulary pretest, pretest reading rate, and bilingual status), and outcome measures summed across passages (definition recall, spelling, CLOZE, response to comprehension questions, and number of unknown words identified).

Values are reported in Table 5.14.

From Table 5.14, it is apparent that the three pretest measures were strongly correlated, indicating strong relationships between students’ vocabulary knowledge, their reading rate, and their status as monolinguals or bilinguals. Bilingual students showed poorer performance in vocabulary and reading rate than monolingual students.

Correlations revealed that some of the posttests were more strongly related than other posttests. The definition recall, cloze, and comprehension question measures were strongly and significantly correlated, with rs ranging from .54 to .68. CLOZE was thought to assess both vocabulary learning and reading comprehension, so the strong correlations are not surprising and
support this interpretation of CLOZE performance (Greene, 2001; Simpson & Randall, 2000).
The highest correlations were between definition recall and CLOZE and between definition recall and comprehension. The ability to understand the meaning of individual words in a text is an important foundation for comprehension (Nagy, 1988), hence the strong correlation between definition recall and the two comprehension measures. Spelling was moderately related to the CLOZE and comprehension question measures but not to the definition recall measure. Although the CLOZE required students to write the target words, the other two tasks were performed orally so spelling was not a likely mediator in the latter cases.

In contrast, the task requiring students to identify unfamiliar words in the passages was not significantly correlated with any of the other posttests. However, it was strongly predicted by the vocabulary pretest and reading rate measures, indicating that students who pointed out more unknown words had lower vocabularies and were slower readers. The moderate correlation with bilingualism indicates that some of this may have resulted from lower proficiency in English.

The pretests were predictive of some posttest scores. Vocabulary and reading rate predicted memory for the spellings of target words in the passages. Vocabulary predicted performance on the comprehension questions. The vocabulary pretest was a written test and participants needed to be able to access the meanings of words by their orthographic form alone. This suggests the importance of spelling ability for vocabulary learning. In contrast, vocabulary pretest scores were not significantly correlated with definition recall and CLOZE scores which is puzzling, given that both the CLOZE and definition tasks assessed vocabulary learning in the experimental tasks. The experimental interventions produced significant differential effects in both tasks. Perhaps effects of the interventions were sufficient to overcome and eradicate effects of individual differences in general vocabulary knowledge on these measures.
Table 5.14

*Selected Correlations (N=41)*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nelson Denny Vocabulary Pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pretest Reading Rate</td>
<td>.61**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bilingual Ability of Participant</td>
<td>.53**</td>
<td>.60**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Total Definitions Recalled ^a</td>
<td>.30</td>
<td>.26</td>
<td>-.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Total Number of Unknown Words Identified</td>
<td>-.53**</td>
<td>-.61**</td>
<td>.44**</td>
<td>-.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Spelling ^a</td>
<td>.51**</td>
<td>.36*</td>
<td>-0.27</td>
<td>.29</td>
<td>-.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>CLOZE ^a</td>
<td>.25</td>
<td>.27**</td>
<td>-.18</td>
<td>.68**</td>
<td>-.12</td>
<td>.48**</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Response to comprehension questions ^a</td>
<td>.38*</td>
<td>.17**</td>
<td>.07</td>
<td>.61**</td>
<td>-.01</td>
<td>.37</td>
<td>.54**</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>44.34</td>
<td>106.30</td>
<td>.43</td>
<td>3.80</td>
<td>2.32</td>
<td>16.78</td>
<td>14.68</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>19.87</td>
<td>27.16</td>
<td>.50</td>
<td>4.92</td>
<td>3.09</td>
<td>2.19</td>
<td>4.02</td>
</tr>
</tbody>
</table>

*Note.* Numbers in leftmost column correspond with row labels. *p < .05; **p < .01.*

^a Totaled across the four passages of text.
Synopsis of Participants’ Reactions during the Intervention

Review of notes and audiotapes revealed several themes regarding participants’ reaction to the study. For one, participants in the intervention sessions stated that they found the sessions and strategies useful. As a second theme, participants in the control group struggled with the posttest measures. A third theme was participants in the intervention groups asked for help during the transfer task. The final theme was participants who did not complete the study indicated that they found many aspects of the tasks challenging.

During intervention, some participants in the Strategies group and the Strategies plus Definition group made comments relating words to cognates in their native language. For example, they identified facilitate with “fácil” Spanish for easy. Some participants in the Definition group remarked that they liked the definitions that were provided better than dictionary definitions because sometimes there were too many definitions in the dictionary and sometimes these definitions did not make sense to them. Some participants in the Strategies plus Definition group stated that examining the context made it easier to understand the supplied definitions, thus revealing the advantage of processing both sources of information. Several participants were excited when their use of strategies yielded a result similar to the supplied definition. Some participants in the intervention groups came to the second and third sessions with reports of using the strategies while completing readings for their education courses and other courses. Some asked why these methods were not taught all the time. Others stated that they would now use the definitions in their textbooks and wished that all textbooks had definitions.

During posttest measures, participants in the intervention groups sometimes struggled with tasks. A comment that typifies students’ response to comprehension questions is: “I know I
just read that, but I cannot remember it now.” When asked for definitions a typical response of a struggling participant was: “We talked about that word \( cast \), it means something like looking down, not happy about what he saw.”

During the transfer task some participants in the intervention group asked questions such as “There are no definitions?” “We’re not gonna talk about this? “You want me to read it by myself?”

When participants completed the three sessions, they asked if they could continue with more sessions or contact the researcher if they needed further assistance. These are some examples of how participants valued the interventions. Another sign that intervention group participants’ valued the sessions was the concern many expressed when they needed to reschedule. When rescheduling was required, participants apologized for the inconvenience and texted or emailed that they really wanted to continue and could they please reschedule.

Participants in the control group enjoyed reading the passages and discussing the tangential questions. They also struggled during posttest tasks. Their comments in general were slightly different from the comments of participants in the intervention groups. Instead of stating, “I just read that,” they would indicate that they did not remember reading the information that they were questioned about in the passage. During definition recall there was limited specific reference to the passages. In general participants in the control group displayed less enthusiasm and confidence during the posttests as compared to participants in the intervention groups. Some participants in all groups asked if there were choices of words for the CLOZE passage. One remarked that when she had to fill in the blanks for tests, there were words to choose from that helped her fill in the blanks. Participants in all groups approached the spelling and rereading in a similar manner. They just did it.
There were seven participants who started the study but did not complete it. They had been assigned to the following treatment groups: one in the Strategies plus Definition group and two in each of the other groups. When presented with the first task, the vocabulary pretest, one participant said: “I have to do how many words? Do I have to do all of them?” She had a similar complaint for each succeeding task and did not return for a future session. She also did not respond to emails. The other participants who did not complete the study commented that it was a lot of work, the readings were long, they didn’t understand the strategies and or the definitions were confusing.

Results of statistical test and participants’ engagement provide support for the use of definitions and strategies to learn words. There is some support for the impact of that word learning on comprehension. Results do not support the generalization of these skills to independent reading.
CHAPTER 6. Discussion

Summary of Procedures and Findings

The study reported here was conducted to explore methods that would enable community college students to learn unknown words as they read discipline specific academic text. It was expected that the word learning would positively impact reading comprehension. It was also hypothesized that word learning and enhanced comprehension would be evident on a transfer task where participants worked independently. An experimental designed was utilized with 41 participants randomly assigned to one of four groups, Strategies only, Definition only, Strategies plus definition and a control group. Participants met individually with the researcher for three sessions. During all sessions, participants completed several tasks. The first task was to read aloud a specific text passage. While they were reading, decoding, pronunciation of target words, reading rate and prosody were monitored and recorded. After reading each passage, they were asked to identify any unknown words, words whose meaning they did not know. Then the interventions were administered, followed by a second oral reading of the passage. At the end of each passage, posttest measures were administered: response to comprehension questions, CLOZE, spelling and definition recall. In addition to these tasks there were other tasks specific to each session. During the first session, participants completed a pretest (the Vocabulary Subtest of the Nelson Denny Reading Test). They responded to demographic questions, and participated in the first intervention specific to their group. During the second session, participants completed the second intervention. During the third session, participants completed the third intervention and a transfer task.

As stated above, interventions were specific to each group. Participants in the Strategies only group were taught and coached to use strategies such as context clues, morphological clues
and syntactic clues. Participants in the Definition only group were provided with researcher developed definitions. They received modeling and coaching in the use of these definitions to understand the meaning of these words in the passage. Participants in the Strategies plus Definition group received both the strategies and the definition support. Participants in the Control group were prompted to respond to tangential question about the just read text passages. During the transfer task, participants read a passage independently, without support of definitions or coaching from the researcher. The posttest measures were also administered after the transfer task.

Other measures administered assessed strategy use during interventions for the Strategies plus Definition and the Strategies groups, definition use for the Strategies plus Definition and Definition groups, types of feedback supplied to all groups, and duration of sessions. These measures provided insight into participants’ use of the methods taught and the consistency of interventions.

**Word Learning Tasks**

**Definition recall.**

One measure of word learning was definition recall. Participants were presented with target words from each text passage and asked to define the word as it was used in the text that they had just read. It was hypothesized that participants in the three intervention groups would recall significantly more definitions than participants in the Control group and that participants in the Strategies plus Definition group would outperform participants in all other groups. Results partially support this hypothesis. Participants in the Strategies plus Definition and the Definition groups did significantly outperform participants in the Control group. Participants in the Strategies group did not significantly outperform participants in the Control group but there was
a moderately large effect size ($d = .75$). The performance of the Strategies plus Definition group was not significantly different from the Definition group and the Strategies group but again, the effect size of the Strategies plus Definition group ($d = 2.43$) was larger than these groups ($d = 1.95$ for Definition group). When the total number of definitions recalled while controlling for vocabulary was calculated, results supported the superiority of performance of the intervention groups over the control group supplying further support for enhanced word learning for the intervention groups as measured by definition recall.

Review of individual words and word learning by text passage also supported the superiority of word learning by participants in the Strategies plus definition and Definition groups. In general, the common factor of significance was the use of definitions with both the Strategies plus Definition and the Definition groups outperforming the Control group. This may be due to the fact that the task was specifically geared toward teaching definitions explicitly so that the training in definition use aided in ability to recall definitions. This is similar to the results found by Baumann et al. (2003) with participants in the Text Book Vocabulary group outperforming participants in the Context Morphology group on the textbook vocabulary posttest. With more training and a larger sample size, significance may have been reached for the Strategies group over the control group. The Baumann et al. (2003) study did find that students were able to use the context and morphological strategies to learn words when context supported word learning and/or affixes had been taught. That study did include a much longer training period, thirty 45 minute lessons.

It is also possible that without the support of definitions, use of strategies is not sufficient for word learning. Natural text passages may not contain enough contextual cues to support word learning (Beck et al., 2002; Fukkink & de Glopper, 1998). Students need to be familiar with
affixes in order to utilize those cues for word learning (Baumann et al., 2002; Simpson & Randall, 2000). Baumann et al. suggested that future studies use a flexible approach of a combination of strategies and definitions. Participants in the Strategies plus Definition group were prompted to use multiple strategies and definitions flexibly. The mean use of strategies, and definitions was higher for the Strategies plus Definition group than for the groups that only used one method. The conclusion drawn is that although the use of definitions alone may aid in word learning, the combined use of strategies and definitions is a more effective way for students to learn unknown words. A multi pronged approach to word learning has extensive theoretical and research support (Kelly, Lesaux, Kiefer, & Faller, 2010; Pressley and Afflerbach, 1995; Graves, 1987; McKeon & Curtis, 1987; among others). Word learning requires more than just definitional knowledge; it also requires deep knowledge of how and when specific words are used. An integrated use of strategies enables readers to uncover the meaning of words. The following sentence from the second passage offers an example of integrated strategy use. "With a puzzled look on his face, the boy stared at the teacher, then cast his eyes on the children bunched there on the floor, whose limbs could not avoid touching.” To understand the word cast as it was used in the second text passage, a reader would need to use the context clues in the passage that supported the uncomfortable connotation of the word. Determining that cast was used as a verb and not a noun would also assist in uncovering the full meaning. Use of a dictionary would provide several definitions but relation to the context would allow for appropriate choice of dictionary definition. The use of strategies and definitions may assist students in accessing deep word knowledge.
**Identification of unknown words.**

In order to use strategies to learn unknown words, one must first recognize that a word is unknown (Taraban, Rynearson, & Kerr, 2004, Graves, 1987). Thus it was hypothesized that participants in the intervention groups would be able to identify more unknown words than participants in the control group as the intervention progressed. However, many students failed to identify any words as unknown creating floor effects and rendering analysis of variance with repeated measures an inappropriate statistical test. The percentages of students who failed to identify any words as unknown did vary by group and text passage but there was no trend toward better performance with practice. In summing all words across the text passages to eliminate floor effects, analysis of variance on these totals yielded no significant differences among the groups. Participants may have failed to identify more words as unknown because they may have thought they knew the words. They may have known other meanings for the words, or they may have had a sense of the words based on their reading of the text. Participants with more limited vocabularies as measured by the Vocabulary Subtests of the Nelson Denny Reading test did identify significantly more words as unknown than participants with higher scores on that vocabulary test. Thus in working with students with limited vocabularies, use of their ability to identify unknown words may enable them to benefit from strategies in learning those words. Methods to sensitize readers to unknown words is a matter for further research.

**Pronunciation and spelling.**

Memories for pronunciations and spellings provides additional measures of word learning. Participants were able to pronounce most of the target words correctly. This is not surprising as the participants were college students and had all passed or tested out of remedial
reading. There were no significant differences between groups on pronunciation of target words possibly due to ceiling effects.

Ceiling effects also precluded use of repeated measures analysis of variance on the spelling recall measure. Reducing ceiling effects by summing all scores across the text passages yielded no significant differences between groups. Trends in the data do support possible superior performance of the Strategies plus Definition group over the Control group ($d = .92$). There was variability in the number of participants who spelled all words correctly, this variability occurred across text passages and across groups. In general more participants spelled all words correctly for the second and third texts and more participants in the Strategies plus Definition group spelled all words correctly as compared to the other groups. Receiving a spelling test during the first session may have caused students to pay more attention to letters in target words during later sessions. Strategies plus definition students may have looked at spellings more than the other groups as a result of applying strategies and definitions to study the words. As noted above, the spelling posttest measure came after the CLOZE posttest. When students were asked to spell some of the words that they had not supplied for CLOZE, they made the connection to the words that they had not supplied. Some participants even asked for the CLOZE sheet back so that they could write in the words. Of course, their request was not granted.

For both the pronunciation and the spelling measures, it is not surprising that participants performed so well because the target words were orthographically regular. These college students were in at least stage 3 of Chall’s (1983) stages of reading. Participants may not have been in stage 4, multiple viewpoints, but they had certainly mastered the mechanics of reading and therefore were good decoders, enabling them to pronounce most, if not all, of the words. In
accordance with Ehri’s connectionist theory (1998a, 1998b), because students were able to automatically decode and pronounce words, they also retained spellings of these words in memory.

**Comprehension Tasks**

**Response to comprehension questions.**

One measure of comprehension was participants’ response to open ended researcher developed comprehension questions. Participants were prompted to orally recall as much information as they could to questions based on the just read text. While there was no significant main effect of treatment for response to comprehension questions in the ANOVA that compared performance across both treatment and transfer passages (see Table 5.2) large effects sizes were detected which are similar to the mean effect size found by Stahl and Fairbanks (1987) in the ANOVA comprising just treatment texts. In their meta-analysis on the effects of vocabulary instruction on reading comprehension, Stahl and Fairbanks found a mean effect size of .97 demonstrating that students across a variety of settings who received vocabulary instruction performed significantly better on measures of comprehension compared to participants in control groups. In the study reported here, the effect sizes (Cohen’s d) ranged from .80 to 1.06 for the intervention groups on treatment texts as compared to the control group. (See Table 5.3).

During intervention, the mean proportion of correct comprehension responses for the intervention groups on the three intervention texts ranged from .31 to .35. The Strategies plus Definition was the highest performing group. The rate of correct response was low perhaps indicating that this was a challenging task. Support for this being a challenging task was evident in the comments of participants. At least half of the participants across all groups commented at least once on the difficulty of this task. Examples of comments are as follows: “I can’t
remember”, “This is hard”, and “I know I just read that but what was it?” While this was a challenging task for many participants in all groups, the mean proportion of correct responses was much lower for the Control group, .19. Using repeated measures analysis of variance, performance for the intervention groups was not significantly better than the control group, and neither was performance for the intervention groups great, but intervention groups did perform better than the control group.

Additional analysis summing responses to comprehension questions across the treatment passages and using the Nelson Denny Vocabulary subtest as a covariate in ANCOVA did yield significant results with the three intervention groups outperforming the Control group (see Table 5.5). On average, participants in the intervention groups responded correctly to approximately 13 questions out of 40; whereas the mean for the Control group was 6.01 out of 40. Response to comprehension questions on the intervention passages does provide support for word learning impacting comprehension, but the trends in the data and low rate of correct responses suggest that further investigation is indicated. As Baumann et al. (2002) noted, word learning may support comprehension, and their study did provide empirical evidence for this support. It is noteworthy that the present study also provides support for the impact of word learning on comprehension even though it was of much shorter duration than the Baumann et al. study.

**CLOZE.**

CLOZE is a task that measures both word learning and reading comprehension (Greene, 2001; Simpson & Randall, 2000). Analyzes of CLOZE performance provided support for participants’ ability to learn unknown words and for that word learning to impact comprehension. All intervention groups outperformed the control group on the ability to supply missing words on intervention texts. This demonstrates that they had learned the words
sufficiently to use the words in the passages; they were able to supply the words from memory, not from a list, when and where the words were needed. They knew the meanings of the words and how to use them in the passages. Participants in the intervention groups outperformed participants in the control group, but there was no statistical difference between the intervention groups contrary to what was hypothesized. The means and effect sizes for the intervention groups were very similar. The lack of differentiation in performance between groups may signal that some form of word work is better than no intervention.

Of note in the CLOZE task was the significant interaction between treatment groups and sessions. Participants in the Strategies plus Definition, Strategies and Control groups demonstrated the greatest ability to supply missing words on the second text passage. This might be due to the fact that they had practice with CLOZE on the first text, so they were aware of what they needed to do during session two. The passage for session three had a much higher readability level and this may be why performance did not continue to increase. However, the fact that the definition group maintained similar performance on this task across the three intervention passages does seem to rule out the impact of practice. It may be that working with the definition alone was not sufficient for practice to have an effect. The decrease was greater for the control group which did not receive any intervention.

**Fluency, oral reading posttest measures.**

The components of fluency include decoding, reading rate and prosody. Good comprehenders read with fluency (Kuhn & Stahl, 2003). In the study reported here, there were no significant differential effects on any measure of fluency between groups. In fact there were ceiling effects for decoding and prosody. For decoding, more participants in the Strategies plus Definition group achieved ceiling than in the other three groups. In the Strategies group and
Definition group more participants did not always achieve ceiling as compared to the Control group. However, there were large effect sizes for decoding (Cohen’s $d$) with the three intervention groups outperforming the Control group. Thus even though there was not significant support for decoding being impacted by treatment, the overall decoding rates showed trends in the data supporting the impact of word learning strategies on this one component of fluency – decoding.

There were also ceiling effects for prosody. Analysis to reduce ceiling effects did not yield significant results between groups. Examination of means and effect sizes revealed a moderate effect size for the Strategies plus Definition group over the Control group. The effect sizes for the Strategies group and Definitions group were negative and small. In addition, more participants in the Strategies plus Definition group reached ceiling as compared to the other groups. The performance of participants in the Strategies group and Definition group was overall lower than that of the Control group. While there are trends favoring the Strategies plus Definition group over the other groups, this trend is questionable as the range of scores is limited and the variability in performance is negligible. The lower performance of participants in the Strategies group and Definition group is also negligible. One reason why there was no real difference in prosody may be due to the fact that participants were all college students and for this task, they were reading the passage for the second time. The second reading may have enabled participants to read with more prosodic features with the first reading acting as a practice reading. It may be that a more fine grained measure of prosody would be needed to detect differences if any exist.

The third measure of prosody, reading rate, also did not yield significant differences between groups. Examination of means and effect sizes indicated superior performance of the
Strategies plus Definition group over the Control group, but no other differences between groups. The average reading rate of participants in all groups ranged from 125.72 words per minute to 140.09 words per minute. Reading rate for typical individuals beyond fourth grade ranges from 120 to 180 words per minute (Shaywitz, 2003). On average, participants in this study were within that range, albeit at the lower to middle part of that range.

There is support of the impact of word learning on comprehension. Response to comprehension questions and performance on CLOZE provided significant support. While the three fluency measures did not provide significant support for greater comprehension of the intervention groups over the Control group, there are trends in the data that suggest the Strategies plus Definition group had superior performance than the control group.

**Performance during Intervention**

**Definition use and strategy use.**

It was hypothesized that participants in the intervention groups would demonstrate increasingly more definition and or strategy use across texts. The Strategies plus Definition group did demonstrate significantly increased ability to use definitions to aid in understanding text across all three text passages used for intervention. The Definition only group did not demonstrate increased ability until the third text. The Strategies plus Definition group learned to use the definitions more quickly than the Definition only group. It could be that support of the Strategies scaffolded definition learning for participants in the Strategies plus Definition group. Additionally, participants in the Strategies plus Definition group were able to use more definitions overall as compared to the Definition only group. However, the fact that the both groups did learn to use definitions equally well by the third session suggests that the combined use of strategies and definition may be faster, but not necessarily better. Analyses controlling for
vocabulary knowledge confirmed the results noted above, that the Strategies plus Definition group used more definitions overall. A question that remains is whether this difference would hold over more than three sessions. The overall superior performance of the Strategies plus Definition group might be due to the slower learning rate of the Definition group particularly during the second session. The question of whether students will use definitions increasingly more effectively over subsequent sessions also needs to be explored over a longer period of time.

In learning unknown words, the Strategies plus Definition group used more strategies than the Strategies group, but this difference was not significant when participants’ differentiated vocabulary was controlled in repeated measures ANCOVA. When strategy use was summed across sessions, participants in the Strategies plus Definition group did use significantly more strategies overall than the Strategies group. Both groups learned to use more strategies by the third session but the increase was not significant. As in definition use, a combination of strategies and definitions seemed to positively impact word learning performance, in this case by enhancing the use of strategies. Additionally as in definition use, investigations with more sessions may help ascertain the ability of readers to increasingly benefit from strategy use.

During intervention, strategy use was somewhat challenging for participants as some did not understand all the cues. Participants were familiar with context cues, but had difficulty with syntactic cues and especially with morphological cues. (Syntactic awareness is necessary if readers are to have access to syntactic cues (Baumann et al., 2003). As Simpson and Randall (2000) point out, morphological cues are only effective if readers know a variety of affixes. Many of the participants in this study demonstrated limited syntactic awareness and were unfamiliar with the affixes in the target and unknown words.
The fact that after three session participants in the Strategies plus Definition group were able to use definitions to learn on average 74% of unknown words and strategies to learn 77% of unknown words does highlight that the use of strategies and definitions with instructor support, is an effective method for learning unknown words. The Definition group was able to learn 69% of unknown words and the Strategies group 54%. The superiority of the combination of methods is supported by the research here. In a study by Ellison and Boykin (1994), participants who were engaged in cooperative learning of words with definitional and contextual support were able to learn on average 70% of the words. That study was a one time intervention with no instructor support. In the study reported here the participants learned a slightly higher percentage of words. The instructor support and additional intervention sessions may have enabled increased learning.

**Feedback during sessions.**

After participants had finished reading the text passages, they participated in tasks based on their treatment group. They received feedback on the tasks they performed. The types of feedback that participants received were categorized as corrective feedback, positive reinforcement, instruction or generic comment. From a small stratified random sample of intervention sessions, it was revealed that participants in all groups received all types of feedback but the amounts by category did differ. Participants in the Strategies plus Definition group received the most feedback and that feedback was in the category of instruction and corrective feedback, and some positive reinforcement. It is not surprising that this group would have the most feedback because there were more tasks to complete, using both strategies and definitions. The Strategies group had the second highest amount of feedback mainly consisting of instruction and positive reinforcement, and to a lesser extend – corrective feedback. This is as expected
because of the need for instruction in morphological cues and syntactic cues. The Control group had less feedback than the Strategies plus Definition and Strategies groups but more than the Definition group. The feedback for the Control group mainly consisted of generic comments which were related to the tangential discussion prompts. While the above three groups had differing amounts of feedback, the difference was not very large. The Definition group had the least amount of feedback and the amount was much smaller than the three groups mentioned above. The feedback for the Definition group was centered around positive reinforcement and instruction. This could be due to the fact that using definitions was a straightforward task; participants had one definition to use rather than multiple strategies or a combination of strategies and definitions. The differential types of feedback that groups received indicate that intervention during treatment followed protocol. In general, the intervention groups received feedback that supported their learning of the strategies and or definitions. The generic comments to the intervention groups were the kind that would be utilized in tutoring sessions to help participants feel relaxed. The control group received feedback that was not focused on instruction or correction. The few instances of correction or instruction for the control group were to redirect the participants to discussing the tangential prompts.

Session duration.

Sessions were timed to allow for comparison of time spent across groups. There was no significant difference between groups on the amount of time that each session lasted. Even though there were different tasks for each group, the mean times that groups spent during each session were not statistically different. However, the effect sizes for the difference between intervention groups as compared to the control group were large. The greatest amount of time spent in a session was on average, 48 minutes for the Strategies plus Definition group. The
average amount of time for the control group was 40 minutes. If this additional 8 minutes is what is needed for improved word learning and increased comprehension, perhaps that additional time could be considered 8 minutes well spent. In the Kelly, Lesaux, Kiefer, & Faller, (2010) study, teachers did comment on the fact that the vocabulary work did require additional time. The fact that there needs to be time for vocabulary instruction and development is also supported by additional researchers (Baumann et al., 2002; Baumann et al., 2003; Beck et al., 2002; Graves, 1987).

One concern was that time could be a confound because the intervention groups, but not the Control group, would need to spend time learning the strategies and interacting with the text. If the intervention groups spent more time with the text then controls, it could be that simply spending time with the text and not the intervention would be the cause of any differences on posttests. To rule out this possibility in this current study, time spent in sessions was equated by having the Control group spend time in discussion prompted by tangential questions. The analysis of session duration indicated that this feature of the design was accomplished.

There was a significant interaction effect for session duration indicating that for all groups, session two was shorter than session one and session three. This is in alignment with the design in that there were more tasks in the first and third session than in the second session.

**Effects of text passage and interaction effects.**

There were significant effects for text passage on posttest measures of definition recall, response to comprehension questions and CLOZE indicating that there were significant differences between text performance from the first to the fourth text passage. There were also significant interaction effects for definition recall and CLOZE indicating that performance by group varied depending on the text passage. For definition recall, all participants increased their
ability to recall definitions from the first through the third passage, but the intervention groups (Strategies, Definition and Strategies plus Definition) did not sustain that growth on the transfer task. The interaction effect resulted from the control group not only showing continued growth for the first three passages, but that growth also continued for the transfer task. The growth seen by all groups during the first three text passages may have been due to the fact that participants knew that they would be expected to define words after the first passage and that may have sensitized them to the task. Differentiated performance on the transfer task will be discussed below in the section on performance during transfer tasks.

Participants in the three intervention groups also demonstrated increasing ability to supply accurate responses to comprehension questions from the first through the fourth text passage. Participants in the Control group demonstrated diminished ability on the second text but ability then increased on the third and fourth passages. In fact, the performance of the Control group surpassed performance of the other groups on the transfer passage although this was not a significant interaction effect. Of note is that even though one of the readability measures indicated that the transfer passage was more difficult than the other passages, all of the groups demonstrated better comprehension of this passage than the other passages as measured by their response to comprehension questions (see Figure 5.3). This suggests that readability values were not indicative of passage comprehension difficulties.

As for definition recall, the intervention groups may have been sensitized to the task by the first passage thus increasing performance. However, this does not then explain the performance of the Control group. The diminished performance of the control group on the second passage may be that this task required more than just defining a word. Responding to comprehension questions is an active process that requires more of a cognitive load than defining
words (Simpson & Randall, 2000; and Mezynski, 1983). Without the support of intervention, it may have taken the Control group longer to learn to respond accurately to comprehension questions. Differentiated performance on the transfer task will be discussed below.

Performance during the CLOZE task did not follow the pattern above for the intervention groups. Participants in the Definition group did not show increasing ability to supply missing words. Performance in the Definition group remained about the same for the first three passages and declined dramatically for the transfer task. Participants in the Strategies plus Definition and Strategies groups demonstrated increased performance from the first to second passage, a slight decrease during the third passage and a sharp decrease during the transfer task. (This decrease is explained below in the section on transfer tasks.) The control group demonstrated an increase from the first to the second passage, a large decrease during the third passage, and relatively similar performance during the transfer task with the effect that the Control group performed much better on the transfer task than the intervention groups. It is unclear why there was limited improvement in performance on this task. It may be that this was a challenging task for participants. Many participants asked where the word choices were for the missing words. Participants explained that they had performed this task during high school or on tests, but they had done so with four words being supplied as choices to use to fill in the blanks.

**Participants’ engagement during training.**

During training sessions, participants, stayed on task without prompting. Participants used the strategies in a variety of ways, and they did not always use the strategies in order. Participants in the Strategies plus Definition group used the definitions in conjunction with the strategies. As Fukkink (2005) noted, there is no invariable way to learn unknown words while
reading. Process oriented methods that enable readers to flexibly use strategies as they interact with text allows readers to use whatever information is available.

All participants came to sessions ready to work, apologizing if they were even a few minutes late. Participants in the intervention groups reported using the strategies with their course readings. One participant asked why these methods were not taught in college courses. Participants in the Control group did not report using strategies but they were enthusiastic during readings. Participants related the readings to work that they were doing in their education courses. Most participants demonstrated a high level of motivation during posttest and were genuinely interested in the readings. This supports the use of discipline specific text to engage students in the reading process (Shanahan, Shanahan, & Misischia, 2006).

Performance on Transfer Tasks

It was hypothesized that word learning and its impact on comprehension would transfer to a novel task where participants would read a passage independently. The studies by Baumann et al. (2002) and Baumann et al. (2003) yielded significant results on some transfer tasks. In the study reported here, there were no significant differences on transfer tasks. In fact in most instances participants in the Control group performed better than participants in the intervention groups on the transfer task. There were negative moderate to large effect sizes on the transfer task on some parts of all posttest measures except the ability to identify unknown words. In response to comprehension questions and CLOZE the Control group out performed all three intervention groups. There was superior performance by the Control group over the Strategies and Definition groups on definition recall, decoding and prosody. On pronunciation of target words the Control group outperformed the Definition group. Differences were all non significant but effect sizes were moderate to large. The trends in the data do suggest that without the support
of intervention, participants were not able to learn words and there was no support for enhanced comprehension. Some participants asked for the definitions, and or whether we were going to work on the passage together. The transfer text had a readability of 16; this was higher than the other training passages where readability ranged from 10.3 to 13. Participants may not have been able to use the strategies in the more challenging passage. In their work with elementary school age children, Beck et al. (2002) and Baumann et al. (2003) suggested that interventions need to be longer to achieve effects on independent tasks. For college students, intervention that encompasses six weeks to an entire semester (Caverly, Nicholson, & Radcliffe, 2004; Falk-Ross, 2002) may allow for transfer to independent reading. In studies that had superior performance with shorter durations, there were no transfer tasks and posttest measures were multiple choice (Fukkink & de Glopper, 1998; Ellison and Boykin, 1994).

The one measure where there was superior performance by the intervention groups on the transfer task was the ability to identify unknown words. This is a good first step in word learning because as was noted above (Taraban, Rynearson, & Kerr, 2004, Graves, 1987), if a word is not identified as unknown, it cannot be learned.

**Impact of Demographics and Attrition**

While there was random assignment of participants to treatment groups, there were between group differences on demographic characteristics. On initial analysis, there was a significant difference between groups on the age variable. Pairwise comparison failed to localize the significant difference. Because the difference did exist and the means for the Strategies plus Definition and Control groups were higher than the other groups, additional analyses were performed to ascertain the possible impact of that difference on posttest measures. Analysis of
covariance and correlations indicated that there was not likely any impact of this age difference on posttest measures.

The groups were fairly similar on the number of college credits taken, ethnicity and gender. The groups were less similar on vocabulary and language ability. The Strategies plus Definition and Control Groups demonstrated great vocabulary knowledge compared to the Strategies group and Definition group. While there were differences between the means, these differences were not significant and there was great variability as evidenced by the large standard deviations. The variability, along with the lack of significance minimizes the impact of these mean differences. There were more monolingual students in the Strategies plus Definition group than in the other groups. Additionally, monolingual ability was positively correlated with vocabulary indicating that monolingual participants had higher vocabulary knowledge than bilingual participants. Thus differences on posttest measures that favored the Strategies plus Definition group had the potential to be influenced by the stronger vocabulary knowledge of that group. Supplemental analyses with vocabulary as a covariate corrected for this possibility. While the groups were not completely even in terms of demographics, the differences were not significant and were considered within the analyses.

Because the Strategies plus Definition group had one participant drop out and the other groups each had two participants drop out there was a differential rate of attrition. This might have just been an anomaly or it could have been something inherent in the Strategies plus Definition group that enticed continued participation. The supplemental analyses mentioned above also controlled for this uneven attrition.
Correlations between Selected Variables

Correlations were obtained between selected pretest measures (vocabulary, reading rate and bilingual ability) and posttest measures (definition recall, identification of unknown words, spelling, CLOZE and response to comprehension questions). It was expected that there would be positive correlations between the pretest and posttest measures. There were some positive correlations among pretest and posttest measures. Vocabulary and reading rate were predictors of spelling. This is as expected because vocabulary knowledge is related to knowledge of words in all their forms including the orthographic form, and if one is able to read at a rate sufficient to decode automatically the words are also accessible in their orthographic forms. Vocabulary also predicted response to comprehension questions. This was also as expected as vocabulary knowledge is related to reading ability as explained by the various hypotheses on the vocabulary – reading comprehension connection discussed in the literature review of this study (Stahl & Nagy, 2006; Ruddell, 1994; Nagy, 1988). There was a significant negative correlation between vocabulary knowledge and the ability to identify unknown words. Participants with limited vocabularies seemed to be aware of their limitations and as noted above this could be helpful in assisting them to learn more words. Vocabulary knowledge could also impact the ability to know when a word is unknown but that was not the case in this study. Participants with higher vocabulary knowledge may have overestimated their word knowledge thinking that they knew the words or some form of the words. Pretest measures did not predict definition recall, and CLOZE. This was surprising for some measures. Prior vocabulary knowledge could impact definition recall and CLOZE because superior vocabulary knowledge should support word learning. It could be that more practice was necessary with specifically defining and supplying words as opposed to picking a definition among choices as was the case in the pretest.
In addition to the above described pretest posttest correlations, there were strong positive correlations between the three pretest measures included in the correlational analysis. Participants with superior scores on the vocabulary test had faster reading rates. The ability to know words allows for faster reading. Participants who were monolingual also had faster reading rates and higher vocabulary test scores. Those participants who were bilingual were still learning English. Even though they had passed or tested out of remedial English, their English may not have been that of a native English speaker. In reviewing the audiotapes, it is obvious that many of the bilingual participants struggled with English pronunciation, word meaning and conversational skills.

There were also strong positive correlations between some of the posttest measures. Definition recall, response to comprehension questions and CLOZE were all positively and strongly correlated. This provides support for CLOZE as a measure of word learning and comprehension. It is noteworthy that these three measures were the measures that yielded superior performance by at least two of the intervention groups over the Control group. In order to comprehend passages, one must know the words (Nagy, 1988). Thus the relationship seen here between the word learning measures and the comprehension measures adds support to the theory of word knowledge impacting comprehension. CLOZE and spelling were also significantly and highly correlated. Participants needed to write the words for the CLOZE task but definition recall and response to comprehension questions were oral tasks. The strong relationship may not have been necessary for the oral tasks as is was for the written task. That reading rate did not predict definition recall or strongly predict the other measures could be that reading rate was not a sensitive enough measure. This may also hold for bilingual ability.
Strengths and Limitations

This study used a variety of methods to ensure rigorous research. A pretest posttest experimental design with random assignment to the three treatment and one control group was used. Time spent in intervention was measured and analyzed for all groups. The Control group spent time in a task that was different from the treatment groups to eliminate Hawthorne effects as a confound. However, the nature of the task given to students in the control condition might be a concern. It is possible that the task might have distracted participants from comprehending the texts. After reading the passages, they were given tangential questions to answer. These questions elicited self to text talk that has been observed in other studies to lead readers away from the meaning of the text. Asking students to draw on personal knowledge and to relate text to personal experience is an activity that many students engage in and is even promoted as a strategy for enhancing reading comprehension. However, it has been shown to impede comprehension (Beck et al., 2002). The possibility that distraction occurred may by indicated by the fact that when control students did not engage in these discussions, as happened on the transfer passage, their comprehension scores increased though the rise was not statistically significant. It remains for future research to determine whether this is a valid concern. Present findings can be interpreted to show that teaching students to apply strategies or definitions or both are more supportive of text comprehension than having students engage in a discussion of text by relating it to their personal experience.

Sessions were audiotaped and the tapes were reviewed to ensure fidelity to treatment protocols and accuracy in scoring of measure. Materials used and scoring were reviewed by experts in the field to assess appropriateness of materials and accuracy of scoring. Scripts were
used during recruitment and interventions. These methods allowed for results to be attributed to the interventions.

This study was limited in its scope. It was conducted with self-selected community college students in a one-on-one setting. These results may not generalize to other populations or other settings. The low number of participants may have resulted in a lack of power to detect significant results. There were instances where there were large effect sizes but results were not significant. With more participants, more power, significance may have been obtained on more measures. The number of training sessions may not have been adequate for participants to learn the interventions and to sensitize participants to identifying unknown words. There are additional word learning strategies, such as writing the word, peer mediation and sentence generation which could be utilized during a longer term intervention. The lack of transfer is also problematic. More training and a transfer text passage that had similar readability to the training texts may have enabled participants to learn words independently. With one researcher providing all of the intervention, there is the question of researcher bias. This was controlled for by the use of scripts and review of audiotapes however, there are nuances that could be controlled for with a larger variety of examiners. This would also allow for generalization to a larger set of personnel.

Two aspects of the demographics of participants presented challenges in this study. The large variation by age of participants was a concern in this study. Statistical tests revealed significant differences among the experimental groups on age. Inspection of the distribution of adults’ ages revealed three possible outliers who were substantially older than the other students, two in the Strategies plus Definition group and one in the Control group. When these outliers were omitted from the data set and the analyses repeated, the pattern of results did not change.
Additionally age was not correlated with any of the other variables. Thus, age differences can be dismissed as a factor influencing the findings in this study.

The other challenging demographic issue was gender. Participants in this study were mostly female. There were only 5 men out of the 41 participants. The intervention groups each had one male and the control group had two male participants. Because of the lack of equal participation by men, this study may be more generalizable to women than men.

During training, participants in the Strategies plus Definition and the Strategies groups used three different strategies to learn unknown words. There was not an analysis of which strategies were most effective. In addition, the Strategies plus Definition group used strategies and definitions. Because there were only three intervention sessions, participants mostly focused on using the strategies and definitions. There was not enough time to fully delve into strategic use of the whole repertoire of strategies and or definitions as advocated by Fukkink (2005), Beck et al. (2002), and Nist and Holschuh (2002). Time for metacognitive review of performance was also limited. Future studies could analyze participants’ differentiated use of the various strategies thus providing information on the effectiveness of the different strategies used. While there are limitations to this study, it does add important information to the research base as will be discussed in the next section.

Another consideration in word learning is that multiple exposure to the target words may enhance word learning (Stahl & Nagy, 2006; Nagy, 1988). In the texts used in the present study, most target words appeared only once. In the third text passage, the word *manuscript* appeared ten times and the word *cursive* appeared six times. In the transfer passage the word *phenomena* appeared twice. All other target words appeared only once in the text. The words *manuscript* and *cursive* were defined correctly by 100% of participants in the Definition group. All participants
in the Strategies plus Definition group correctly recalled the definition for *cursive*. The word *advocate* appeared only once and all participants in the Strategies plus Definition group correctly recalled the definition for that word. There were other target words that were correctly defined by a majority (82% - 91%) of participants in their specific group (see Table 5.6). Thus while multiple exposures to target words may have enabled word learning of the words *manuscript* and *cursive*, other words with only one exposure were also learned by many participants. The present study does not add clarification to the use of multiple exposures of target words to be learned. To teach word learning, it may be helpful to use passages that provide multiple exposures of the words to be learned. This is an issue that needs further study. Natural texts, such as the ones used in the present study may or may not provide multiple exposure of target words. Texts are often modified to provide multiple exposure. As was noted in the literature review, some researchers favor natural texts as this is what readers will read. It may be possible to initially teach word learning skills with modified text and gradually introduce naturalistic texts. This is a topic for future research.

**Educational Implications**

Many community colleges offer tutoring support for students. The training used here provides evidence for effective methods to utilize with students in one-on-one tutoring sessions. Drawing on Pressley and Afflerbach’s (1995) theory of consciously constructive readers, participants were engaged in tasks that required active engagement with the text. Participants benefited from modeling, coaching and support by an expert reader as they learned a limited but flexible use of strategies. While Pressley and Afflerbach would propose a more extensive use of strategies, the strategies used here were in accordance with the scope of this study. Words were learned in context as proposed by Simpson & Randall (2000) and Whitt (1993).
This study also drew on Ehri’s (1998a, 1998b) connectionist theory highlighting the link between word knowledge of pronunciation, spelling and meaning, and the relation of that word knowledge to comprehension of text. As students worked with the words and the text, they used a modified think aloud procedure advocated by Pressley and Afflerbach that provided a window into the processing space proposed by Ehri. Participants needed support in this processing space; modeling, coaching and feedback supported participants as they learned to use strategies and definitions.

Training in sensitivity to unknown words, use of modified definitions, and strategies such as context clues, morphological cues and syntactic cues is supported by the research here. This training could consist of instructor modeling, student oral participations, instructor coaching and feedback. This research also supports the use of glossary definitions in textbooks. Encouraging students to use glossary definitions in relation to text content allows students to access meaning and impacts comprehension. Future research could investigate the usefulness of strategy training and use of modified definitions with small groups and/or in whole class settings. In the study reported here, participants engaged in three training sessions. There was extensive modeling for the first word in the first session. After that, participants were directed to use the strategies independently with coaching and feedback as needed. Future studies might utilize more instructor modeling and be conducted for more than three sessions. This may allow more thorough learning of skills and enable transfer to independent reading. Delayed testing also needs to be investigated to determine the long term effects of word learning and increased comprehension. In the Kelly, Lesaux, Kiefer, and Faller (2010) study, participants engaged in training for 18 weeks, 45 minutes per day, four days per week. Other studies reported improvement after semester long work (Hadley, Eisenswine, & Sanders, 2005; Falk-Ross, 2002).
Baumann et al. (2003) investigated the use of context and morphology, and definitions separately with fifth grade students. This study investigated a combination of these methods with community college students. Research could be extended to use of the combined methods with middle school and high school aged children, various age groups of adult learners, bilingual students and English language learners.

Qualitative analysis indicated that participants in the intervention groups found the strategies, definitions and time spent reading with the researcher useful for the passages during the sessions and for their readings for other course work. The positive attitude to academic reading may be helpful for students as they progress through their college careers (Datta & Mcdonald-Ross, 2002; Mcdonald-Ross & Scott, 1997).

**Conclusion**

Exploring methods to help community college students learn unknown words as they read text and whether that word learning will impact comprehension has support in this study based on students’ ability to recall definitions, complete CLOZE tasks and respond to open ended questions. The particular methods that are most effective requires further investigation. There is some support that definition use is more effective than strategy use in learning words for this population. The combination of strategies and definition use needs to be studied with perhaps more training sessions. Methods to help increase sensitivity to unknown words also needs to be investigated. Once that sensitivity is more developed, use of strategies and definitions will enable students to learn those words. That word learning has the potential to positively impact reading comprehension. The multi-pronged, intentional word learning approach proposed by Graves in 1987 is an approach that is effective with college students today. This study addressed one facet that may help college students access the academic text
necessary to succeed in their coursework. This is a promising study on an important topic that provides direction for replication and extension.
Appendices A-J

APPENDICES A-J

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Appendix A. Recruitment Script

Good afternoon. My name is Leslie Craigo. I am an instructor here at BMCC and I am also a doctoral student at the CUNY Graduate Center. As part of my doctoral studies, I will be conducting supervised research in the use of vocabulary strategies to help college students understand what they are reading. The research project is entitled: “Teaching Community College Students Strategies for Learning Unknown Words as they Read Expository Text”. I am inviting you to participate in this study. Your participation is voluntary. Participation in this study will not influence your grade in any of your courses here at the college. Your instructors will not know who is, and who is not participating in this study. Participation in this study will provide you with individual time with a reading specialist.

If you choose to participate in this study, you will meet with me three times at a time that is convenient for you. When we meet, we will be participating in typical reading activities that you do as part of a college course. If at any time you wish to withdraw from this study, you are free to do so. There is no penalty for withdrawing.

The consent form that I am handing out gives you more information about this project. Please read it along with me. (I will read the consent form aloud.) Take a few minutes to review it. Do you have any questions? (Allow time for questions and answers.) If you think of further questions you may contact me, my advisor or the IRB via the contact info on this form. If you choose to participate in the study, please write your name, phone number and email on the attached card and return them to me. I will contact you within the next week to discuss your participation in this study. If you choose not to participate today, but change your mind at a later date, please contact me via the information on the consent form and we will schedule three sessions.
Thank you for taking the time to consider being a part of this project. It may help us understand how to help college students learn more effectively as they are reading.
Appendix B. Recruitment Flyer

**Reading is Important!**

Participate in a research study,

Meet with a literacy specialist for three sessions to read about teachers and what teachers do,

Sessions provide individual attention and the time frame is flexible.

All students who complete the three sessions will receive a $20 gift card to Barnes and Noble Bookstores.

You must be at least 18 years old

For more information,

Contact: Leslie Craigo at Lcraigo@gc.cuny.edu
Appendix C. Informed Consent

**Project Title:** Teaching Community College Students Strategies for Learning Unknown Words as they Read Expository Text,

**Project Director:** Linnea Ehri, Distinguished Professor, City University of New York (CUNY) Graduate Center, 212 817 8294

**Research Investigator:** Leslie Craigo, Instructor, Borough of Manhattan Community College (BMCC) Teacher Education Department, 212 220 8000 x7451; Doctoral Candidate, CUNY Graduate Center.

**IRB Approval Number:** 10-12-125-0149

**Request for Participation:**

You are being asked to participate in a research project conducted through The CUNY Graduate Center and BMCC. If you decide to participate, the City University of New York requires that you give your signed authorization to participate in this research project.

A basic explanation of the project is written below. Please read this explanation and discuss it with the Research Investigator. If you then decide to participate in the research project, please sign the last page of this form.

**Nature and Purpose of the Study**

This is a research study to investigate whether readers are helped to understand what they read if they learn how to figure out the meaning of words that they do not know. This study is expected to increase our understanding of how college students learn to understand what they read.
Explanation of Procedures

You will have several tasks: to read passages and apply strategies to help you understand what you read, and to complete exercises that may demonstrate what you understand about what you have read. These exercises include: reading aloud; answering question about the reading, fill in the blanks, and, when given a word, providing the definition. These exercises may show what strategies help you to understand what you have read. You will also answer some questions, these include: Have you completed all of your remedial courses? How many courses have you taken at this college? What language(s) do you speak?

You will meet three times with the research investigator, at times that are convenient for you. The session will be audio taped. The readings are practitioner journals and text books that college students use at other colleges.

Potential Discomforts and Risks

The study poses no risks to you. The things you will be asked to do are just like those occurring in any educational setting.

Potential Benefits

The benefit of your participation is to help us understand more about how to help adult readers improve their comprehension and to help them learn unknown words.

I may publish the results of the study, but names of people, or any identifying characteristics, will not be used in any of the publications. If you would like a summary of the study, please provide me with your address below and I will send you a summary in the future.
**Costs/Reimbursements**

There is no cost to you to participate in this study. When you have completed the tasks in all three sessions, you will receive a $20 gift card to Barnes and Noble Book Stores to thank you for your participation.

**Nonparticipation**

Your participation in this research project is completely voluntary. Your decision not to participate in this project will not result in any penalty. **Your participation in this study will in no way influence your grade in this course, or in any other course, and in fact your professor(s) will have no knowledge of who is participating and who is not participating.** You are free not to answer any of the questions.

**Withdrawal from the Project:**

Your participation in this research project is completely voluntary. You may decide not to participate in this project at any time without penalty and are free to leave at any time.

**Contact Information**

If you have any questions about this research, you can contact me at (917) 834 – 9451 or lcraigo@gc.cuny.edu, or my advisor Dr. Linnea C. Ehri at (212) 817-8294 or lehri@gc.cuny.edu. If you have questions about your rights as a participant in this study, or any other concerns, you can contact Kay Powell, IRB Administrator, The Graduate School and University Center, City University of New York, (212) 817-7525, kpowell@gc.cuny.edu.

If you agree to participate, please sign this below. You can keep the second copy for your records. Your participation is greatly appreciated! Thank you.

_______________ ________________ ________________
Participant’s Signature Date Principal Investigator’s Signature Date
Address
## Appendix D. Individual Data Collection Sheet

<table>
<thead>
<tr>
<th>CONSENT SIGNED</th>
<th>☐ YES ☐ NO</th>
<th>START TIME</th>
<th>END TIME</th>
</tr>
</thead>
</table>

### SESSION I: _____/_____ PRETEST SCORES: 1ST READING - PLAY

Nelson Denny: ________ % of words decoded: ______ Reading Rate: ______ Prosody Level: ______

# of Unknown Words identified: ______

**POSTTEST MEASURES**

% of words decoded correctly: ______ Reading Rate: ______ Prosody Level: ______

Comprehension: ______ CLOZE: ______ # of Definitions: ______ Spelling: ________

Pronunciation: ______

### INTERVENTION INFORMATION

☐ Strategy Training Plus Use of Definitions ☐ Strategy Training Alone ☐ Definitions alone ☐ No Intervention
duration ______

### SESSION II: _____/_____ 2ND READING START TIME ______ END TIME ______

% of words decoded: ______ Reading Rate: ______ Prosody Level: ______ # of Unknown Words: ______

Comprehension: ______ CLOZE: ______ # of Definitions: ______ Spelling: ________

Pronunciation: ______

### INTERVENTION INFORMATION

☐ Strategy Training Plus Use of Definitions ☐ Strategy Training Alone ☐ Definitions alone ☐ No Intervention
duration ______

### SESSION III: _____/_____ 3ND READING START TIME ______ END TIME ______

% of words decoded: ______ Reading Rate: ______ Prosody Level: ______ # of Unknown Words: ______

Comprehension: ______ CLOZE: ______ # of Definitions: ______ Spelling: ________

Pronunciation: ______

### INTERVENTION INFORMATION

☐ Strategy Training Plus Use of Definitions ☐ Strategy Training Alone ☐ Definitions alone ☐ No Intervention
duration ______

### SESSION III: _____/_____ TRANSFER TASK

% of words decoded: ______ Silent Reading Rate: ______ Prosody Level: ______ # of Unknown Words: ______

Oral Reading Rate: ______

Comprehension: ______ CLOZE: ______ # of Definitions: ______ Spelling: ________

Pronunciation: ______

### INTERVENTION INFORMATION

☐ Strategy Training Plus Use of Definitions ☐ Strategy Training Alone ☐ Definitions alone ☐ No Intervention
duration ______

### DEMOGRAPHIC DATA

DOB: ______ ETHNICITY: ____________________________

GENDER: M_____ F_____
NATIVE LANGUAGE   LANGUAGES SPOKEN:____________________

ARE YOU BILINGUAL Y  N  DOMINANT LANGUAGE

# OF COURSES TAKEN____
REMDIAL FREE IN ENG WRITING Y  N  ; READING Y  N  ; ESL Y  N  

MAJOR: EDU EDB ECE ECI EDS(M) EDS(S) OTHER
Appendix E Reading Passages

Reading One – The Importance of Play

Some children are slow and cautious in temperament while others tend to be more impulsive. When children become absorbed in play, even children with shorter attention spans often stretch out their playtime. Skillful, adult play partners can help children with short attention spans to extend their play. By providing intriguing toys and encouragement geared to the unique interests of each child, teachers can help strengthen children’s abilities to prolong play. The ability to focus attention and to persist at challenging learning tasks is a crucial component for later academic success in school.

When play is child initiated, children control the play themes and feel empowered. They come to realize their capabilities in mastering the roles, scenarios, and logistical problems that may arise in the course of sociodramatic play. No Kennel for the stuffed puppy? Ok, what can we use as a substitute kennel? As playmates arrange props and environments, teachers are superb helpers in facilitating child mastery of play themes.

Reading Two – Child Centered Curriculum Planning

Far too often, classrooms become alien places in which students shun—they reject, avoid, or disregard the lessons of the teacher as well as the possibility of clearing impediments on life’s way. In such classrooms the teachers’ lessons may be planned without regard for the learners’ engagement. The learner may be left to consider, must I go where the impulse drives – to follow that urge, maybe an urge to self discovery?
I was observing a group of 4 year olds and saw up close what urgency can mean, as well as the consequences of such a journey. A teacher who was licensed in art but had been assigned to a preschool class for the year was conducting a lesson on money with an alert, active group of 4 year olds. As I sat in the back of the classroom – a class I had been in and out of many times during the year – the teacher began her lesson. She stood behind a child size desk that became the holder of her props as the children began to gather, to be bunched together, in a small space on the floor. The desk of course, provided a natural barrier between the teacher and the children. The teacher then held up a piece of cardboard, half the size of a sheet of notebook paper, on which she had mounted a real penny, nickel, dime and quarter. My attention was drawn to one child who had not quite made it to the small space where he was expected to be seated on the floor. With a puzzled look on his face, the boy stared at the teacher, then cast his eyes on the children bunched there on the floor, whose limbs could not avoid touching. He calmly announced, “I’m going to go build with the blocks.” Although it seemed a perfectly logical decision to me, the teacher reprimanded the child for “not following directions.”

Following your own impulses in the classroom, where the locus of power is unevenly experienced between those who teach and those who are taught, can lead to unfortunate consequences for learners. It can lead to silencing the active imagination of the mind and restricting the physical need of busy bodies to move. What may be instructive for us as teachers is a simple reminder: It is critical to plan thoughtfully, carefully, and even lovingly for the students we teach as we make them the center of our planning.
Reading Three – Handwriting Instruction

One of the most fundamental issues in explicitly teaching handwriting to students involves the script(s) students are to be taught. In the United States students are typically taught both manuscript and cursive, as the former is usually introduced in kindergarten or grade 1 and the latter in grade 2 or 3. One relatively common variation is to teach slanted manuscript letters (the D’Nealian alphabet) that more closely resemble their cursive counterparts than the more traditional manuscript alphabet. The supposed purpose of this modified, slanted manuscript alphabet is to make the transition between manuscript and cursive easier and more efficient. Despite the generally agreed upon practice of teaching both manuscript and cursive writing, some educators have challenged the desirability of teaching both manuscript and cursive recommending that only manuscript be taught or emphasizing cursive from the beginning. Still others have advocated the exclusive use of italics.

Unfortunately research does not provide a definitive answer on the relative effectiveness of different scripts. Even so I would like to proffer the following recommendations: instruction should start with manuscript letters for the following four reasons. One, most children come to kindergarten and first grade already knowing how to write some letters. These are typically manuscript letters taught by parents or preschool teachers. Learning a special alphabet such as the D’Nealian, means that children have to relearn many letters they can already write. Two, there is some evidence (although it is dated) that traditional manuscript is easier to learn than cursive. Three, once traditional manuscript is mastered, it can be written as fast as cursive and possibly even more legibly. Four, the use of manuscript in the early grades may actually
facilitate reading development. This is likely due to the fact that the material students read is written in manuscript, not cursive.

Transfer Task – Children’s Scientific Knowledge

In studying children’s understanding of scientific phenomena, many developmental theorists take a theory theory approach, suggesting that children construct rather (than absorb) their knowledge and beliefs about physical and biological phenomena. Some theorists are also nativists, arguing that infants’ brains are neurologically preprogrammed with some basic knowledge about their world, or at least with some preliminary dispositions to interpret events in certain ways. For example, even young infants (i.e., those between 2 and 5 months old) were seen to know that an object maintains its existence and shape as it moves, that two objects cannot occupy the same space at the same time, and that one object can influence another object only when the two come into contact. Researchers have not tested such understandings in newborns, however, partly because newborns’ visual acuity would make it difficult to do so. Thus it is possible that young infants’ early experiences rather than biologically built in preprogramming, are the source of their knowledge about physical objects.

One important step in early theory building is making a distinction between biological and nonbiological entities. By the time infants are 6 months old most have some awareness that people and animals move in ways that nonliving things do not. For example, human beings walk with a rhythmic motion quite different from the movements of inanimate objects that are pushed or thrown. By age 3 or 4, children know that humans and other animals, but not nonliving objects can move themselves and that living and nonliving entities grow in different ways. At about age 4, children also realize that two living creatures in the same category, even if they look quite
different, are apt to share many characteristics – for instance, that a blackbird has more in common with a flamingo (because both are birds) than it does with a bat. And by middle elementary school years, children understand that both plants and animals are defined largely by their genetic heritage and internal makeup – for instance, that round reddish fruits that come from pear trees must be pears rather than apples.
### Appendix F. Sample Running Record Data Collection Sheet

Some children are slow and cautious in temperament while others tend to be more impulsive. When children become absorbed in play, even children with shorter attention spans often stretch out their playtime. Skilful, adult play partners can help children with short attention spans to extend their play. By providing intriguing toys and encouragement geared to the unique interests of each child, teachers can help strengthen children's abilities to prolong play. The ability to focus attention and to persist at challenging learning tasks is a crucial component for later academic success in school.

When play is child initiated children control the play themes and feel empowered. They come to realize their capabilities in mastering the roles, scenarios, and logistical problems that may arise in the course of sociodramatic play. No kernel for the stuffed puppy? Ok, what can we use as a substitute kernel? As paymates arrange props and environments, teachers are superb helpers in facilitating child mastery of play themes.
Appendix G. Strategies Chart

Use these Clues to Figure Out the Meaning of Unknown Words

<table>
<thead>
<tr>
<th>Clue Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Context Clues</td>
<td>Find other words in the text that help you understand this word.</td>
</tr>
<tr>
<td>2. Similar Words</td>
<td>How is this word, or part of this word similar to other words you know?</td>
</tr>
<tr>
<td>3. Function Clues</td>
<td>What is the function of this word in the sentence? Does this word name</td>
</tr>
<tr>
<td></td>
<td>something – is it a noun, describe something – is it an adjective, or is it</td>
</tr>
</tbody>
</table>
## Appendix H. Word Learning Chart

### Strategies to Learn Vocabulary Words

<table>
<thead>
<tr>
<th>Word</th>
<th>Context clues</th>
<th>Morphological cues, related words</th>
<th>Function clues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading one: \temperament</td>
<td>slow and cautious… while others tend to be impulsive</td>
<td>Temper \ment turns verb into word, noun</td>
<td></td>
</tr>
<tr>
<td>component</td>
<td>ability…persist…success</td>
<td>com \noun described by crucial</td>
<td></td>
</tr>
<tr>
<td>empowered</td>
<td>control</td>
<td>power \describes what children feel</td>
<td></td>
</tr>
<tr>
<td>logistical</td>
<td>No Kennel…what can we use?</td>
<td>logic \describes type of problems</td>
<td></td>
</tr>
<tr>
<td>sociodramatic</td>
<td>props…environment…play themes</td>
<td>social drama \describes type of play</td>
<td></td>
</tr>
<tr>
<td>Reading two: \shun</td>
<td>reject, avoid, ignore</td>
<td>verb, action that may students do</td>
<td></td>
</tr>
<tr>
<td>impediments</td>
<td>clearing</td>
<td>im \pedi ment \noun naming what may need to be cleared away</td>
<td></td>
</tr>
<tr>
<td>urgency</td>
<td>impulse…follow that urge</td>
<td>urge \urgent cy cy turns verb – urge to noun naming a</td>
<td></td>
</tr>
<tr>
<td>term</td>
<td>meaning</td>
<td>category</td>
<td>example</td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>barrier</td>
<td>desk…between the teacher and children</td>
<td>noun, what the desk became</td>
<td>feeling</td>
</tr>
<tr>
<td>cast</td>
<td>stared…his eyes on the children</td>
<td>verb, what he did with his eyes</td>
<td>feeling</td>
</tr>
<tr>
<td>reprimanded</td>
<td>not following directions</td>
<td>verb, what the teacher did</td>
<td>feeling</td>
</tr>
<tr>
<td>locus</td>
<td>power is unevenly experienced</td>
<td>noun-place where the power is</td>
<td>feeling</td>
</tr>
<tr>
<td>restricting</td>
<td>physical needs</td>
<td>ing ongoing verb</td>
<td>feeling</td>
</tr>
<tr>
<td>critical</td>
<td>instructive…simple reminder…plan thoughtfully….children…center</td>
<td>describes how important it is to plan</td>
<td>feeling</td>
</tr>
<tr>
<td>Reading three: manuscript</td>
<td>handwriting, introduced in grade 1 (need to know former vs. latter), transition between</td>
<td>noun naming type of handwriting</td>
<td>feeling</td>
</tr>
<tr>
<td>cursive</td>
<td>same as above</td>
<td>noun naming type of handwriting</td>
<td>feeling</td>
</tr>
<tr>
<td>advocated</td>
<td>challenged the desirability… other</td>
<td>Verb, what</td>
<td>feeling</td>
</tr>
<tr>
<td>have…</td>
<td>some people have strongly suggested</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exclusive use of italics</td>
<td>ex exclude describes the use of only one element</td>
<td></td>
<td></td>
</tr>
<tr>
<td>proffer I would like to…recommendations</td>
<td>offer verb, what the author suggests</td>
<td></td>
<td></td>
</tr>
<tr>
<td>legibly …written as fast and possibly even more…</td>
<td>ible legible describes the quality of handwriting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>facilitate Use of manuscript may actually…reading development…materials students read is written in manuscript</td>
<td>facile verb, how printing may help children as they learn to read</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix I. Comprehension Questions and Scoring Rubric

Reading One – The Importance of Play

The researcher introduced this exercise and stated what she expects the student to do: Now that you have read this passage, I will ask you some questions about what you read. I would like you to recall as much information from the text as you can.

<table>
<thead>
<tr>
<th>Question</th>
<th>Scoring Rubric, one point for each bullet</th>
<th>Inadequate responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell me several ways that temperament affects children’s play.</td>
<td>• Different <strong>temperaments</strong> cause children to respond to play in different ways.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Children with <strong>impulsive temperaments</strong> may have shorter attention spans during play.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Children may play for different durations of time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Children with slow and cautious <strong>temperaments</strong> or impulsive temperaments may need encouragement to become engaged in prolonged play.</td>
<td></td>
</tr>
<tr>
<td>Tell me several ways that</td>
<td>• Provide intriguing interesting</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Teachers can help children prolong play. | toys.  
| - Provide encouragement geared to the interests of each child.  
| - Help children master play themes.  
| - Facilitate problem solving  
| - Set up environments, kennel, stuffed puppy |  

| Give me some examples of why teachers should help children prolong play. | - If children can focus their attention for long periods of time on play, they may develop the skills to focus attention on academic tasks.  
| - The ability to focus attention and to persist at challenging learning tasks is a crucial component for later academic success in school. |  

| Tell me several reasons why child-initiated play is important. | - The children are in control  
| - The children feel empowered  
| - The children’s self esteem is increased. |  

The children realize that they are capable of mastering roles and solving *logistical* problems.

Reading Two – Child Centered Curriculum Planning

<table>
<thead>
<tr>
<th>Question</th>
<th>Scoring Rubric, one point for each bullet.</th>
<th>Inadequate responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give me several examples of why some children have difficulty learning in some classrooms.</td>
<td>• The classrooms become alien places. &lt;br&gt;• Teachers do not consider the needs of the children. &lt;br&gt;• Children may <em>shun</em>, reject, ignore, or disregard the lessons.</td>
<td></td>
</tr>
<tr>
<td>Please describe some examples of following urgency.</td>
<td>• A 4 year old did not see a place to sit during a lesson on money. &lt;br&gt;• The boy announced that he was going to play with the blocks instead of attending to the lesson on money. &lt;br&gt;• The teacher <em>reprimanded</em> him for not following</td>
<td></td>
</tr>
</tbody>
</table>
| Describe different ways this passage describes the locus of power in classrooms. | • There is an uneven balance of power between students and teachers.  
• Teachers have more power than students. |
|---|---|
| Please let me know several reasons why teachers need to make children the center of their planning. | • Child centered planning supports the child’s imagination.  
• Child centered planning allows children to be physical, to move their bodies.  
• Child centered planning considers the needs, level of the children,  
• Every child is different, has different interests, needs an individual plan,  
• Child centered planning allows children to learn. |
## Reading Three – Handwriting Instruction

<table>
<thead>
<tr>
<th>Question</th>
<th>Scoring Rubric, one point for each bullet</th>
<th>Inadequate responses</th>
</tr>
</thead>
</table>
| Describe the various scripts that are taught to children.               | • **Manuscript**, printed unattached letters like typewriting  
• **Cursive**, letters are slanted and joined together  
• D’Nealian, slanted manuscript letters |                       |
| What are several examples of the questions concerning which scripts to use? | • How many scripts should be taught?  
• Which script should be taught first? |                       |
| Why is it difficult to provide a definitive answer on how to teach handwriting? | • Research does not provide a definitive answer  
Research is inconclusive |                       |
| What is a solution offered by the author?                               | • Teach **manuscript**, printed letters from the beginning |                       |
| What are several reasons why the author suggests this solution?         | • Most children already know how to print some letters when they start school  
• Learning to print is easier than |                       |
Learning to write in **cursive**
- Printing can be as fast **cursive**
- Printing can be neater than **cursive**
- Printing helps children learn to read

---

**Transfer Task Reading – Children’s Scientific Knowledge**

<table>
<thead>
<tr>
<th>Question</th>
<th>Scoring Rubric, one point for each bullet,</th>
<th>Inadequate responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell me some ways that young children learn about scientific facts.</td>
<td>• They construct scientific knowledge.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• They may be preprogrammed with some basic knowledge about the world.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>They know this instinctually</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Innate knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Early experience may be the source of their knowledge.</td>
<td></td>
</tr>
<tr>
<td>Why is visual acuity of newborns important to</td>
<td>• Newborns do not have enough visual <strong>acuity</strong> to participate in</td>
<td></td>
</tr>
</tbody>
</table>
What is one important step in early scientific theory building for young children?

- They need to know the difference between living and nonliving entities.

Please identify some scientific distinctions that children make.

- Objects maintain their existence and shape as they move.
- Two objects cannot occupy the same space.
- Objects only influence each other if they come into contact with each other.
- People and animals move in ways that nonliving objects cannot.
- Living creatures in the same category share many similar
What are some of the reasons it is important to understand how children develop scientific knowledge?

- There is a sequence of learning such that children understand different concepts at different ages.
- Because children construct knowledge, we should not expect them to passively absorb knowledge.
### Reading One – Play

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
<th>Accurate</th>
<th>Inaccurate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperament</strong></td>
<td>inborn patterns of response, the way a person might typically respond to situations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accurate □ Inaccurate □</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Component</strong></td>
<td>a necessary part of a something or a whole</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accurate □ Inaccurate □</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Empowered</strong></td>
<td>equipped with an ability that gives somebody a greater sense of confidence and/or boosts self-esteem</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accurate □ Inaccurate □</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Logistical</strong></td>
<td>involving the planning and management of any complex task, including children’s play tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accurate □ Inaccurate □</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sociodramatic</strong></td>
<td>refers to a type of play which supports of the development of young children socially, emotionally, physically and cognitively</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accurate □ Inaccurate □</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Reading Two – Curriculum Planning

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shun</strong></td>
<td>to avoid somebody or something intentionally</td>
</tr>
<tr>
<td></td>
<td>Accurate □ Inaccurate □</td>
</tr>
<tr>
<td>Impediments</td>
<td>obstacles or impairments that delay progress, such as one affecting cognitive or social development</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Accurate □  Inaccurate □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Urgency</th>
<th>requiring or compelling speedy action or attention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate □  Inaccurate □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Barrier</th>
<th>a structure such as a desk that blocks, prevents access, or keeps one place, or people separate from another</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate □  Inaccurate □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cast</th>
<th>to direct the eyes or a look toward somebody or something, often in a disapproving, or anxious manner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate □  Inaccurate □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reprimanded</th>
<th>an act or expression of criticism, such as telling the student that they have done something wrong</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate □  Inaccurate □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Locus</th>
<th>location, focus or control of power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accurate □  Inaccurate □</td>
</tr>
</tbody>
</table>

Reading Three - Handwriting

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manuscript</td>
<td>refers to a type of handwriting that is identified as typewritten or handwritten, with letters being unattached, printed</td>
</tr>
<tr>
<td>Cursive</td>
<td>refers to a type of handwriting having the successive letters joined together.</td>
</tr>
</tbody>
</table>
Letters are often slanted and curved
Accurate □ Inaccurate □

**Advocated**
means to speak, plead, or argue in favor of something
Accurate □ Inaccurate □

**Exclusive**
Sole, being the only one used
Accurate □ Inaccurate □

**Proffer**
offer, to give; a proposal offered for acceptance or rejection
Accurate □ Inaccurate □

**Legibly**
describes handwriting that is neat and clear enough for others to read
Accurate □ Inaccurate □

**Facilitate**
to make something easy or easier to do; simplify process
Accurate □ Inaccurate □

Transfer Task, Reading on Children’s Scientific Knowledge

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenomena</td>
<td>facts or occurrences that can be noticed or are observable by others</td>
</tr>
<tr>
<td>Nativists</td>
<td>people who believe that the mind possesses some ideas that are inborn, that some ideas do not come from outside sources</td>
</tr>
<tr>
<td>Word</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Preliminary</td>
<td>beginning; an act that comes before and prepares the way for something else</td>
</tr>
<tr>
<td>Acuity</td>
<td>sharpness of vision; the visual ability to determine fine detail</td>
</tr>
<tr>
<td>Entities</td>
<td>something that exists as or is perceived as a single separate object.</td>
</tr>
<tr>
<td>Inanimate</td>
<td>not living, lifeless, or spiritless</td>
</tr>
<tr>
<td>Heritage</td>
<td>genetic material that passes from one generation to the next</td>
</tr>
</tbody>
</table>
Appendix K. Script for Use with Participants by Session and Group

Script for dissertation –

**Strategies only Group - Session One.**

1. (Record start time of session), Thank you for agreeing to meet with me. This study will provide us with useful information about the reading habits and reading abilities of college students. It will also give you the opportunity to explore your own reading abilities.

2. (Present consent form). Please read this form, it explains this study and your rights.

3. Do you have any questions?

4. Do you agree to participate in this study?

5. Please sign two copies of this form, one is for you to keep, I will keep the other in a locked cabinet.

6. Do you need to take remedial courses in reading, writing, or ESL?

7. How many college credits do you have? What is your major? (EDU, EDB, ECI, ECP, EDS,(S,M), other)

8. What is your native language? What languages do you speak? Are you bilingual?

9. What is your date of birth, ethnicity, and gender?

10. Thank you for agreeing to participate in this study. Relax, try your best, remember that when you have completed all three sessions you will receive a gift certificate to Barnes and Noble.

   Participation in this study is also important because in order to do well in college it is necessary to be able to read lots of text books. Participating in this study offers you the opportunity to explore that kind of reading. It will also help us understand how college
students read. It is important to maintain confidentiality during this study. Not all participants will have the same experience, so please do not discuss this study with other students.

11. Now you will complete a vocabulary assessment. (follow script from Nelson Denny).

12. (Present passage on play). Now please read this passage out loud: (start stop watch, mark miscues: omitted = line through word; unintelligible, mispronounced = circle word and write e for error; substituted words = circle word and write s; if participant asks for help = circle word and write nh.

13. (When participant finishes reading, stop watch, record time and prosody, ask participant):

   “Are there any words that you do not know in this passage? Point to the words whose meaning that you do not know.” (Record unknown words.)

******************************************************************************

1. **Strategies only Group, Session One continued**: Here is a chart that we can use to help us learn the meaning of unknown words. It says (read chart). (Point to the word temperament)

   Let’s figure out what this word means.

   “The first clue listed here, Context Clues, says: ‘Find other words in the text that help you understand this word.’ The words that may help are: Some children are slow … while others tend to be more impulsive. The word temperament can be seen as labeling the way children may respond or react. Reacting slowly and thoughtfully is one way. Reacting quickly and impulsively without thinking it through is another way.

   The second clue, Similar Words, asks: ‘How is this word or part of this word similar to other words you know?’ The word temperament has two parts, temper and ment. Temper is similar to temper, as in what kind of temper does the child have? Tempera is also similar to temperature as in a measurement of heat. I know other words that end with
ment. Let’s see how they work. For example, take the word enjoyment. Enjoy is an action. When you add ment, the word becomes a label that names the state (enjoy- happy) that results from the action. Ment gives a name to an action. For temperament, temper refers to the action, and ment refers to the state in a person that results from the action.

The third clue, Function Clues asks: ‘What is the function of this word in the sentence? Does this word name something - is it a noun, describe something – is it an adjective, or is it an action - verb?’ As we figured out in the Similar Words clue, words that end in ment are words that give a name to the action.

So using these cues, we can figure out that temperament describes the way that children respond to events; they may respond slowly or impulsively.

We came to an understanding of the word temperament from the Context Clues. Using the other clues helped confirm our understanding. When we use the Clues, remember that they can be used separately or together. Sometimes some clues will be more helpful than other clues.”

2. (Point to each subsequent target word and any other words identified as unknown. Prompt participant to use strategies and deduce meaning. If participants struggle, model strategies, offer suggestion, correct errors. Mark strategy use as i = independent strategy use; a = needed assistance.)

3. (Offer positive feedback on first few words): “Yes, those words are related to the word we are trying to learn”. (Then offer intermittent feedback.)

Posttest measures – When all unknown words have been learned, say: “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.
1. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

2. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

3. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

4. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

5. “Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you again!” (record end time of session)

Strategies only Group, Session Two,

“Welcome, remember that we are participating in important work that will help us understand how college students read. Please read the following passage out loud.” (start watch, record miscues)

1. “Point to the words whose meaning that you do not know.” (record unknown words)

2. (Present Strategies chart) “Remember that we have been using strategies to learn the meaning of unknown words.” (point to first target word) “Can you figure out what this word means?” (If the participant does not respond or does not use strategies, researcher points to the first cue on the strategies chart and says) “Try this.” (If the participant still does not respond, the researcher says:) “Look at the other words in the sentence or in other sentences.” (If more help is needed, the researcher points to the words in the sentence that help in meaning
generation: reject, avoid, or disregard. If still more help is needed, the researcher will say)

“This means that a lot of times, children shun, they avoid, they do not participate in classroom activities.” (The researcher points to subsequent target words and offers assistance only as needed.)

Posttest Measures

3. When all target and unknown words have been learned posttest measures are administered.
   “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

4. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

5. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

6. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

7. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

8. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you for our final session! (record end time of session)

1. Strategies only Group - Session Three. “Welcome, this is the last session, Please read this passage aloud” (record time, decoding and prosody)

2. “Point to the words whose meaning that you do not know.”
3. (Strategies chart will be on the table, but not specifically presented.) “We have been using strategies to figure out what words mean. Use those strategies to figure out what this word means.” (If the participant struggles, the researcher will encourage the participant to use the strategies independently. Prompts will include) “Think about what we did last session.” “What clues can you use to help you figure out the words?” (If the participant still struggles, the researcher will point to the strategies on the strategy chart. If that is not sufficient then assistance will be provided as in session two.)

4. When all target and unknown words have been learned posttest measures are administered. “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

5. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

6. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

7. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

8. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.
Transfer Task

1. (Present passage on Scientific Knowledge), “This task is different than the other tasks. You will be working independently without feedback from me. Please read this passage silently so that you are able to understand it.” (record starting and ending time of silent reading.)

2. “Are there any words in this passage whose meaning that you did not know? Point to the words that you did not know.” (Record words)

3. “Did you do anything with the words you did not know? What did you do to help you understand the words that you did not know?” (record responses and realize there is audiotape)

4. “Please read the passage out loud” (record rate, decoding and prosody)

5. (Present comprehension, Cloze, spelling and definition tasks)

6. Thank you for participating in the study. Here is the gift card to Barnes and Noble. Please sign this receipt which acknowledges that you received the gift certificate. If you have any further question please feel free to contact me.

Script for dissertation – Definition only Group

Session One,

1. (Record start time of session), Thank you for agreeing to meet with me. This study will provide us with useful information about the reading habits and reading abilities of college students. It will also give you the opportunity to explore your own reading abilities.

2. Please read this form, it explains this study and your rights.

3. Do you have any questions?

4. Do you agree to participate in this study?
5. Please sign two copies of this form, one is for you to keep, I will keep the other in a locked cabinet.

6. Do you need to take remedial courses in reading, writing, or ESL?

7. How many college courses have you taken?

8. How many college credits do you have? What is your major? (EDU, EDB, ECI, ECP, EDS,(S,M), other)

9. What is your native language? What languages do you speak? Are you bilingual?

10. What is your date of birth, ethnicity, and gender?

11. Thank you for agreeing to participate in this study. Relax, try your best, remember that when you have completed all three sessions you will receive a gift certificate to Barnes and Noble. Participation in this study is also important because in order to do well in college it is necessary to be able to read lots of text books. Participating in this study offers you the opportunity to explore that kind of reading. It will also help us understand how college students read. It is important to maintain confidentiality during this study. Not all participants will have the same experience, so please do not discuss this study with other students.

12. Now you will complete a vocabulary assessment. (follow script from Nelson Denny).

13. (Present passage on play) Now please read this passage out loud: (start stop watch, mark miscues: omitted= line through word; unintelligible, mispronounced = circle word and write e for error; substituted words = circle word and write s; if participant asks for help = circle word and write nh.

14. When participant finishes reading, stop watch, record time and prosody, ask participant: “Are there any words that you do not know in this passage? Point to the words whose meaning that you do not know.” Record unknown words.
1. (point to the first target word) “We can use **definitions** to learn the meaning of unknown words.”

(Present definition chart)

What does temperament mean? The definition tells us that temperament means inborn patterns of response, the way a person usually responds to situations. So in the sentence: Some children are slow and cautious in temperament while others tend to be more impulsive. Temperament means that some children have an inborn response in that they may be slow and cautious when responding to situations. This is how they respond in general to lots of situations. It is their typical reaction. Other children respond more quickly, more impulsively. This is their typical reaction. These are the words that I would use to help me understand the word temperament and to help me understand this sentence.

2. (point to subsequent target and unknown words) “Use the definition, what does this sentence mean?” (If the participant struggles or provides an erroneous answer, the researcher will provide corrective feedback, supplying an appropriate sentence. If the participant comes to an adequate understanding, positive verbal feedback will be provided for the first few words, then on an intermittent basis) “Good use of definition.” “Yes, that is what this sentence means.”

3. Mark words learned independently as **I** and when help is needed mark **H** next to target words on data sheet.

4. Posttest measures – When all unknown words have been learned, say: “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

5. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.
6. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

7. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

8. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

9. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you again! (record end time of session)

Definition group Session Two

1. Welcome, remember that we are participating in important work that will help us understand how college students read. Please read the following passage out loud. (start watch, record miscues)

2. Point to the words whose meaning that you do not know. (record unknown words)

3. (Point to first target word and definition.) “Use this definition. In your own words, what does this word mean in this sentence?”

4. (If participants struggles, model use of the definition to create meaning. Provide positive feedback intermittently. Record use of definition I = independent, H = needed help.)

5. (Point to subsequent target and unknown words and continue procedure.)

Posttest measures – When all unknown words have been learned, say: “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.
2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

6. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you for our final session! (record end time of session)

Definition group – Session Three

1. Welcome, this is the last session, Please read this passage aloud (record time, decoding and prosody)

2. Point to the words whose meaning that you do not know.

3. (Point to first target word and definition.) “Use this definition. In your own words, what does this word mean in this sentence?”

4. (If participants struggles, model use of the definition to create meaning. Provide positive feedback intermittently. Record use of definition I = independent, H = needed help.)

5. (Point to subsequent target and unknown words and continue procedure.)
1. Posttest measures – When all unknown words have been learned, say: “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

Transfer Task

1. (Present passage on Scientific Knowledge), “This task is different than the other tasks. You will be working independently without feedback from me. Please read this passage silently so that you are able to understand it.” (record starting and ending time of silent reading.)

2. “Are there any words in this passage whose meaning that you did not know? Point to the words that you did not know.” (Record words)

3. “Did you do anything with the words you did not know? What did you do to help you understand the words that you did not know?” (record responses and realize there is audiotape)

4. “Please read the passage out loud” (record rate, decoding and prosody)

5. (Present comprehension, Cloze, spelling and definition tasks)
6. Thank you for participating in the study. Here is the gift card to Barnes and Noble. Please sign this receipt which acknowledges that you received the gift certificate. If you have any further question please feel free to contact me.

Script for Dissertation, Strategies plus Definition Group

Session one

1. (Record start time of session), Thank you for agreeing to meet with me. This study will provide us with useful information about the reading habits and reading abilities of college students. It will also give you the opportunity to explore your own reading abilities.

2. Please read this form, it explains this study and your rights.

3. Do you have any questions?

4. Do you agree to participate in this study?

5. Please sign two copies of this form, one is for you to keep, I will keep the other in a locked cabinet.

6. Do you need to take remedial courses in reading, writing, or ESL?

7. How many college credits do you have? What is your major? (EDU, EDB, ECI, ECP, EDS,(S,M), other)

8. What is your native language? What languages do you speak? Are you bilingual?

9. What is your date of birth, ethnicity, and gender?

10. Thank you for agreeing to participate in this study. Relax, try your best, remember that when you have completed all three sessions you will receive a gift certificate to Barnes and Noble.

Participation in this study is also important because in order to do well in college it is necessary to be able to read lots of text books. Participating in this study offers you the opportunity to explore that kind of reading. It will also help us understand how college students read. It is
important to maintain confidentiality during this study. Not all participants will have the same experience, so please do not discuss this study with other students.

11. Now you will complete a vocabulary assessment. (follow script from Nelson Denny).

12. (Present passage on Play) Now please read this passage out loud: (start stop watch, mark miscues: omitted = line through word; unintelligible, mispronounced = circle word and write e for error; substituted words = circle word and write s; if participant asks for help = circle word and write nh.

13. When participant finishes reading, stop watch, record time and prosody, ask participant:
   “Are there any words that you do not know in this passage? Point to the words whose meaning that you do not know.” Record unknown words.

*****************************************************************

1. (Present strategies chart) Here is a chart that we can use to help us learn the meaning of unknown words. It says (read chart). (Point to the word temperament) Let’s figure out what this word means.

   “The first clue listed here, Context Clues, says: ‘Find other words in the text that help you understand this word.’ The words that may help are: Some children are slow … while others tend to be more impulsive. The word temperament can be seen as labeling the way children may respond or react. Reacting slowly and thoughtfully is one way. Reacting quickly and impulsively without thinking it through is another way.

   The second clue, Similar Words, asks: ‘How is this word or part of this word similar to other words you know?’ The word temperament has two parts, temper and ment. Temper is similar to temper, as in what kind of temper does the child have? Tempera is also similar to temperature as in a measurement of heat. I know other words that end with ment. Let’s see how they work. For
example, take the word enjoyment. Enjoy is an action. When you add ment, the word becomes a label that names the state (enjoy-happy) that results from the action. Ment gives a name to an action. For temperament, temper refers to the action, and ment refers to the state in a person that results from the action.

The third clue, Function Clues asks: ‘What is the function of this word in the sentence? Does this word name something - is it a noun, describe something – is it an adjective, or is it an action - verb?’ As we figured out in the Similar Words clue, words that end in ment are words that give a name to the action.

So using these cues, we can figure out that temperament describes the way that children respond to events; they may respond slowly or impulsively.

“We came to an understanding of the word temperament from the Context Clues. Using the other clues helped confirm our understanding. When we use the Clues, remember that they can be used separately or together. Sometimes some clues will be more helpful than other clues.”

2. “We can also use definitions to help us learn the meaning of unknown words.” (Present definition chart).

“The target word is temperament. For temperament the definition is inborn patterns of response, the way a person might typically respond to situations. This is almost the same as the meaning we learned from the clues. The part that the definition adds is that the response is an inborn pattern. Not only is temperament a typical pattern of response, but temperament is also something that children are born with. So from using the clues and the definition, we learn a lot about the word temperament and what it means in this sentence.”

3. (Point to the next target word). “Use the strategies to learn this word” (Prompt participant to use strategies and deduce meaning. If participant struggles, model strategies, offer
suggestion, correct errors. Mark strategy use as i = independent strategy use; a = needed assistance.)

4. (Present definition) “What does this definition add to your understanding of the word? What does this word mean?” (Record use of definition)

5. (Continue procedure with all target and unknown words).

1. When all target and unknown words have been learned posttest measures are administered.
   “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

6. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you again! (record end time of session)

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**Strategies plus Definition Group Session Two**

Welcome, remember that we are participating in important work that will help us understand how college students read. Please read the following passage out loud. (start watch, record miscues)
1. “Point to the words whose meaning that you do not know” (record unknown words)

2. “Remember, we have been using strategies and definitions to help us learn the meaning of unknown words.” (Present strategies chart, point to first word). “Can you figure out what this word means?” (If the participant does not respond or does not use strategies, researcher points to the first cue on the strategies chart and says) “Try this.” (If the participant still does not respond, the researcher says:)
   “Look at the other words in the sentence or in other sentences.” (If more help is needed, the researcher points to the words in the sentence that help in meaning generation: reject, avoid, or disregard. If still more help is needed, the researcher will say) “This means that a lot of times, children shun, they avoid, they do not participate in classroom activities. (record use of strategies).

3. (Present definition) “What does this definition add to your understanding of the word?. What does this word mean?” (Record use of definition)

4. Continue procedure with all target and unknown words.

1. **Posttest measures** – When all unknown words have been learned, say: “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the missing word on the line.”

4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.
6. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you for our final session! (record end time of session)

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**Strategies plus Definition Group Session Three**

Welcome, this is the last session. Please read this passage aloud (record time, decoding and prosody)

1. “Point to the words whose meaning that you do not know.”

2. Strategies chart will be on the table, but not specifically presented.) We have been using strategies and definitions to figure out what words mean. First, use those strategies to figure out what this word means. (If the participant struggles, the researcher will encourage the participant to use the strategies independently. Prompts will include) “Think about what we did last session.” “What clues can you use to help you figure out the words?” (If the participant still struggles, the researcher will point to the strategies on the strategy chart. If that is not sufficient then assistance will be provided as in session two. Record strategy use.)

3. (Present definition) “What does this definition add to your understanding of the word? What does this word mean?” (Record use of definition)

4. (Continue procedure with all target and unknown words.)

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1. **Posttest measures** – When all unknown words have been learned, say: “Please read the passage again.” Time reading, mark miscues (line, e, s, nh), record prosody.

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”
4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

Transfer Task

1. (Present passage on Scientific Knowledge), “This task is different than the other tasks. You will be working independently without feedback from me. Please read this passage silently so that you are able to understand it.” (record starting and ending time of silent reading.)

2. “Are there any words in this passage whose meaning that you did not know? Point to the words that you did not know.” (Record words)

3. “Did you do anything with the words you did not know? What did you do to help you understand the words that you did not know?” (record responses and realize there is audiotape)

4. “Please read the passage out loud” (record rate, decoding and prosody)

5. (Present comprehension, CLOZECloze, spelling and definition tasks)

6. Thank you for participating in the study. Here is the gift card to Barnes and Noble. Please sign this receipt which acknowledges that you received the gift certificate. If you have any further question please feel free to contact me.
Script for Dissertation, Control Group Session One

(Record start time of session), Thank you for agreeing to meet with me. This study will provide us with useful information about the reading habits and reading abilities of college students. It will also give you the opportunity to explore your own reading abilities.

1. Please read this form, it explains this study and your rights.
2. Do you have any questions?
3. Do you agree to participate in this study?
4. Please sign two copies of this form, one is for you to keep, I will keep the other in a locked cabinet.
5. Do you need to take remedial courses in reading, writing, or ESL?
6. How many college credits do you have? What is your major? (EDU, EDB, ECI, ECP, EDS,(S,M), other)
7. What is your native language? What languages do you speak? Are you bilingual?
8. What is your date of birth, ethnicity, and gender?
9. Thank you for agreeing to participate in this study. Relax, try your best, remember that when you have completed all three sessions you will receive a gift certificate to Barnes and Noble. Participation in this study is also important because in order to do well in college it is necessary to be able to read lots of text books. Participating in this study offers you the opportunity to explore that kind of reading. It will also help us understand how college students read. It is important to maintain confidentiality during this study. Not all participants will have the same experience, so please do not discuss this study with other students.
10. Now you will complete a vocabulary assessment. (follow script from Nelson Denny ).
11. (Present passage on Play) Now please read this passage out loud: (start stop watch, mark miscues: omitted= line through word; unintelligible, mispronounced = circle word and write e for error; substituted words = circle word and write s; if participant asks for help = circle word and write nh.

12. When participant finishes reading, stop watch, record time and prosody, ask participant: “Are there any words that you do not know in this passage? Point to the words whose meaning that you do not know.” Record unknown words.

1. “Let’s discuss what we have just read. Here are some questions, Let’s talk about them.” (Present questions, read them one at a time and allow time for participant response and discussion.)

2. Questions:
   
   I. What do you remember about play when you were a young child in school?
   
   II. Tell me some of your favorite memories from your early school days.
   
   III. What kinds of activities do adults do when they want to have fun that are similar to what they did for fun as children?

3. After discussion administer posttests.

1. Posttest measures “Please read the passage again.” (Record time reading, mark miscues (line, e, s, nh), record prosody.)

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”
4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

6. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you again! (record end time of session)

Control Group Session Two

1. Welcome, remember that we are participating in important work that will help us understand how college students read. Please read the following passage out loud. (start watch, record miscues)

2. Point to the words whose meaning that you do not know. (record unknown words).

3. “Let’s discuss what we have just read. Here are some questions. Let’s talk about them.” (Present questions, read them one at a time and allow for participant response and discussion.)

4. Questions:
   
   I. What are some things that you learned in your early years of school?

   II. Tell me about some of the children in your classes when you were young.

   III. What kinds of things do you do to help you learn new material now?

1. Posttest measures “Please read the passage again.” (Record time reading, mark miscues (line, e, s, nh), record prosody.)

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.
3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

6. Thank you for participating today. Your next session is day… date… time… place…..Looking forward to seeing you for our final session! (record end time of session)

Control Group Session Three

Welcome, this is the last session, Please read this passage aloud (record time, decoding and prosody)

1. “Point to the words whose meaning that you do not know.”

2. “Let’s discuss what we have just read. Here are some questions. Let’s talk about them.” (Present questions, read them one at a time and allow for participant response and discussion.)

3. Questions:
   
   I. What kinds of things did you write about when you were a young child?

   II. Tell me why you think children should learn to use a computer and why they should also use pens and pencils.

   III. When you have to write papers for your college courses, what kinds of things do you do to help you write the papers?
1. Posttest measures “Please read the passage again.” (Record time reading, mark miscues (line, e, s, nh), record prosody.)

2. Present participant with comprehension questions. Read directions from comprehension scoring rubric, score participant answers.

3. Present CLOZE passage. State: “This is the passage that you have just read. Some of the words have been deleted. Please write the word that is missing on each line.”

4. Present spelling sheet. Say: “Now I would like you to spell some words. Each word will have a number; write the word on the line with the same number.” Follow directions on researcher spelling sheet.

5. Present each target word for definition and say: “Please define this word as it was used in the passage you just read.” Score definition.

Transfer Task

1. (Present passage on Scientific Knowledge), “This task is different than the other tasks. You will be working independently without feedback from me. Please read this passage silently so that you are able to understand it.” (record starting and ending time of silent reading.)

2. “Are there any words in this passage whose meaning that you did not know? Point to the words that you did not know.” (Record words)

3. “Did you do anything with the words you did not know? What did you do to help you understand the words that you did not know?” (record responses and realize there is audiotape)

4. “Please read the passage out loud” (record rate, decoding and prosody)

5. (Present comprehension, CLOZE, spelling and definition tasks)
6. Thank you for participating in the study. Here is the gift card to Barnes and Noble. Please sign this receipt which acknowledges that you received the gift certificate. If you have any further question please feel free to contact me.
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