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The Effects of Visual Imagery and Keyword Cues on Third-Grade Readers' Memory, Comprehension, and Vocabulary Knowledge

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THE EFFECTS OF VISUAL IMAGERY AND KEYWORD CUES ON THIRD-GRADE READERS' MEMORY, COMPREHENSION, AND VOCABULARY KNOWLEDGE

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Curriculum and Instruction

by
Heather Rogers Brooker
August 2013

Accepted by:
Dr. Linda B. Gambrell, Committee Chair
Dr. Angela Eckhoff
Dr. William Fisk
Dr. Martha Thompson
ABSTRACT

It is estimated that nearly 70% of high school students in the United States need some form of reading remediation, with the most common need being the ability to comprehend the content and significance of the text (Biancarosa & Snow, 2004). Research findings support the use of visual imagery and keyword cues as effective comprehension strategies (Denner, McGinfly, & Brown, 1989; Gambrell & Jawitz, 1993; Sadoski, 1985). This study extends the current body of research on these two strategies by (a) exploring and comparing the combined effects and interactions of training students in the coordinated use of visual imagery and keyword cues, and (b) examining the effects of training students in the use of keyword cues as a post reading comprehension strategy. For the purposes of this study, 98 third-grade students were randomly assigned to one of the following treatment conditions: (a) visual imagery (during reading), (b) keyword cues (after reading), (c) visual imagery (during reading) + keyword cues (after reading), or (d) general memory instructions (before reading). Strategy instruction for all treatment conditions took place across four instructional lessons, following Pearson and Gallagher’s (1983) “gradual release of responsibility” model. In order to examine main effects of treatment condition on narrative and expository dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge, participants were administered immediate-post assessments one week after their final instructional lesson, and delayed-post assessments six weeks after their final instructional lesson. A series of parallel MANOVAs were conducted to analyze student performance on the immediate/delayed-post assessment
narrative and expository dependent measures. Follow-up post hoc analyses of significant univariates revealed that participants in the two treatment conditions where they were trained to utilize keyword cues, significantly outscored their peers in one or both of the other two treatment conditions on (a) immediate-post assessment measures of memory, and explicit and implicit comprehension, and (b) delayed-post assessment measures of implicit comprehension. In addition, qualitative analyses revealed higher accounts of perceived value as a function of future strategy use, for participants who were trained in the use of keyword cues.
DEDICATION

To my parents, Drs. Margaret and Lowrie Glasgow, who instilled in me the value of education, at every level, and who have been my greatest support of love and guidance through this journey – this degree truly belongs to three people. To my children, Maggie and Jack, who have been a constant source of joy, and reminder of the importance of improving education for all children. To my grandmother, Betty Rogstad, who has inspired me in all my efforts to be a better person through her unwavering expectation of great accomplishments from me, and unconditional love. To my sister-in-law, Kara, who through everything always makes me smile.
ACKNOWLEDGEMENTS

My sincerest appreciation and respect to my advisor, Dr. Linda B. Gambrell, who has guided me in this endeavor, as a constant beacon of what all of us walking this path inspire to become. Thank you to Dr. William Fisk, who has shown unquestioning faith in me as a student, educator, and researcher. Thank you to Dr. Angela Eckhoff for always sharing her wisdom and contagious enthusiasm for teaching and research. Thank you Dr. Martha Thompson, for taking the time to relate your knowledge of statistics to the goals of this study, and for providing me with the foundation to continue those research endeavors.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iv</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>x</td>
</tr>
</tbody>
</table>

## CHAPTER

### I. DOCUMENTED NEED FOR EFFECTIVE COMPREHENSION INSTRUCTION
- Components of Effective Comprehension Instruction .................................................. 1
- Purpose of the Study ..................................................................................................... 5
- Research Questions ...................................................................................................... 6
- Definition of Terms ...................................................................................................... 7

### II. AN OVERVIEW OF RELATED LITERATURE

- The Role of Working Memory in Reading Comprehension ............................................. 12
- Theoretical Foundations ............................................................................................... 15
- Empirical Evidence Supporting the Strategic Use of Visual Imagery and Keyword Cues As Aids to Memory, Comprehension, and Vocabulary ........................................ 21
- Foundation of Current Study ....................................................................................... 32

### III. METHODS AND PROCEDURES

- Hypotheses .................................................................................................................. 34
- Methods ....................................................................................................................... 36
Table of Contents (Continued)

<table>
<thead>
<tr>
<th>VI. RESULTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Questions</td>
<td>79</td>
</tr>
<tr>
<td>Summary of Overall Findings</td>
<td>81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>V. DISCUSSION</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose and Methods</td>
<td>109</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>113</td>
</tr>
<tr>
<td>Classroom Applications</td>
<td>126</td>
</tr>
<tr>
<td>Limitations and Implications for Future Research</td>
<td>128</td>
</tr>
<tr>
<td>Conclusions</td>
<td>132</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPENDICES</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Preassessment of Contextually Relevant Vocabulary</td>
<td>139</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
</tr>
<tr>
<td>B: Instructional Lesson Passages/Keyword Cue Lists</td>
<td>151</td>
</tr>
<tr>
<td>C: Spache Readability Levels of Instructional Lessons and Immediate-/Delayed-Post Assessment Passages</td>
<td>160</td>
</tr>
<tr>
<td>D: Treatment Condition Scripted Protocols for Researcher Modeled Instructional Lesson</td>
<td>162</td>
</tr>
<tr>
<td>E: Immediate-Post Assessment Narrative Measures</td>
<td>175</td>
</tr>
<tr>
<td>F: Immediate-Post Assessment Expository Measures</td>
<td>180</td>
</tr>
<tr>
<td>G: Immediate-Post Assessment of Contextually Relevant Vocabulary Knowledge</td>
<td>185</td>
</tr>
<tr>
<td>H: Key Informant Reports</td>
<td>188</td>
</tr>
<tr>
<td>I: Delayed-Post Assessment Transfer Measures</td>
<td>190</td>
</tr>
<tr>
<td>J: Immediate-Post Assessment Procedures</td>
<td>194</td>
</tr>
<tr>
<td>K: Delayed-Post Assessment Retention Procedures</td>
<td>205</td>
</tr>
<tr>
<td>L: Delayed-Post Assessment Transfer Procedures</td>
<td>212</td>
</tr>
</tbody>
</table>

REFERENCES .............................................................................................................214
### LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Demographic Characteristics of Sample</td>
<td>40</td>
</tr>
<tr>
<td>4.1</td>
<td>Effect Sizes of Narrative Measures Yielding Significant Treatment Condition Effects</td>
<td>83</td>
</tr>
<tr>
<td>4.2</td>
<td>Effect Sizes of Expository Measures Yielding Significant Treatment Condition Effects</td>
<td>83</td>
</tr>
<tr>
<td>4.3</td>
<td>Univariate Findings for Immediate-Post Assessment Narrative Dependent Measures</td>
<td>90</td>
</tr>
<tr>
<td>4.4</td>
<td>Univariate Findings for Immediate-Post Assessment Expository Dependent Measures</td>
<td>91</td>
</tr>
<tr>
<td>4.5</td>
<td>Means, Standard Deviations, and Pairwise Comparisons of Immediate-Post Assessment Narrative Dependent Measures</td>
<td>92</td>
</tr>
<tr>
<td>4.6</td>
<td>Means, Standard Deviations, and Pairwise Comparisons of Immediate-Post Assessment Expository Dependent Measures</td>
<td>93</td>
</tr>
<tr>
<td>4.7</td>
<td>Univariate Findings for Delayed-Post Assessment Retention Narrative Dependent Measures</td>
<td>95</td>
</tr>
<tr>
<td>4.8</td>
<td>Univariate Findings for Delayed-Post Assessment Retention Expository Dependent Measures</td>
<td>96</td>
</tr>
<tr>
<td>4.9</td>
<td>Means, Standard Deviations, and Pairwise Comparisons of Delayed-Post Assessment Retention Narrative Dependent Measures</td>
<td>97</td>
</tr>
<tr>
<td>4.10</td>
<td>Means, Standard Deviations, and Pairwise Comparisons of Delayed-Post Assessment Retention Expository Dependent Measures</td>
<td>98</td>
</tr>
<tr>
<td>4.11</td>
<td>Univariate Findings for Delayed-Post Assessment Transfer Narrative Dependent Measures</td>
<td>99</td>
</tr>
</tbody>
</table>
List of Tables (Continued)

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.12</td>
<td></td>
</tr>
<tr>
<td>4.13</td>
<td></td>
</tr>
</tbody>
</table>

4.12 Univariate Findings for Delayed-Post Assessment
   Transfer Expository Dependent Measures ........................................... 100

4.13 Thematic Categories ............................................................................ 103
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Independent, Potential Confounding, and Dependent Study Variables</td>
<td>44</td>
</tr>
<tr>
<td>3.2</td>
<td>Calendar of Study Events</td>
<td>62</td>
</tr>
<tr>
<td>4.1</td>
<td>Significant Multiple Pairwise Comparison Findings of Immediate-/Delayed-Post Assessment Dependent Measures</td>
<td>83</td>
</tr>
<tr>
<td>5.1</td>
<td>A Heuristic For Thinking About Reading Comprehension</td>
<td>127</td>
</tr>
</tbody>
</table>
CHAPTER ONE

DOCUMENTED NEED FOR EFFECTIVE COMPREHENSION INSTRUCTION

Literacy, or the ability to read and comprehend text, is an essential skill for preparing students to serve as productive members of our society. According to White and McCloskey (2003), being literate allows individuals to function in society, to achieve goals and to develop knowledge and potential. It can be assumed that comprehension is the ultimate goal in successful reading, particularly within the theoretical transfer of comprehension to application and task performance. The ability to comprehend text depends on the integration of several cognitive factors/skills, ranging from lower-level cognitive skills (i.e., phonics, oral reading accuracy, and word recognition skills) to higher-level cognitive skills (i.e., vocabulary acquisition, comprehension, inference-making, and predicting).

When comprehension was first recognized as an essential factor in reading proficiency in our country, it’s assessment was often limited to a behaviorist lens, where reading success was equated with performance on directly observable tasks that measured lower-level skills (i.e. phonics, oral reading accuracy, and word recognition skills). It wasn’t until the 1960’s and 1970’s, with the acceptance and advancements in the field of cognitive psychology, that research efforts in comprehension were redirected to focus on the identification and examination of the ‘unobservable’ implicit, higher-order cognitive factors/skills (i.e., vocabulary acquisition, inference-making, predicting) involved in comprehension (Pearson, 2009). In 1976, in an effort to advance these research objectives, the National Institute of Education issued a Request for Proposal (RFP)
describing the need for a Center for the Study of Reading whose central concern would be comprehension. Findings from a seminal study, conducted at the Center by Durkin (1978-79), found that in 24 fourth-grade classrooms in 13 different school systems across central Illinois, less than 1% of the designated reading period was being dedicated to comprehension instruction.

In this same time period, public concerns regarding controversial social reforms within schools, and public property tax funding of these newly reformed schools, led the to the creation of the United States Department of Education. The Department of Education’s release of National Assessment of Educational Progress (NAEP) reports brought concerns of student reading achievement under further public scrutiny. In 1983, in response to declining student achievement scores and growing public concern, the National Commission on Excellence in Education (NCEE) released the report, *A Nation at Risk: The Imperative for Education Reform*. The report displayed an American educational system that was quickly falling behind in an emerging global economy. Within the report, it was estimated that 23 million Americans were functionally illiterate with approximately 13% of 17-year-olds being identified as functionally illiterate.

In 1997, in response to the growing urgency among state and local policy makers, researchers, and the American public, for major educational reforms with measurable objectives and goals, Congress requested that the National Institute of Child Health and Human Development (NICHD) along with the Secretary of Education convene a National Reading Panel (NRP) to examine empirical findings relating to effective reading instruction for school-aged children. In the report, the panel outlined empirical evidence
supporting the effectiveness of explicit comprehension instruction, as a means of helping students become more proficient readers. These findings, along with the acceptance and advancement of research findings in the field of cognitive psychology, led researchers and policy makers to focus their efforts on the identification and examination of effective explicit teaching strategies as a means of instructing and guiding students to gain proficiency in the implicit higher-order cognitive skills involved in effective reading comprehension.

After three decades of research and reform in comprehension instruction and assessment, Biancarosa and Snow (2004), in their publication, *Reading Next—A Vision for Action and Research in Middle and High School Literacy*, reported that nearly 70% of high school students in the United States need some form of reading remediation, with the most common need being the ability to comprehend the content and significance of the text. The current need for more effective comprehension instruction in our nation’s schools is further mirrored in the results of the 2011 National Assessment of Educational Progress (NAEP) report, which showed that while the average reading score for fourth-grade students was significantly higher than the average reading score in 2005, the percentages of students performing at or above proficient, or at advanced, have shown no significant increase since 1992. While some may focus on the fact that these findings show no net decrease in literacy scores, “the increased literacy demands of today’s society and job market mean that the flat profile is really a need decrease in scores” (Taylor, Pearson, García, Stahl, & Bauer, 2006, p. 304).
Furthermore, within our own state of South Carolina, the latest NAEP Report (2011) revealed that 4th grade students' overall reading achievement score was 215, falling below the nation's average score of 220, and significantly lower than the average reading achievement scores of 36 of the states. In addition, according to the report, South Carolina has not shown any significant increase in the percentages of fourth-graders’ scoring at the basic, advanced or proficient levels since 1998.

**Components of Effective Comprehension Instruction**

Reading achievement scores reflect the need for improved literacy instruction in today's classrooms (NAEP, 2011). Effective readers selectively employ multiple comprehension strategies, before, during, and after reading, to help guide and integrate the cognitive factors/skills involved in effective reading comprehension. Explicit instruction of reading strategies has proven to be an effective instructional technique in helping to raise students’ reading achievement (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989). In particular, research has shown that the explicit instruction of multiple reading strategies can positively benefit reading achievement by allowing students to utilize different skills for memory, comprehension, and vocabulary acquisition (Pearson & Dole, 1987; Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, & Brown, 1992).

According to Gambrell and Jawitz (1993), "Successful initiation and use of appropriate comprehension strategies depend on the reader's awareness of specific strategies and the employment of these strategies to assure better comprehension” (p. 265). This statement aligns with research-based comprehension instruction reviews by
Pressley (1989) and Stahl (2004), which both posited the need for explicit training of multiple methodological approaches in order to produce efficient, self-regulated comprehenders.

Studies have shown that the acquisition of several of the cognitive factors/skills involved in reading comprehension, are directly related to a reader's memory system (Baker, 2008; Daneman & Carpenter, 1980; Kintsch & Kintsch, 2005; Vellutino, 2003). In particular, how a reader's memory subsystems attend to, encode, and retrieve pertinent textual information before, during, and after reading. In an effort to gain a better understanding of the role of memory in text comprehension, researchers have identified several strategies that positively influence readers' memory subsystems, including visual imagery and keyword cues (Ackerman, 1996; Denner, McGinfly, & Brown, 1989; Pressley, 1976; Sadoski, Goetz, Sticker, & Burdenski, 2003; Zaromb & Roediger III, 2009).

**Purpose of the Study**

The major hypothesis in the present study is grounded in theoretical perspectives which support the notion that visual imagery (during reading) and keyword cues (after reading) play similar roles in the processing chains involved in comprehension, in particular, as potential retrieval strategies for aiding young readers’ comprehension of text (Paivio, 1971, 2007; Ericcson & Kintsch, 1995; Kintsch, 1998) In order to test this hypothesis, this study examined and compared the effects of explicit strategy training in four different treatment conditions: visual imagery (during reading), keyword cues (after reading), visual imagery (during reading) + keyword cues (after reading), and general
memory instructions (before reading). The idea of combining the two instructional approaches comes from current theoretical consensus, which identifies text comprehension as an active process where a reader is creating a representational system that allows for efficient search, retrieval, and rapid inference based on verbal and nonverbal interactions with their environments (Lorch & van den Broek, 1997). Furthermore, that these two strategies, when used in combination, could interact in positive interconnected ways that result in enhanced memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text.

While there is a wealth of empirical evidence supporting the effectiveness of both visual imagery and keyword cues on memory, comprehension, and vocabulary of text in elementary school readers; no study to date has examined the effects and interactions of training students to combine visual imagery (during reading) and keyword cues (after reading) as a means of enhancing third grade students' memory, comprehension, and vocabulary knowledge in both narrative and expository text passages. In addition, while a number of studies have documented the effectiveness of keyword cues as a pre-reading strategy for comprehending text, no research could be located about the use of keyword cues as a post-reading strategy.

**Research Questions**

The specific questions that guided the study were:
1. What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative text?

2. What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of expository text?

3. What do key informant reports reveal about student perceptions of their experience utilizing the strategy training they received, and how do those differences relate to treatment condition performance on immediate-/delayed-post assessments?

Definition of Terms

Key terms used in this research are defined below:

Abstract noun: a word describing a quality, state, action, or other intangible, as joy, idea, movement. (In The Literacy Dictionary, 1995)

Collaboration: the act of working with others to learn and understand new information/skills.

Comprehension: process where reader constructs meaning from written text based on their prior knowledge and experiences to form their own individual meaning of the text.

Explicit comprehension questions - the answers are specifically stated in the text (Leslie & Caldwell, 2006).
Implicit comprehension questions - readers must make inferences from information not specifically stated in the text (Leslie & Caldwell, 2006).

Comprehension strategies: a systematic sequence of cognitive procedures for aiding a reader in their construction of meaning before, during, and/or after reading.

Concrete noun: a noun with a material referent, as *house, book.* (In *The Literacy Dictionary*, 1995).

Conditional knowledge: the knowledge of *when* and *why* to use a particular strategy. (Almasi, 2003).

Construction Integration Model: model set forth by Kintsch and Ericcson (1995) for skilled learners that divides working memory into two subsystems, referred to as Short Term Working Memory (ST-WM) and Long-Term Working Memory (LT-WM). The LT-WM component serves as an intermediary storage hub, where encoded information for skilled domains can be quickly retrieved when appropriate retrieval cues become activated in ST-WM.

Dual Coding Theory (DCT): theoretical model set forth by Paivio (1971), with a basic premise that the brain receives information via two separate routes, one verbal and one nonverbal.

Declarative knowledge: the knowledge about the structure and goal of a task (Paris, et. al, 1983).

Expository text: text that presents written material in structures such as: compare and contrast, problem and solution, or descriptive. They are often referred to as content area texts (e.g. history, science, mathematics) [Leslie & Caldwell, 2006].
**Long-Term Memory:** processing subsystem of the human brain that allows for long-term storage of encoded information that can be later retrieved and incorporated into information being processed in working memory by the learner.

**Long Term-Working Memory (LT-WM):** within the Construction Integration Model, LT-WM allows a pathway to specified information stored in long-term memory through the activation of retrieval cues in short term-working memory (ST-WM).

**Narrative text:** text that presents written material in structures often dealing with a setting, character, goal/problem, events, and resolution. They are often utilized in the younger grades and consist of different genres such as: legends, folktales, fantasy, mystery, etc…

**Keyword cues:** words that act as meaning makers by connecting the reader to hierarchal contextually relevant pieces of information. For the purposes of this study, they consisted of words or short telegraphic phrases found directly in a passage that unfolded the meaning of the passage in chronological or sequential order.

**Literacy:** the ability to use printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential (National Assessment of Adult Literacy, 2003).

**Metacognition:** awareness and knowledge of our cognitive processing of information and/or situations.

**Motivation:** the initiated and directed allocation of time and effort to perform a behavior and/or obtain a particular goal.
Procedural knowledge: the knowledge of how to use a particular strategy.

(Almasi, 2003).

Recall: bringing up an overall representation of information just encountered through either a communicative medium such as: words, pictures, or oral retellings (Harris & Hodges, 1995).

(a) Cued recall – recall that is aided or prompted.

(b) Delayed recall – remembering material at some point in time after study.

(c) Free recall – a memory task in which a subject is given a series of items and is later asked to recall them in any order.

(d) Immediate recall – remembering material very soon after studying it.

Recency effect: the tendency to remember what a learner has most recently been exposed to over information previously encountered.

Retention: a delayed assessment of learning to discover its relatively long-term effects.

(In The Literacy Dictionary, 1995)

Schema: systems of cognitive structures that represent chunks of interrelated encoded information about relationships of stimuli encountered in the world.

Self-efficacy: belief in one’s ability to successfully perform a particular behavior and/or achieve a particular goal.

Sensory register: subsystem of human brain that holds incoming stimuli from the surrounding environment for no more than 2-3 seconds.
Short term-working memory (ST-WM): within the Construction Integration model, this subsystem of the brain is utilized to process and remember the information a learner is currently encountering. Based on the reader’s former knowledge and experiences, certain retrieval cues can be activated and utilized to quickly integrate this information to existing knowledge from a reader's LT-WM.

Strategy: a structured set of rules or plans that are adaptable, and can be used in conjunction with different skills or strategies.

Transfer: For the purposes of this study, refers to the transfer of strategy training in a way that the student recognizes and effectively utilizes procedural and conditional strategy knowledge to the newly encountered expository text during delayed-post assessments.

Value: For the purposes of this study, the relative worth or utility of performing a particular behavior and/or achieving a particular goal.

Visual Imagery: the process of forming mental image(s) through nonverbal mental modalities and connecting the image(s) to words or phrases within the verbal system of our brains.

Working Memory (Short-term memory): processing subsystem of the human brain that can hold small amounts of information for 20-30 seconds unless it is held in by maintenance rehearsal or encoded into existing schemas in long-term memory.
CHAPTER TWO
AN OVERVIEW OF RELATED LITERATURE

Ever since the public release of the NCEE’s 1983 report, *A Nation at Risk: The Imperative for Education Reform*, student proficiency in reading has remained a concern among researchers, educators, policy makers, and educational stockholders. In response, educators turn to empirically supported instructional strategies grounded in theoretical frameworks for effective comprehension instruction. This chapter provides the following: (a) an overview of the role of working memory in reading comprehension, (b) theoretical foundations relating the strategic use of visual imagery (during reading) and keyword cues (after reading) to working memory, (c) empirical findings supporting the role of these two strategies as potential aids for increasing reading achievement in the classroom, and (d) foundation for the present study.

**The Role of Working Memory in Reading Comprehension**

Studies have shown that the acquisition of several of the cognitive factors/skills involved in reading comprehension, are directly related to a readers memory system (Baker, 2008; Daneman & Carpenter, 1980; Kintsch & Kintsch, 2005; Vellutino, 2003). In particular, how a reader's memory subsystems attend to, encode, and retrieve pertinent textual information before, during, and after reading. Over the past four decades, several theoretical models have examined the relationship between memory and reading achievement through the lens of Atkinson & Shiffrin’s (1968) Information Processing Theory (e.g., Atkinson & Shiffrin, 1968; Gough, 1972; LaBerge & Samuels, 1974; Rumelhart, 1985). According to the Information Processing Theory, a learner's memory
system is subdivided into three sub-compartments, including (a) the sensory registry for incoming stimuli and attentional allocation, (b) the working memory for the processing and encoding of the chosen stimuli, and (c) the long-term memory (LTM) for the storage and retrieval of encoded information. Within the framework of this model, it is theorized that during the reading process, if a learner is able to retrieve relevant information from LTM, and connect it to the information being processed in the working memory; then, the learner should be able to make meaning of the current text in a way that aids storage in LTM for later retrieval.

One common thread in many of these current cognitive theories of reading achievement is the acknowledgement of the challenges of the limited duration and storage capacity of working memory as readers attempt to integrate all the cognitive/factors skills involved in effective comprehension. This limitation is evident in research studies that have shown that children with limited working memory capacity have difficulty in reading and comprehension (Daneman & Carpenter, 1980; Oakhill, Cain & Bryant, 2003; Oakhill, J., 1982; Seigneuric & Ehrlich, 2005; Seigneuric, Ehrlich, Oakhill, & Yuill, 2000; Swanson, Howard, & Sáez, 2006). Furthermore, results from a study conducted by Seigneuric and Ehrlich (2005), revealed that individual differences in working memory capacity was a direct predictor of Grade 3 comprehension abilities, and that measures of working memory in Grade 2 had direct effects on Grade 3 reading comprehension performance.

Assuming that readers have the working memory capacity to process comprehension strategies, the question is not whether to have a child use a
comprehension strategy, but instead *when* a child should use the strategy. Most comprehension strategy instruction implemented within classrooms today requires the learner to attend to the strategy before or during passage reading. By having the child utilize a strategy while reading, the working memory is simultaneously being used for two strenuous processes, appropriate strategy use and attainment of overall meaning. With this cognitive burden in mind, it could be assumed that training readers in the utilization of post reading strategies could potentially reduce the demands on working memory by allowing students to allocate more cognitive resources to established, self-regulated comprehension processes, before shifting those resources to less routinized strategy comprehension aids. Oakhill (1982) conducted a study with eight-year old children to examine the differences in constructive processes between skilled and less skilled comprehenders' memory for sentences. Findings suggested that the less skilled comprehenders made less use of constructive cognitive processes in remembering text, suggesting that this group's deficiencies may be a result of impairments in constructive memory processing of text. From these results, she suggested that "...training them in selection of pictures or summary statements which represent integrated versions of the original material" (Oakhill, 1982, p. 18) may offer a viable avenue for helping them learn to become more constructive in text recall and the overall comprehension process.

The use of keyword cues as a post reading comprehension strategy could also offer readers and instructors insight into any existing schemas the reader may have that are interfering with their retrieval of passage information. A study on retrieval-induced forgetting (RIF), Anderson and Bell (2001) asserted that in an individual’s attempt to
communicate their comprehension of text, they are relying on “schema-driven retrieval”, which may be compromised if their attentional resources are distracted by existing associated knowledge in their long-term memory. Specifically, in this study the use of passage-specific keyword cue lists for rendering free recalls, could serve as (a) a metacognitive tool for a reader’s self-awareness of weaknesses and/or misconceptions in their comprehension of the text they just read, as well as (b) an observable indicator for instructors of those weaknesses and/or misconceptions.

The purpose of this study was to examine the effects of training readers in the utilization of keyword cues (after reading) as a retrieval aid to visual imagery (during reading), as a means of potentially reducing the cognitive load of working memory during reading; allowing the reader to more efficiently process and synthesize large amounts of textual information through verbal and nonverbal routes.

**Theoretical Foundations**

The theoretical rationale for this research study was grounded in two principal theories that specifically address the role of a readers’ memory systems in relation to the use of visual imagery (during reading) and keyword cues (after reading) as strategic aids for enhancing memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text. The first, Dual-Coding Theory (DCT) provides theoretical support for the use of visual imagery, and the second, Construction-Integration (CI) Model, provides theoretical support for the use of keyword cues.
Dual-Coding Theory

Theoretical foundations for implementing visual imagery instruction as a text processing strategy, is most prominently founded in Paivio's (1971, 2007) Dual-Coding Theory. The basic premise of this theory of cognition is that the brain receives information via two separate but interconnected routes, one verbal (e.g., language) and one nonverbal (e.g., situations and objects). Essentially, readers' brains are taking in both linguistic and visual information as they interact with text, and both types of information have the ability to reinforce and strengthen readers' overall "meaning-making" process based on their prior experiences. Sadoski & Paivio (2004) describe the interaction and reinforcement between these two cognitive routes in terms of 'logogens' (incoming verbal information), and 'imagens' (multisensory nonverbal components).

According to DCT, 'logogens' are constrained by structure to make meaning, whereas 'imagens' are less confined by logical thought processes and are more holistic in nature. (Sadoski & Paivio, 2004). Logogens and imagens are processed initially as familiar representational connections induced by sensory stimuli. Once the logogen and/or imagen has been recognized and directed to the verbal and/or nonverbal system, associative processing can begin. This is where readers begin to make meaningful connections within the respective code systems, activating the potential for meaningful comprehension within the individual systems. Finally, referential connections can be made when meaningful connections are made between the two coding systems. It is the associative and referential connections in between the 'logogens' and 'imagens' that have
the ability to strengthen a reader's abilities to continually integrate large amounts of information in their memory systems.

A study by Sadoski, Goetz, Sticker, and Burdenski (2003) looked at imagery effects in written composition. In the study, undergraduates were given 4 concrete and 4 abstract terms to define. Results of the study suggested a strong association exists between language concreteness and meaningful comprehension and recall. The authors' concluded that the study's findings, "...can be explained by the DCT assumption that meaning and memory are enhanced by referential connections between the verbal and nonverbal codes" (p. 451). Thus, training children to make contextually relevant visual images offers a pathway for creating "conceptual mental pegs" that can be directly associated with written text for effective encoding and retrieval.

Another study by Pressley (1976) supports the benefits of helping children to create connections between logogens and imagens as a means for improving children's ability to integrate large amounts of textual information into their memory systems for retrieval and comprehension of written text. In the study, 8-year old students received 4-weeks of explicit mental imagery training, where they were instructed to stop after reading specific segments of the short story and create a mental image of that segment before moving on. Students in the treatment condition, who received the training, significantly outperformed students in the control condition on a short-answer assessment of memory for the short story. These findings support that making associative and referential connections between verbal and non-verbal routes can aid young readers’ memory and comprehension of age-appropriate text.
Construction-Integration Model

Ericsson and Kitsch’s (1995) construction-integration model (CI) provides theoretical support for the use of keyword cues as retrieval strategies in text processing. Unlike earlier memory models, CI offered an expanded view of working memory's storage capacity. In particular, they were looking to explain individuals’ expanded working memory capacity when executing expert skills. This model divides working memory into two subsystems, referred to as Short-Term Working Memory (ST-WM) and Long-Term Working Memory (LT-WM).

The LT-WM component serves as an intermediary storage hub, where encoded information for skilled domains can be quickly retrieved when appropriate retrieval cues become activated in ST-WM. The researchers assert that LT-WM is reserved for specific skilled activities, where individuals are able to effectively and quickly integrate and react to a large amount of information. These functions are executed rapidly despite the known limited capacity of overall short-term memory and time constraints of retrieving encoded information from long-term memory. The theory asserts that the cognitive processes needed to carry out skilled activities are made up of a series of cognitive states, or thoughts, that are dependent on each other.

Within the framework, sensory, perceptual, and conceptual operations, all of which are dependent on prior knowledge, the environment, and elaborative processes, must be combined in the formation of these cognitive states. In the model, LT-WM houses process-specific memory buffers, where large amounts of intermediate
components are stored and connected together to form an overall integrated meaning of the skill (Ericcson & Kintsch, 1995).

Storage and retrieval of information in this form provides two major advantages: (a) speed, and (b) protection from interference. In terms of speed, the researchers argue that activation of a retrieval cue allows specific encoded information from long-term memory to be recovered at rates similar to retrieval speeds of information from short-term memory. Within the CI model, LT-WM allows a pathway to specified information stored in long-term memory through the activation of retrieval cues, thus explaining the storage of large amounts of information in an easily accessible form.

Within the context of this model, it is assumed that encoding with the use of retrieval cues is occurring at two separate levels. The first level of encoding is based on the recency effect, or the tendency to remember what a learner has most recently been exposed to over information previously encountered. Therefore, the first type of retrieval cues described in the model are used for processing information that only needs to be available for a short amount of time; and, the second, elaborative type, is used for information that has to be available for longer periods of time and consists of intricate semantic links with prior knowledge and experience (existing schema). In terms of text comprehension, it is assumed that while reading a sentence, readers are using the first level of encoding to process new information and relate it to the most recent information read; and, the second level of encoding as an overall comprehensive tool, pulling together the contextual message of the text along with any additional elaborative information available from the reader’s prior knowledge bank.
Support for this phenomena was carried out in a study by Glanzer and Nolan (1986) where subjects were interrupted during text reading and asked to recall overall topic and detail information presented in the sentence they were currently reading vs. information from one to three sentences earlier. Findings showed there was a 700 ms difference delay in recall of details of the earlier sentence versus the more recently read sentence. However, there was no significant difference in recall rates of topic information between the two sentences. The researchers concluded that the details of the current sentence were being held in ST-WM, and were thus quickly retrievable, while the details from three sentences earlier had moved out of ST-WM. On the other hand, the overall topic information was being encoded through more stable, longer-lasting elaborative structures, which were connected with semantic links that became more stable over time (Ericsson and Kintsch, 1995).

By limiting the amount of details being processed in ST-WM, readers have cognitive resources available to access relevant information in long-term memory through the use of specified retrieval cues. Freeing up processing space in working memory leaves readers less susceptible to interference from irrelevant information. This concept can help explain why readers are able to read a chapter in a novel, put it down for a couple of days, and then resume reading from where they left off without having to reread in order to make sense of the new material. Yet, those same readers might experience difficulty recalling specific details from the previously read text.

From a developmental perspective, it is logical to assert that beginning readers utilize the majority of their ST-WM processes to attend to decoding and vocabulary
recognition. Therefore, they may have less cognitive resources available to develop retrieval structures in their LT-WM, which are necessary to formulate a more holistic, contextual meaning of the larger passage at hand. Providing readers with sequentially relevant retrieval cues after reading, in the form of passage-specific keyword cue lists, consisting of short, telegraphic phrases about passage details and a summarizing resolution sentence, may allow readers to link the overall meaning of the passage, without overloading their working memory while reading. By minimizing the cognitive load of this processing center, readers may have more cognitive resources available to effectively comprehend the text.

**Empirical Evidence Supporting the Strategic Use of Visual Imagery and Keyword Cues As Aids To Memory, Comprehension, and Vocabulary Knowledge**

The following two sections outline the wealth of research-based findings supporting the use of visual imagery and keyword cues as retrieval aids for aiding young readers’ overall construction of meaning; in particular, significant findings of their efficacy as strategies for memory, comprehension, and vocabulary knowledge.

**Research Supporting the Use of Visual Imagery as a Strategy for Memory, Comprehension, and Vocabulary**

Findings from several seminal studies support the effectiveness of explicit training in the use of visual imagery as an aid to increasing children’s’ memory, comprehension, and vocabulary of text (Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; Hargris & Gickling, 1978; Pressley, 1976; & Sadoski, 1985). Visual imagery, in relation to text comprehension, can be described as the process of forming mental
image(s) through nonverbal mental modalities and connecting the image(s) to words or phrases within the verbal system of our brains. Research supports that, (a) readers who form vivid mental images while interacting with written text can enhance their memory or recall of what they have read (Gambrell & Jawitz, 1993; Pressley, 1976; Sadoski, 1985; Sadoski, Goetz, Sticker, and Burdenski, 2003), (b) visual imagery instruction as an effective strategy to improve reading comprehension (Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; McCallum & Moore, 1999; Pressley, Johnson, Symons, & McGoldrick, 1989; Sadoski, Goetz, Sticker, and Burdenski, 2003), and (c) the ability of young children to form mental images for concrete words can be an effective strategy for increasing vocabulary knowledge (Hargis & Gickling, 1978; Levin & Pressley, 1978; Pressley, 1977).

**Studies on the implications of visual imagery training on memory and comprehension.** As mentioned previously, visual imagery is an instructional strategy with empirical evidence supporting its effectiveness in enhancing young children's memory of text (Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; Pressley, 1976; Sadoski, 1985). A study by Sadoski, Goetz, Sticker, and Burdenski (2003) looked at imagery effect in written composition. In the study, undergraduates were given four concrete and four abstract terms to define. Results of the study suggested a strong association exists between language concreteness and meaningful comprehension and recall. The authors' concluded that these findings, "...can be explained by the DCT assumption that meaning and memory are enhanced by referential connections between the verbal and nonverbal codes" (p. 451).
Pressley's 1976 study examined the use of mental imagery training + contextually appropriate illustrations on 8-year olds’ prose comprehension. The treatment group showed a slight advantage on a post-multiple choice test, but the difference was not significant. However, there was a significant effect on the posttest between good readers and average and poor readers. He asserted that a possibility for lack of a significant difference between the treatment and control group could be attributed to the fact that since the two groups were randomly assigned based on reading level, maybe many of the participants in the control group were already imaging and reaping the benefits.

Another study regarding visual imagery and memory conducted by Sadoski (1985), found that third- and fourth-grade participants that reported making mental images during the climax of a narrative text, were consistently associated with increased retelling scores. Furthermore, the study found that providing students with non-illustrated text resulted in students reporting twice as many images than in an earlier exploratory study where illustrations were included in the text (Sadoski, 1983). The researcher attributed the difference to the idea that non-illustrated text may force readers to evoke more mental images. The study also found that students who reported climax imaging showed no significance difference on total retell scores whether they were asked to describe their imaging first or retelling first vs. peers who did not report climax imaging. From these findings he contended that "...imagery can serve as a comprehension strategy, as a mental peg for memory storage, retrieval, and reintegration, and as a repository of deeper meanings that unitize text information" (p. 666).
Gambrell and Jawitz (1993) saw a slightly different trend regarding the use of relevant text illustrations. In their study, fourth-grade students were randomly assigned to one of the following four treatment conditions: (a) training and instruction in forming mental images of non-illustrated text, (b) training in instructions in attending to text-relevant illustrations, (c) training and instruction in forming mental images and attending to text-relevant illustrations, or (d) instructions to do whatever they could to remember what they had read (control group). The treatment condition that was instructed and trained in the use of visual imagery and to attend to text-relevant illustrations significantly outperformed their peers in the other three treatment conditions on measures of memory (free recall) and comprehension (cued recall). Like Pressley (1976) and Sadoski (1985), findings supported the benefits of the ability of certain upper elementary children to independently utilize visual imagery as a tool for enhancing comprehension. Just as Pressley (1976) asserted, regarding the findings from his study, an important aspect to keep in mind is that all of these children were reading on grade-level; and, therefore, the significant differences observed in this study may not apply to low-ability readers, and/or low picture learners.

Gambrell and Bales (1986) examined the effects of utilizing mental imagery training as a comprehension-monitoring strategy for struggling fourth-and fifth-grade readers. Both the treatment group (instructions to utilize visual imagery), and the control group (no explicit instructions to utilize visual imagery), silently read two passages, one with an implicit and one with an explicit inconsistency. Findings revealed that participants in the treatment group significantly outperformed participants in the control
group on reporting and identifying both types of inconsistencies. In addition, in post interviews, the control group rarely reported utilizing mental imagery. In terms of DCT, this is not surprising, considering that most of those children were probably utilizing their cognitive resources as struggling readers to attend to other reading requirements in which they had deficiencies.

In another study conducted by McCallum and Moore (1999), the researchers examined the effects of reported imagery for participants in Grades 2 through 5. Findings showed a moderately strong relationship between main idea extractability and both constrained and non-constrained imagery generation, with imagery extractability success decreasing with increased reports of non-constrained images. However, there was a lot of variability in imagery reporting in individuals between different texts, leading the researchers to predict that imagery may be (a) more effective for certain types of text, and (b) that an individual's background knowledge seems to be a more important indicator of student success on main idea extractability. In terms of DCT, this seems logical, as lack of background knowledge could cause a cognitive burden on the reader, leaving less resources for imaging while processing text.

**Studies on the implications of visual imagery training on vocabulary knowledge.** Many of the first studies dealing with imagery and vocabulary acquisition focused on word-pictorial associative learning (Levin, Divine-Hawkins, Kerst, & Guttmann, 1974; Levin & Pressley, 1978). The goal of the first study was to examine individual differences in the effectiveness of utilizing visual imagery as an effective organizational strategy for prose comprehension. The researchers categorized learners
into one of the following three groups: (a) subjects who performed well on paired-associate tasks from both pictures and words (high pictures, high words), (b) subjects who performed relatively poorly on both pictures and words (low pictures, low words), and (c) subjects who performed relatively well on pictures but poorly on words (high pictures, low words). Findings from the study suggested that benefits of induced visual imagery in prose comprehension was most effective for subjects who were high picture, high word, and high picture, low word learners; suggesting that training students to become more effective imagers, could potentially counterbalance low word learning deficiencies.

The second study focused on general ability, age, and educational experience in relation to the utilization of self-generated visual imagery paired-associate tasks as a function of prose comprehension. Findings revealed that participants in the induced-imagery treatment condition significantly outperformed their peers in the control group on word-pair associate task measures. Based on these findings, the researchers concluded that word-pair associate task performance is primarily affected by cognitive development based on maturation of the central nervous system, rather than educational experience. However, general ability was significantly related to performance in both the control and imagery-induced treatment conditions, suggesting that individual differences in vocabulary acquisition was more effective for participants that were seen as good learners. These findings regarding general ability reinforce the above findings that induced visual imagery in both word-pair associative tasks and prose comprehension vary as a function of an individual's learning style and general ability.
Pressley's (1977) review of imagery studies and vocabulary learning reinforced the benefit of word-pictorial associative learning, but explained that the advantage of this type of vocabulary acquisition is developmentally dependent, with it becoming a more effective educational tool with increasing age (i.e. around the age of 6 or 7). He attributed this to the possibility that children may become more flexible with forming self-produced visual elaborations as they begin to associate more memory for the associative pairs.

Hargis & Gickling (1978) conducted a study on the effect of using imagery to teach "sight words" to beginning kindergartner readers. In the study they presented two sets of stimulus words, (a) set A consisting of high imagery nouns (bird, door, fire...), and (b) set B consisting of low imagery nouns (end, wish, today...). Findings revealed that in both immediate and delayed-post tests, participants scored significantly higher on recall of the high imagery nouns vs. the low imagery nouns. From the results, the researchers concluded that high imagery, or more concrete, nouns are more readily learned and stay in memory longer than low imagery nouns. In terms of educational practice, they suggested that low imagery words possibly be paired with pictures for reinforcement and that they be presented with greater repetition, in age-relevant context phrases or sentences in order to compensate for observed differences in recall between the two groups.

The common themes that run through these studies examining visual imagery and vocabulary acquisition are that (a) concrete words are easier to visualize, (b) children become better at induced visual imagery with age, and (c) utilizing self-generated visual imagery with word-associative pairs is more effective for high picture learners with higher general learning ability. Sadoski's (2005) review offers additional empirical
evidence of how to utilize visual imagery techniques as a route for vocabulary learning. In addition to the findings above, he cites possible support of the effectiveness utilizing keyword cues as a post reading comprehension aid; through the generation of post reading graphic organizers, which place vocabulary in a hierarchical diagram. While he acknowledges the advantages of utilizing DCT in formulating vocabulary-learning strategies he warns that, “Pictures could hinder the visual learning of words through focal-attention and visual interference, among other possible reasons” (pp.233-234).

Several similar themes are found within the studies discussed in this section regarding visual imagery instruction as an effective strategy for enhancing young reader’s memory, comprehension, and vocabulary of text. Information yielded from the studies revealed that there are multiple variables to consider when instructing children in this strategy: concreteness vs. abstractness of text, developmental stage and background knowledge of reader, type of learner, reading ability, motivation, cognitive load, and the amount and usefulness of text-relevant illustrations.

Considering all these factors, if young readers are going to become self-regulated imagers we are going to have to guide them on how to image, not what to image. Gambrell and Koskinen (2002) suggest scaffolding students towards self-regulated imaging, keeping in mind that although their images can and will most likely be unique from others, they must be contextually relevant. This "scaffolding" process of strategy instruction can be achieved through the "gradual release of responsibility" model, which has been proven to be an effective approach for comprehension strategy instruction in young children (Pearson & Gallagher, 1983).
Research Supporting the Strategic Use of Keyword Cues As An Aid to Memory and Comprehension

Research has shown the efficacy of keyword cues as an effective retrieval strategy for enhancing memory and comprehension of text (Ackerman, 1996; Alp & Bäuml, 2009; Denner, McGinly, & Brown, 1989; Denner, Rickards, & Albanese, 2003; Zaromb & Roediger III, 2009). Findings from these studies have reported significant increases in young children's abilities to recall text from memory. Denner, McGinly & Brown in 1989, conducted an earlier study on the use of keyword cues as a pre-reading instructional approach. In the study, second-grade students were provided with keyword cues (referred to as 'story impressions'), as a set of fourteen selected single word or telegraphic phrases (consisting of no more than 3 words) which provided "... significant information about the setting characters, and major elements of the plot" (p. 322).

The keyword cues were arranged vertically in the order they occurred in the passage. Participants in the keyword cue group were given the cues prior to reading the passage as a means for creating a story, referred to as a 'story guess'. The purpose of generating the 'story guess' was to activate participant’s prior knowledge as a means of formulating a prediction about the stories contents. After generating the ‘story guess’, participants read the passage, and rendered cued recalls. Results showed that the students who had been exposed to the keyword cues and asked to generate "story guesses" prior to reading, scored significantly higher on measures of cued-recall than their peers in the control group. Similar results were reported in a study carried out with 8th grade participants (Denner, Rickards & Albanese, 2003).
In another study by Alp and Bäuml (2009), participants were allowed to study a list of categorized items and were then provided with a subset of the category names as keyword cues. Findings showed that recall for the cued categories were improved, but the un-cued categories were impaired. Findings from all these studies suggest that providing students with contextually relevant keyword cues may enhance their performance on cued recall activities.

Another study by Zaromb and Roediger III (2009) investigated recall of ambiguous sentences where participants were assigned to one of the following treatment conditions: (a) no keyword cues provided, (b) embedded meaningful keyword cues provided, (c) pre-keyword cues provided, or (d) delayed keyword cues provided. Findings showed that subjects in both the pre-cued and delayed cued conditions scored significantly higher than their peers in the other two treatment conditions on measures of enhanced recall. Furthermore, in a test of simple cued recall, findings showed the highest recall rates for participants in the delayed keyword cued condition; hence, providing support for the potential effectiveness of keyword cues as an after reading retrieval strategy for aiding students' memory of text.

Ackerman (1996) conducted a study where he investigated the induction of retrieval strategies by young children. In the study, participants, between the ages of 7 and 12, were provided with one of the following: (a) whole-context keyword cues, (b) part-context keyword cues, or (c) non-context associated keyword cues for categorically related words. Findings showed that the participants between the ages of 7 and 9, who were provided with whole context keyword cues, scored significantly then their same-
aged peers in the other two treatment conditions. Another important finding was that the robustness of retrieval induction increased developmentally, with the older children showing retrieval induction in situations with less keyword cue support. The author explained a possible reason for this developmental difference may be attributed to the fact that younger children may struggle more with retrieval because of situational constraints, rather than as a consequence of a general inability to monitor and modify their retrieval processes. A final notable point from this study, is that results "...suggest that specific problems of retrieval induction contribute strongly to children's utilization deficiencies in memory tasks" (p. 270), lending further support to the utilization of keyword cues as a memory and comprehension retrieval strategy.

The studies above support the use of keyword cues as a pre reading aid to children’s memory and comprehension of text, as well as, a retrieval aid to young children’s memory of text. Based on these empirical findings, the purpose of this study was to examine the effects of training third-grade readers in the use of keyword cues (after reading), as a post reading retrieval aid to memory, comprehension, and vocabulary knowledge of narrative and expository text. In addition, the study explored and examined the combined effects of training students in the use of visual imagery (during reading) and keyword cues (after reading) as a means for young reader’s to create a more holistic, integrated representation of meaning through the integration of verbal and nonverbal connections.
Foundations of Current Study

This chapter outlines the theoretical foundations and relevant research findings that support the educational value of the proposed research study. The need for quality research regarding reading achievement, in particular comprehension instruction and assessment, remains a national priority. Comprehension involves the selection, initiation, and efficient use and integration of several cognitive factors/skills (i.e., phonics, oral reading accuracy, word recognition skills, vocabulary acquisition, inference-making, and predicting). The strategic use of effective comprehension strategies before, during, and after reading, can help reduce the cognitive load placed on a reader’s working memory while attempting to process and integrate large amounts of written text (Pearson & Dole, 1987; Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, & Brown, 1992). Visual imagery and keyword cues are two comprehension strategies with a wealth of empirical evidence supporting their efficacy in aiding readers’ memory and comprehension of text (Ackerman, 1996; Alp & Bäuml, 2009; Denner, McGinley, & Brown, 1989; Denner, Rickards, & Albanese, 2003; Douville, 2004; Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; Pressley, Johnson, Symons, & McGoldrick, 1989; Sadoski, 1985; Zaromb & Roediger III, 2009).

Within the theoretical frameworks of Paivio’s (1971) DCT, and Ericcson and Kintsch’s (1995) CI Model, these two strategies could potentially serve as two separate sources of mental hooks for storing pertinent information during the comprehension process. While there is a wealth of empirical evidence supporting the effectiveness of both visual imagery and keyword cues on young readers’ memory, comprehension, and
vocabulary knowledge (Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; Hargris & Gickling, 1978; Pressley, 1976; & Sadoski, 1985), there are no studies to date that have examined the effectiveness of strategy training in their combined use, or in the use of keyword cues as a post reading comprehension strategy.

This research adds to the existing body of knowledge regarding these two comprehension strategies, through the examination of the effects of training students in the utilization of visual imagery (during reading) and keyword cues (after reading) as a means of (a) reducing the cognitive load on a reader’s working memory by providing instruction on how to use these strategies as mental hooks at two different points in the comprehension process, one during and one after reading, and (b) allowing readers to form a richer more holistic representation of meaning through the integration of the nonverbal and verbal representations stored on these mental hooks.

In order to examine these effects, participants were randomly assigned to one of the following four treatment conditions: (a) visual imagery (during reading), (b) keyword cues (after reading), (c) visual imagery (during reading) + keyword cues (after reading), and (d) general memory instructions (before reading). This study design allowed the researcher to explore and compare the effects of the individual and combined use of these two strategies in relation to a treatment condition receiving no explicit strategy training (general memory instructions).
CHAPTER THREE
METHODS AND PROCEDURES

Reading achievement scores reflect the need for improved literacy instruction in today's classrooms (NAEP, 2011). Explicit instruction of reading strategies has proven to be an effective instructional technique in helping to raise students’ reading achievement (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989). In particular, research has shown that the explicit instruction of multiple reading strategies can positively benefit reading achievement by allowing students to utilize different skills for memory, comprehension, and vocabulary acquisition (Pearson & Dole, 1987; Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almasi, & Brown, 1992).

This study examined and compared the effects of explicit strategy training in the combined use of visual imagery (during reading) and keyword cues (after reading) with explicit strategy training of visual imagery (during reading), keyword cues (after reading), and general memory instructions (before reading), on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text. This study also analyzed key informant reports in regard to qualitative differences in their accounts of their experience utilizing the strategy training they received and how those differences related to treatment condition performance on immediate-/delayed-post assessments.

Hypotheses

The major hypothesis in the present study is grounded in theoretical perspectives which support the notion that visual imagery (during reading) and keyword cues (after
reading) play similar roles in the processing chains involved in comprehension; in particular; as potential retrieval strategies for aiding young readers’ comprehension of text (Paivio, 1971, 2007; Ericcson & Kintsch, 1995; Kintsch, 1998). Furthermore, that these two strategies, when used in combination, could interact in positive interconnected ways that result in enhanced memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text. Based on these assumptions, this study was conducted to explore the effects of explicit strategy training in four different treatment conditions: (a) visual imagery (during reading), (b) keyword cues (after reading), (c) visual imagery (during reading) + keyword cues (after reading), and (d) general memory instructions (before reading).

Descriptive and inferential statistics were conducted to determine the between and within subject effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text. As generally recognized in educational research, the level of statistical significance was set at 0.05.

In addition, this study qualitatively assessed key informant reports using content analyses, in order to analyze participants’ experiences utilizing the strategy training they received and how those differences related to treatment condition performance on immediate-/ and delayed-post assessments.

Thus, this study sought to explore the following research questions:
1. What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative text?

2. What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of expository text?

3. What do key informant reports reveal about student perceptions of their experience utilizing the strategy training they received, and how do those differences relate to treatment condition performance on immediate-/delayed-post assessments?

**Methods**

There is a wealth of empirical evidence supporting the effectiveness of explicit strategy instruction in both visual imagery and keyword cues on memory, comprehension, and vocabulary acquisition of text in elementary school readers. (Ackerman, 1996; Alp & Bäuml, 2009; Denner, McGinfly, & Brown, 1989; Denner, Rickards, & Albanese, 2003; Douville, 2004; Gambrell & Bales, 1986; Gambrell & Jawitz, 1993; Pressley, Johnson, Symons, & McGoldrick, 1989; Sadoski, 1985; Zaromb & Roediger III, 2009). However, no study to date has examined the effects and interactions of training students to combine visual imagery (during reading) and keyword cues (after reading) as a means of enhancing third-grade students' memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge in both narrative and expository text passages.
In addition, while a number of studies have documented the effectiveness of keyword cues as a pre-reading strategy for comprehending text, no research could be located about the use of keyword cues as a post reading comprehension strategy. This study was designed to add to the existing body of research regarding these two strategies by investigating the effectiveness of instructions to use visual imagery (during reading) + keyword cues (after reading) to enhance third-grade readers' memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text.

**Setting**

This study was conducted in three different public elementary schools located in Upstate South Carolina. All three schools serve children who are enrolled in kindergarten through fifth grade.

**School A.** School A consisted of 545 students for the 2010-2011 school year. It is a Title 1 school, with 241 of the students qualifying for free lunch and 44 qualifying for reduced lunch. Enrollment consisted of 274 males and 271 females. The population consisted of approximately 73.58% White/Caucasian, 15.60% Black, 4.59% Hispanic, 1.83% Asian/Pacific Islander, and 4.40% two or more races.

**School B.** School B consisted of 443 students for the 2010-2011 school year. It is also a Title 1 school, with 216 of the students qualifying for free lunch and 36 for reduced lunch. Enrollment consisted of 225 males and 218 females. The student population consisted of approximately 92.10% White/Caucasian, 1.13% Black, 4.52% Hispanic, .23% Asian/Pacific Islander, and 2.03% two or more races.
School C. School C consisted of 770 students in the 2010-2011 school year. This school is not classified as a Title 1 school, with 143 of the students qualifying for free lunch and 27 for reduced lunch. Enrollment consisted of 397 males and 143 females. The student population consisted of approximately 73.64% White/Caucasian, 11.43% Black, 1.56% Hispanic, 8.96% Asian/Pacific Islander, and 4.42% two or more races.

All preassessments, treatment condition instructional lessons, immediate-/delayed-post assessments, and key informant interviews were conducted/administered by the researcher at the participants’ respective schools. All preassessments were administered in large groups in classrooms outside of the general classroom setting. All instructional lessons were conducted in small groups, of four to six, in conference rooms or empty classrooms outside of the regular classroom setting. For the immediate-/delayed-post assessments and key informant interviews, the participants met individually with the researcher in conference rooms or empty classrooms outside of the regular classroom setting.

Participants

Research-based comprehension instruction reviews for elementary school children point to the need for explicit training of multiple methodological approaches in order to produce efficient, self-regulated comprehenders (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989; Stahl, 2004). Explicitly training students in the use of visual imagery and keyword cues, are two methodological approaches with a wealth of empirical evidence supporting their effectiveness in aiding elementary students’ memory, comprehension, and vocabulary of text. In order to investigate the effectiveness of
explicit strategy training in the combined use of these two approaches, this study initially recruited 104 third-grade students enrolled in three schools in Upstate South Carolina.

Study participants were recruited from the classrooms of eight, third-grade teachers across the three schools. Originally, twenty-six participants were randomly assigned to each of the four treatment conditions. Criteria for inclusion in the study included the following: (a) a Fall 2010 Measure of Academic Progress (MAP) reading assessment score within 1.5 standard deviations (SD) above or below the Northwest Evaluation Association (NWEA) median, (b) teacher verification of reading ability at the third-grade level, and (c) no documented learning disabilities in reading. The study did include English Language Learners (ELLs), as long as they met the above criteria.

Prior to the onset of the study, power was determined with G Power (Faul, Erdfelder, Lang, & Buchne, 2007), a statistical program, in order to identify how many participants were necessary to recognize significant change, if significant change had indeed occurred. Based on research accepted conventions among education researchers, including empirically-based meta-analyses of research education examining explicit reading strategy instruction (Education Consumers Foundation, 2011), $\alpha$ was set at the .05 level, 1-beta at a conservative .90, and effect size at .25. Based on these input parameters, it was determined that a total number ($n$) of participants needed to detect any significant statistical differences between treatment conditions on immediate- and delayed-post assessment dependent measures was 81.

One hundred and four 3rd-grade students enrolled in three public elementary schools in Upstate South Carolina, initially agreed to participate in this study. Over the
course of the study, three students moved out of their respective districts, and three others missed one or more of the instructional lessons and/or post assessments, and were unable to make them up due to scheduling. Therefore, at the end of the study, data on only 98 of the original subjects were analyzed for the intended purposes of this study. Of these 98 participants, 48% were male and 52% were female. The final study sample was comprised of over 77% Caucasian, 3% Hispanic, 16% African American, and 3% Asian/Pacific Islander. Demographic characteristics of this study’s participants are depicted in Table 3.1.

Table 3.1
_Demographic Characteristics of Sample_

<table>
<thead>
<tr>
<th></th>
<th>Visual n</th>
<th>Keyword n</th>
<th>Visual + Keyword n</th>
<th>General Memory n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>24</td>
<td>26</td>
<td>25</td>
<td>23</td>
</tr>
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<tr>
<td>Race/Ethnicity</td>
<td></td>
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</tr>
<tr>
<td>Caucasian</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Hispanic</td>
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<td>Asian/Pacific Islander</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Reading Ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above Average</td>
<td>9</td>
<td>11</td>
<td>10</td>
<td>8</td>
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<tr>
<td>Average</td>
<td>14</td>
<td>13</td>
<td>14</td>
<td>12</td>
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<tr>
<td>School C</td>
<td>8</td>
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</tr>
</tbody>
</table>
All participants had MAP reading assessment scores within 1.5 SD above or below the NWEA established median for third-grade students at the onset of that school year. For the purposes of this study, participants’ MAP reading assessment scores were used to categorize subjects into one of three reading ability groups based on the following criteria: above average (0.5 SD above median < MAP score ≤ 1.5 SD), average (0.5 SD below median < MAP score ≤ 0.5 SD above median), below average (1.5 SD below median < MAP score < 0.5 SD below median). Based on the above criteria, the study sample was comprised of approximately 39% above average readers, 54% average readers, and 7% below average readers. Prior to the onset of the study intervention, a series of one-way analyses of variance (ANOVA’s) were conducted to ensure that the random assignment of participants to treatment conditions had not resulted in a significant preintervention difference in the following preintervention measures: (a) Fall 2010 MAP reading assessment scores, (b) defined reading ability levels, (c) gender, and (d) contextually relevant vocabulary knowledge. Results of the analyses revealed no significant differences across treatment conditions for any of the four variables.

Research Design

In order to compare the effectiveness of explicit strategy training in the use of visual imagery (during reading) and keyword cues (after reading) on third-grade students’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text, four treatment conditions were established:
**Visual imagery (during reading).** In this condition participants were given instructions to use visual imagery (during reading) to remember story/text information. This condition was designed to investigate the effects of readers' use of visual imagery as a retrieval strategy for memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text.

**Keyword cues (after reading).** In this condition participants were given instructions to use keyword cues (after reading) to remember story/text information. This condition was designed to investigate the effects of readers' use of keyword cues as a retrieval strategy for memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text.

**Visual imagery (during reading) + keyword cues (after reading).** In this condition participants were given instructions to use visual imagery (during reading) and keyword cues (after reading) to remember story/text information. This condition was designed to investigate the effects of readers' combined use of visual imagery and keyword cues as retrieval strategies memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text.

**General memory instructions (before reading).** In this condition, participants were given instructions to read and try to remember as much as they could about story/text information. This condition was designed to explore the effects of the above instruction conditions to a group receiving no explicit strategy instruction on readers’
memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text.

To analyze and compare overall main effects of treatment condition, a post-test only sequential explanatory mixed-methods design (Creswell & Plano Clark, 2006) was implemented. The design analyzed potential main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text, and analyzed key informant reports for differences in participants’ perceptions about their experience utilizing the strategy training they received in relation to treatment condition performance on immediate-/delayed-post assessments. Figure 3.1 illustrates the independent, potential confounding, and dependent variables in this study.
In order to control for group differences, participants in the study were randomly assigned to one of the four treatment conditions. In addition, subjects were recruited from the classrooms of eight different third-grade teachers’ classrooms across three different public elementary schools in Upstate South Carolina in an effort to control for any pre-existing group differences due to daily classroom instruction and/or school attended.
One-way ANOVAs were conducted prior to the onset of the study to ensure the randomly assigned treatment condition groups were not statistically different prior to the intervention period on the following measures, (a) Fall 2010 MAP reading assessment scores, (b) defined reading ability levels, (c) gender. At the .05 level of significance, it was concluded that there were no statistical differences among the four treatment conditions on any of these measures.

At the onset of the study, participants were administered a researcher-developed preassessment of contextually relevant vocabulary knowledge. The vocabulary preassessment consisted of multiple-choice questions designed to measure participants’ knowledge of key terms found in the immediate-post assessment narrative and expository passages. In order to ensure that there were no significant preintervention differences between treatment conditions on the measures of contextually relevant vocabulary knowledge, 2 one-way ANOVAs were conducted, one for narrative and one for expository vocabulary items. At the .05 level of significance, it was concluded that there were no statistical differences between the four treatment conditions on the narrative or expository measures of contextually relevant vocabulary knowledge. The preassessment of contextually relevant vocabulary knowledge used in this study can be found in Appendix A.

During the study intervention, participants received four separate instructional lessons (one per week over a four-week period) in their assigned treatment condition. All instructional lessons were carried out at participants’ respective schools, in small groups of four to six. In order to control for group differences that might arise due to
teacher effects and/or classroom settings, all of the treatment condition instructional lessons were conducted/administered by the researcher, in conference rooms or empty classrooms outside of the regular classroom setting.

Two narrative and two expository passages (one for each of the four lessons) were used for the four treatment condition instructional lessons. The four passages used for the instructional lessons were obtained from the Sundance Comprehension Strategies Kit (Gambrell & Wortman, 2007). This source of passages was chosen because, unlike most basal text passages, it provides appropriate leveled passages at lengths that allow for strategy instruction conducive to the “gradual release of responsibility” model (Pearson and Gallagher, 1983), which has proven to be an effective approach for comprehension strategy instruction in young children. Prior to the onset of the study, the researcher got teacher confirmation that none of the passages from this kit had been utilized for instruction at the three participating schools. All of the instructional passages used in this study were written at the third-grade readability level according to the Spache Readability Formula (Spache, 1953). The four instructional passages and their readability levels can be found in Appendices B and C, respectively.

During each instructional lesson, the researcher, a) introduced the passage, b) progressed through an explicit script of strategy instruction based on treatment condition, and c) guided students in their use of their treatment condition strategy as they rendered free recalls of the passages with partners. Following Pearson and Gallagher's (1983) "gradual release of responsibility” model, the four instructional lessons for each treatment condition were structured in the following manner (a) researcher modeled lesson with
narrative text, (b) guided instruction lesson with expository text, (c) collaborative lesson with expository text.

During all four instructional lessons, participants in the keyword cues (after reading), and visual imagery (before reading) + keyword cues (after reading) treatment conditions utilized keyword cues while rendering free recalls of the passages. The list of keyword cues for each passage consisted of words or short telegraphic phrases found directly in the passage. The list of keyword cues unfolded the meaning of the passage in chronological or sequential order. The last keyword cue in each list was a telegraphic phrase from the passage that represented the resolution (narrative) or main idea (expository). The list of keyword cues for the narrative and expository passages, were generated by the researcher and her committee chair using the following guidelines:

1. The researcher and her committee chair each generated their own individual keyword cue lists for the passages.

2. The researcher and the committee chair met and discussed any discrepancies in their lists until they were able to reach 100% agreement on a keyword cue list for both passages.

3. A third expert reader, read each passage and attempted to use the keyword cue lists generated by the researcher and her committee chair to retell the passage, making suggestions on any items they felt were excluded or unnecessary.

The list of keyword cues for each passage did not exceed 20% of the total words in the passage. The keyword cue lists generated for the four instructional passages are provided in B.
The four instructional lessons for each of the treatment conditions were identical in content, time allocated for partner retellings, and overall procedure. Scripted instructional lesson protocols used for explicit strategy training in each of the four treatment conditions during the researcher modeled instructional lesson can be found in Appendix D.

In order to examine main effects of treatment condition, participants were administered an immediate-post assessment one week after the completion of their fourth instructional lesson; and, a delayed-post assessment, six weeks after their fourth instructional lesson. The immediate-post assessments measured the effectiveness of treatment condition strategy use on student performance on narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge. The delayed-post assessments examined the effectiveness of treatment condition instruction on, (a) student retention of the narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge measured in the immediate-post assessment, and (b) student transfer of treatment condition strategy knowledge on expository dependent measures of memory (free recall) and explicit and implicit comprehension (cued recall).

Results from the immediate- and delayed-post assessments were analyzed for overall main effects of treatment condition using a series of multivariate analyses of variances (MANOVAs). MANOVA procedures with significant $F$-values were followed by univariate analyses and post hoc multiple comparison analyses using Tukey’s honestly
significant difference (HSD) test. All statistical analyses were conducted using SPSS 19 (Green & Salkind, 2008).

In order to analyze participant perceptions about their experience utilizing the strategy training they had received, twenty randomly selected participants (five per treatment condition) rendered key informant reports two weeks following their fourth instructional lesson. The reports were conducted by the researcher and were audio-recorded. Key informant reports were analyzed for qualitative differences in participants’ perceptions about their experience utilizing the strategy training they received and how those differences related to treatment condition performance on immediate-/delayed-post assessments. The key informant reports were transcribed and analyzed by the researcher using content analysis guidelines outlined by Taylor-Powell and Renner (2003).

**Research Instrumentation**

**Preassessment of contextually relevant vocabulary knowledge.** Prior to the onset of the study, participants were administered a researcher-developed preassessment of contextually relevant vocabulary knowledge. The preassessment consisted of 53 multiple-choice items, that were designed to measure student knowledge of contextually relevant vocabulary terms found in the immediate-post assessment narrative and expository passages. The terms that were included in the preassessment, were terms that had been identified by the Spache Revised Word List (Spache, 1974) as “unfamiliar words” that children at the third-grade level and below do not generally recognize. Before designing the preassessment, the researcher and two expert readers eliminated any terms generated on the Spache word list that they all three identified as definite service words
to ensure 100% interrater reliability on the elimination process. Once the researcher had created the vocabulary preassessment, the researcher and two other expert readers met to determine that each item met the following pre-established criteria:

- The focus word that is used in the sentence has the same meaning as when then word is used in the passage.
- Four stems for each word item -- the last one is always, "I’m not sure."
- There is one clear, correct answer.
- There is one answer that is absolutely incorrect.
- There are two answers that are incorrect but plausible in the context of the sentence.
- The definitions should "fit" in the place of the focus word and still make sense.
  In other words, if you take out the focus word and put the stems in place of the word, the sentence would still make sense grammatically.

If any of the above criteria were not met on an item, the three expert readers had to make suggestions and all come to consensus on an acceptable solution. Before administering the preassessment of contextually relevant vocabulary knowledge, the researcher reminded participants that the assessment was not for a grade and not to guess if they were not completely sure of the answer. To ensure that participants felt comfortable with these instructions, the researcher added an "I'm not sure" choice item for them to fill in. This assessment was designed in this fashion to control for the ‘guess factor’ inherent to multiple-choice tests. The researcher administered the vocabulary preassessments in large group settings outside the regular classroom setting at the
participants’ respective schools. The researcher collected the preassessments and scored them accordingly. The preassessment of contextually relevant vocabulary knowledge for this study can be found in Appendix A.

**Immediate-post assessment measures.** The immediate-post assessments measured the effectiveness of treatment condition strategy use on student performance on narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge (multiple-choice assessment). All immediate post-assessment measures were administered individually to each participant by the researcher, one week after their fourth instructional lesson.

**Immediate-post assessment passages.** The narrative and expository passages that the above measures were based on were obtained from the *Qualitative Reading Inventory 4 [QRI-4]* (Leslie & Caldwell, 2006). This source of reading passages was chosen because it offered passages that are generally familiar to young elementary school children in organization and curricular content, as well as passage specific measures of student memory (free recall) and explicit and implicit comprehension (cued recall) of narrative and expository text with pre-established measures of validity and reliability. The immediate-post assessment narrative and expository passages can be found in Appendices E and F, respectively. The two passages utilized for the immediate-post assessment were written at the third-grade readability level according to the Spache Readability Formula (Spache, 1953). The readability levels of the two passages can be found in Appendix C.
**Memory (free recall) assessments.** During the immediate-post assessment, after silently reading a passage, participants were asked to render free recalls, in order to examine the effect of treatment condition on participants’ memory of text. All recalls were administered individually by the researcher and audio-taped to record and analyze the number of propositions recalled and amount of time spent retelling.

The free recalls were scored and analyzed by the researcher for number of propositions recalled using established scoring guides based on propositional analyses ($\alpha = .98+$) conducted by authors of the *QRI-4* (Leslie & Caldwell, 2006). The free recall scoring guide for the narrative passage, “The Friend”, measured participant recall of 55 total unit ideas within the passage. The unit ideas for the narrative passage included passage-specific propositions dealing with the following story structure elements: a) setting/background, b) goal, c) events, and resolution. All unit ideas held equal weight, and were each worth one point. The free recall assessment for the narrative passage, “The Friend”, can be found in Appendix E. The free recall scoring guide for the expository passage, “The Busy Beaver”, measured participant recall of 49 total unit ideas within the passage. The unit ideas for the expository passage included passage-specific propositions dealing with main ideas and supporting details. All unit ideas held equal weight, and were each worth one point. The free recall assessment for the expository passage, “The Busy Beaver”, can be found in Appendix F.

Twenty (five from each treatment group) of the narrative and expository free recall immediate-post assessments were randomly selected and scored by another independent rater, using the same established scoring guides provided in the *QRI-4* that
the researcher had used. After the researcher and the independent rater had each scored
the randomly selected free recalls independently, they met to compare their scoring
results. The interrater reliability between the two raters was 95% for the narrative passage
and 97% for the expository passage.

During the immediate-post assessments, participants in the keyword cues (after
reading), and visual imagery (before reading) + keyword cues (after reading) treatment
conditions utilized keyword cues while rendering free recalls of the narrative and
expository passages. The list of keyword cues for each passage consisted of words or
short telegraphic phrases found directly in the passage. The list of keyword cues unfolded
the meaning of the passage in chronological or sequential order. The last keyword cue in
each list was a telegraphic phrase from the passage that represented the resolution
(narrative) or main idea (expository). The list of keyword cues for the narrative and
expository passages were generated using the same guidelines used to generate the
keyword cue lists for the four instructional passages. The list of keyword cues for each
passage did not exceed 20% of the total words in the passage. The keyword cue lists
generated for the narrative and expository passages are provided in Appendices E and F,
respectively.

Explicit and implicit comprehension (cued recall) assessments. Following the
rendering of free recalls for a passage, participants were administered a passage-specific
cued recall assessment to measure explicit and implicit comprehension of the passage.
Both the narrative and expository comprehension assessment consisted of eight passage-
specific questions. The questions for each assessment, and the answers to the questions,
were provided in the *QRI-4* (Leslie & Caldwell, 2006). For each passage, the assessment questions consisted of four questions to elicit textually explicit passage information, and four questions to elicit textually implicit passage information. Prior to the onset of the study, the researcher and committee chair reached 100% agreement with respect to the explicit and implicit nature of the comprehension questions on the narrative and expository assessments, as well as the appropriateness of the provided answers.

All participant cued recall assessments were scored by the researcher, according to templates of acceptable answers established by authors of the *QRI-4* (Leslie & Caldwell, 2006). In addition, twenty (five from each treatment condition) of the narrative and expository immediate-post comprehension assessments were randomly selected and scored by another independent rater, using the same established scoring criteria provided in the *QRI-4* that the researcher had used. After the researcher and the independent rater had each scored the randomly selected cued recall assessments independently, they met to compare their scoring results. The interrater reliability between the two raters was 100% for both the narrative and expository passage.

The immediate-post comprehension (cued recall) questions for the narrative and expository passages are provided in Appendix E and F, respectively.

*Contextually relevant vocabulary knowledge assessment.* After rendering free recalls and answering measures of explicit and implicit comprehension (cued recall) for the narrative and expository passages, participants were administered a multiple-choice, immediate-post assessment of contextually relevant vocabulary knowledge. The vocabulary assessment consisted of twelve multiple-choice questions designed to
measure their knowledge of key terms found in the immediate-post assessment narrative and expository passages. The twelve multiple-choice questions in this assessment were the items remaining from the original 53-item preassessment of contextually relevant vocabulary knowledge, after excluding the items that 50% or more of the participants got correct. The resulting twelve-item assessment, consisted of seven items to assess contextually relevant vocabulary knowledge of key terms in the narrative passage, and five items to assess contextually relevant vocabulary knowledge of key terms in the expository passage. Each item was worth one point, and had only one acceptable answer. The immediate-post assessment of contextually relevant vocabulary knowledge used in this study can be found in Appendix G.

**Key informant reports.** Two weeks after their fourth instructional lesson, twenty randomly selected participants (five per treatment condition), rendered key informant reports regarding their perceptions of treatment instruction. The interviews were conducted by the researcher and were audio-recorded. The key informant reports were transcribed and analyzed by the researcher by content analysis guidelines outlined by Taylor-Powell and Renner (2003).

In order to establish interrater reliability for the coding analyses guidelines established, the researcher and other expert reader independently coded four (20%) randomly selected key informant reports, in their entirety, based on the above categories. Comparison of their independent analyses resulted in an interrater reliability of $K = 0.90$. The research-developed questions for the key informant reports are provided in Appendix H.
**Delayed-post assessment measures.** Delayed-post assessments examined the effect of treatment condition on (a) student *retention* of immediate-post assessment narrative and expository dependent measures, and (b) student *transfer* of treatment condition strategy knowledge on measures of memory (free recall), and explicit and implicit comprehension (cued recall) for a newly encountered expository passage. All delayed-post assessment measures were administered individually to each participant by the researcher, six weeks after their fourth instructional lesson.

**Delayed-post assessment of retention.** The delayed-post assessment of retention measured the effect of treatment condition on student retention of immediate-post assessment narrative and expository dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge.

**Delayed-post assessment retention measures of memory (free recall).** In order to examine the effect of treatment condition on participants’ retention of immediate-post assessment narrative and expository dependent measures of memory (free recall), participants were asked to render free recalls of the narrative and expository passage they had read during the immediate-post assessment. The narrative and expository free recall assessments were the same assessments that were used for immediate-post assessment measures of memory. All recalls were administered individually by the researcher and audio-taped to record and analyze the number of propositions recalled and amount of time spent retelling.
Following the same guidelines outlined in the immediate-post assessment, delayed-post assessment retention measures of memory (free recall) were scored and analyzed by the researcher for number of propositions recalled using the established scoring guides based on propositional analyses ($\alpha = .98+$) conducted by authors of the QRI-4 (Leslie & Caldwell, 2006) for the passages. The free recall scoring guide for the narrative passage, “The Friend”, measured participant recall of 55 total unit ideas within the passage. The unit ideas for the narrative passage included passage-specific propositions dealing with the following story structure elements: a) setting/background, b) goal, c) events, and resolution. All unit ideas held equal weight, and were each worth one point. The free recall assessment for the narrative passage can be found in Appendix E. The free recall scoring guide for the expository passage, “The Busy Beaver”, measured participant recall of 49 total unit ideas within the passage. The unit ideas for the expository passage included passage-specific propositions dealing with main ideas and supporting details. All unit ideas held equal weight, and were each worth one point. The free recall assessment for the expository passage can be found in Appendix F.

In addition, twenty (five from each treatment condition) of the narrative and expository free recall immediate-post assessments were randomly selected and scored by another independent rater, using the same established scoring guides provided in the QRI-4 that the researcher had used. After the researcher and the independent rater had each scored the randomly selected free recalls independently, they met to compare their scoring results. The interrater reliability between the two raters was 96% for the narrative passage and 98% for the expository passage.
Delayed-post assessment retention measures of explicit and implicit comprehension (cued recall). After rendering free recalls for a passage, participants were administered the same cued recall assessments administered during the immediate-post assessment. All participant cued recall assessments were scored by the researcher, according to the same templates of acceptable answers established by authors of the *QRI-4* (Leslie & Caldwell, 2006) that were used to score immediate-post assessment measures of explicit and implicit comprehension (cued recall).

In addition, twenty (five from each treatment condition) of the narrative and expository cued recall assessment were randomly selected and scored by another independent rater, using the same established scoring criteria provided in the *QRI-4* that the researcher had used. After the researcher and the independent rater had each scored the randomly selected cued recall assessments independently, they met to compare their scoring results. The interrater reliability between the two raters was 100% for both the narrative and expository passages. The delayed-post assessment of participants’ retention of explicit and implicit comprehension (cued recall) for the immediate-post assessment narrative and expository passages are provided in Appendix E and F, respectively.

Delayed-post assessment retention measures of contextually relevant vocabulary knowledge. After rendering free recalls and answering measures of cued recall for the narrative and expository measures of retention, participants’ were administered the same multiple-choice assessment of contextually relevant vocabulary knowledge that they had been administered during the immediate-post assessment (Appendix J).
Delayed-post assessment of transfer. After completing all measures of delayed-post assessment retention, participants were administered a delayed-post assessment of transfer. The delayed-post assessment of transfer examined the effect of treatment condition on student transfer of treatment condition strategy knowledge to a newly encountered expository passage. Delayed-post assessments of transfer measured student performance on expository dependent measures of memory (free recall), and explicit and implicit comprehension (cued recall).

Delayed-post assessment of transfer passage. In order to examine student transfer of treatment condition strategy knowledge on measures of memory (free recall), and explicit and implicit comprehension (cued recall), participants were asked to read a newly encountered expository passage (Appendix I). The expository passage was obtained from the QRI-4 (Leslie & Caldwell, 2006). This source of reading passages was chosen because it offered passages that are generally familiar to young elementary school children in organization and curricular content, as well as passage specific measures of student memory (free recall) and explicit and implicit comprehension (cued recall) of narrative and expository text with pre-established measures of validity and reliability. The expository passage utilized for the delayed-post assessment transfer measures was written at the third grade readability level according to the Spache Readability Formula (Spache, 1953). The passage and its readability level can be found in Appendix C.

Delayed-post assessment transfer measures of memory (free recall). After participants had completed all measures of delayed-post assessment retention, they were asked to render a free recall of a newly encountered expository passage, “Cats: Lions and
Tigers in Your House”, as a means to examine the effect of treatment condition on participant’s transfer of treatment condition strategy knowledge on expository measures of memory. The free recall assessment used to analyze transfer was scored and analyzed by the researcher for number of propositions recalled using established scoring guides based on propositional analyses (α = .98+) conducted by authors of the QRI-4 (Leslie & Caldwell, 2006). The free recall scoring guide for the expository passage, “Cats: Lions and Tigers in Your House”, measured participant recall of 47 total unit ideas within the passage. The unit ideas for the expository passage included passage-specific propositions dealing with main ideas and supporting details. All unit ideas held equal weight, and were each worth one point. The free recall assessment for the expository passage can be found in Appendix I.

In addition, twenty (five from each treatment group) of the expository free recalls examining the effect of treatment condition on participant’s transfer of treatment instruction on expository measures of memory (free recall) were randomly selected and scored by another independent rater, using the same established scoring guide provided in the QRI-4 that the researcher had used. After the researcher and the independent rater had each scored the randomly selected free recalls independently, they met to compare their scoring results. The interrater reliability between the two raters was 93% for the expository passage.

Delayed-post assessment transfer measures of explicit and implicit comprehension (cued recall). Following the rendering of their free recall for the expository passage, “Cats: Lions and Tigers in Your House”, participants were
administered a passage-specific cued recall assessment to measure explicit and implicit comprehension of the passage. The cued recall assessment consisted of eight passage-specific questions. The questions for the assessment, and the answers to the questions, were provided in the QRI-4 (Leslie & Caldwell, 2006). The cued recall assessment questions consisted of four questions to elicit textually explicit passage information, and four questions to elicit textually implicit passage information. Prior to the onset of the study, the researcher and committee chair reached 100% agreement with respect to the explicit and implicit nature of the cued recall questions on the assessment, as well as the appropriateness of the provided answers.

All participant cued recall assessments were scored by the researcher, according to the template of acceptable answers established by authors of the QRI-4 (Leslie & Caldwell, 2006). In addition, twenty (five/treatment condition) of the cued recall assessments were randomly selected and scored by another independent rater, using the same established scoring criteria provided in the QRI-4 that the researcher had used. After the researcher and the independent rater had each scored the randomly selected cued recall assessments independently, they met to compare their scoring results. The interrater reliability between the two raters was 100%.

The cued recall assessments used to examine the effect of treatment condition on participants’ transfer of treatment condition strategy knowledge on explicit and implicit comprehension (cued recall) of a newly encountered expository text is provided in Appendix I.

**Procedures**
In this section, the preintervention, instructional, and post assessment procedures of the research are described. See Figure 3.2 for a calendar of study events.

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Preintervention measurements</th>
<th>Intervention (treatment condition instruction)</th>
<th>Immediate-post assessments</th>
<th>Key informant reports</th>
<th>Delayed-post assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>December 13-17, 2010</td>
<td>Four instructional lessons in strategy use</td>
<td>One week after final instructional lesson</td>
<td>Two weeks after final instructional lesson</td>
<td>Six weeks after final instructional lesson</td>
</tr>
<tr>
<td>Keyword Cues</td>
<td>December 13-17, 2010</td>
<td>Four instructional lessons in strategy use</td>
<td>One week after final instructional lesson</td>
<td>Two weeks after final instructional lesson</td>
<td>Six weeks after final instructional lesson</td>
</tr>
<tr>
<td>Visual Imagery + Keyword Cues</td>
<td>December 13-17, 2010</td>
<td>Four instructional lessons in strategy use</td>
<td>One week after final instructional lesson</td>
<td>Two weeks after final instructional lesson</td>
<td>Six weeks after final instructional lesson</td>
</tr>
<tr>
<td>General Memory</td>
<td>December 13-17, 2010</td>
<td>Four instructional strategy use</td>
<td>One week after final instructional lesson</td>
<td>Two weeks after final instructional lesson</td>
<td>Six weeks after final instructional lesson</td>
</tr>
</tbody>
</table>

Figure 3.2. Calendar of Study Events.

**Preintervention measurements.** Prior to the study intervention, the researcher collected participant data for the following potential moderating variables: (a) Fall 2010 MAP reading assessment scores, (b) defined reading ability levels, (c) gender, and (d) scores on a researcher-developed preassessment of contextually-relevant vocabulary knowledge. The preassessment of contextually relevant vocabulary knowledge consisted of multiple-choice questions designed to measure participants’ knowledge of key terms found in the immediate-post assessment narrative and expository passages. The researcher administered all preassessments of contextually relevant vocabulary in large
groups outside of the regular classroom setting at the participants’ respective schools. Students had as long as needed to complete the preassessment. The researcher collected and graded all of the preassessments. The preassessment of contextually relevant vocabulary knowledge can be found in Appendix A.

In order to ensure that there were no significant preintervention differences between treatment conditions on measures of any of the potential moderating variables, a series of one-way ANOVAs were conducted. At the .05 level of significance, it was concluded that there were no statistical differences between the four treatment conditions on any of the preintervention measures.

**Intervention Procedure**

**Treatment conditions.** In order to examine and compare the effectiveness of explicit strategy training in the individual and combined use of visual imagery (during reading) and keyword cues (after reading), participants were randomly assigned to one of the following four treatment conditions, (a) visual imagery (during reading), (b) keyword cues (after reading), (c) visual imagery (during reading) + keyword cues (after reading), and (d) general memory instructions (before reading).

**Delivery format of instructional lessons.** In order to examine the effect of explicit strategy training among these four treatment conditions on third-grade-readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text, participants received four separate instructional lessons (one lesson per week over a four week period) in their assigned treatment condition. All instructional lessons were conducted at participants’
respective schools, in small groups of four to six, in conference rooms or empty classrooms outside of the regular classroom setting.

The researcher instructed the four instructional lessons in all four treatment conditions in order to minimize effects for teacher differences. The instructional lessons were carried out during the school day and lasted for approximately 15-20 minutes each. During each instructional lesson, the researcher, a) introduced the passage, b) progressed through an explicit script of strategy instruction based on treatment condition, and c) guided students in their use of their treatment condition strategy as they rendered free recalls of the passages with partners. For each treatment condition, the first and third instructional lesson was carried out with narrative passages, and the second and fourth instructional lessons with expository passages. All four of the passages used in the instructional lessons were written at the third grade readability level according to the Spache Readability Formula (Spache, 1953). The four passages used for the instructional lessons and their readability levels can be found in Appendices, B and C, respectively.

During the four instructional lessons, all participants were informed that they would be reading passages, and then practicing retelling all they could remember about the passages with a partner. They were also informed that after completing the four instructional, small group lessons, they would meet individually with the researcher to render free recalls and answer questions about a narrative and an expository passage to show the researcher all they had learned about using their treatment condition strategy. The four instructional lessons for each of the treatment conditions was identical in content, time allocated for partner retellings, and overall procedure. A summary of the
explicit strategy training for each of the four treatment conditions during the instructional lessons are provided below:

**Visual imagery (during reading).** For participants’ in this treatment condition, the researcher began the two narrative lessons by providing a brief introduction of the passage. Then, the researcher instructed participants by stating:

“When you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You can visualize when you are reading, by making pictures in your head when you read describing and action words to help you “see” what happens and how it happens. Then, you can add what you already know about the story to make pictures in your mind. Today, you are going to practice making pictures in your head while you read this story, to help you understand and remember what you have read. While you are reading you can look at the pictures, they can help you make pictures in your head about all the things that happen in the story. When you are done reading the story, we will talk about it.”

For the two instructional lessons using expository text, the researcher began the lessons by providing a brief introduction of the passage. Then, the researcher instructed participants by stating:

“When you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You can visualize when you are reading, by making pictures in your head when you read describing and action words to help you “see” what happens and how it happens. Then, you can add what you
already know about the topic to make pictures in your mind. Today, you are going
to practice making pictures in your head while you read this passage, to help you
understand and remember what you have read. While you are reading you can
look at the pictures, they can help you make pictures in your head about all the
things that you learn. When you are done reading the passage, we will talk about
it.”

For all four instructional lessons, participants in this treatment condition, read the
passages silently, then practiced using the pictures they had made in their heads to render
free recalls with a partner.

**Keyword cues (after reading).** For participants’ in this treatment condition, the
researcher began the two narrative lessons by providing a brief introduction of the
passage. Then, the researcher instructed participants by stating:

“Now, you are going to read this story to find out what happens. When you are
finished reading, we will talk about it. Remember to try to understand and
remember what you read.”

After participants had silently read the story, the researcher instructed them by
stating:

“A good way to remember what you read is to focus on keywords from the story
in the order that they appeared. You can use these words to help you use your
own words to talk about the plot, or major events in the story. They can also help
you remember about characters and the setting of the story. Here is a list of
keyword cues for this story. Now, you each get a chance to use these keyword
cues to help you retell the story to a partner. When using the list of keyword cues
to retell the story, don’t just read the list of cues; instead, use the keywords to help
you retell the story in your own words. When using the list of keyword cues to
retell the information in the passage, don’t just read the list of cues; instead, use
the keywords to help you retell the information you learned in your own words.”
For the instructional lessons with expository text, the researcher began the lesson
with a brief introduction of the passage. Then, the researcher instructed participants by
stating:
“Now, you are going to read this passage to find out what happens. When you are
finished reading, we will talk about it. Remember to try to understand and
remember what you read.”
After participants had silently read the passage, the researcher instructed them by
stating:
“A good way to remember what you read is to focus on keywords from the
passage in the order that they appeared. You can use these words to help you use
your own words to organize and talk about important information, like the main
ideas and supporting details. Here is a list of keyword cues for this passage.
Now, you each get a chance to use these keyword cues to help you retell the
information to a partner. When using the list of keyword cues to retell the
information in the passage, don’t just read the list of cues; instead, use the
keywords to help you retell the information you learned in your own words.”
For all four instructional lessons, after receiving either the narrative or expository instructions described above, participants’ in this treatment condition practiced utilizing keyword cues to render free recalls of passages with a partner. The key word cue lists used for the instructional lessons are provided in Appendix B.

**Visual imagery (during reading) + keyword cues (after reading).** For participants’ in this treatment condition, the researcher began the two narrative lessons by providing a brief introduction of the passage. Then, the researcher instructed participants by stating:

“When you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You can visualize when you are reading, by making pictures in your head when you read describing and action words to help you “see” what happens and how it happens. Then, you can add what you already know about the topic to make pictures in your mind. Today, you are going to practice making pictures in your head while you read this story, to help you understand and remember what you have read. While you are reading you can look at the pictures, they can help you make pictures in your head about all the things that happen in the story. When you are done reading the story, we will talk about it.”

After participants had silently read the story, the researcher instructed them by stating:

“Another good way to remember what you read is to focus on keywords from the story in the order that they appeared. You can use these words to help you use
your own words to talk about the plot, or major events in the story. They can also help you remember about characters and the setting of the story. Here is a list of keyword cues for this story. When using the list of keyword cues to retell the story, don’t just read the list of cues; instead, use the keywords to help you retell the story in your own words. When using the list of keyword cues to retell the information in the passage, don’t just read the list of cues; instead, use the keywords to help you retell the information you learned in your own words.

Now, you each get a chance to use the pictures you made in your head, along with these keyword cues to help you retell the story to a partner.”

For the two instructional lessons using expository text, the researcher began the lessons by providing a brief introduction of the passage. Then, the researcher instructed participants by stating:

“When you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You can visualize when you are reading, by making pictures in your head when you read describing and action words to help you “see” what happens and how it happens. Then, you can add what you already know about the topic to make pictures in your mind. Today, you are going to practice making pictures in your head while you read this passage, to help you understand and remember what you have read. While you are reading you can look at the pictures, they can help you make pictures in your head about all the things that you learn. When you are done reading the passage, we will talk about it.”
After participants had silently read the passage, the researcher instructed them by stating:

“Another good way to remember what you read is to focus on keywords from the passage in the order that they appeared. You can use these words to help you use your own words to organize and talk about important information, like the main ideas and supporting details. Here is a list of keyword cues for this passage. When using the list of keyword cues to retell the information in the passage, don’t just read the list of cues; instead, use the keywords to help you retell the information you learned in your own words. Now, you each get a chance to use the pictures you made in your head and these keyword cues to help you retell the information to a partner.”

For all four instructional lessons, after receiving either the narrative or expository instructions described above, participants’ in this treatment condition practiced utilizing the pictures they had made in their head (during reading) and the keyword cues (after reading) to render free recalls of the passages with a partner. The list of keyword cues used for the instructional lessons are provided in Appendix C.

**General memory instructions (before reading).** For participants’ in this treatment condition, the researcher began the two narrative lessons by providing a brief introduction of the passage. Then, the researcher instructed participants by stating:

“Now, you are going to read this story to find out what happens. When you are finished reading, we will talk about it. Remember to try to understand and remember all you can about what you are reading.”
For the instructional lessons with expository text, the researcher began the lesson with a brief introduction of the passage. Then, the researcher instructed participants by stating:

“Now, you are going to read this passage to find out what happens. When you are finished reading, we will talk about it. Remember to try to understand and remember what you read. “

For all four instructional lessons, after receiving either the narrative or expository instructions described above, participants’ in this treatment condition practiced rendering free recalls of the passages with a partner.

**Organization of instructional lessons.** Following Pearson and Gallagher's (1983) "gradual release of responsibility" model, which has been proven to be an effective approach for comprehension strategy instruction in young children, the four instructional lessons for each treatment condition, were structured in the following manner, alternating narrative and expository text:

**Researcher modeled lesson (narrative).** During this lesson, the researcher modeled for participants the procedures they were to use for the retelling of an entire narrative passage based on the treatment condition they had been randomly assigned to. After the researcher modeled treatment condition procedures, the participants were instructed to read the passage silently. Immediately after reading, participants practiced retelling with a partner, following the guidelines that had been modeled for them. While the students were retelling with partners, the researcher prompted students if they were struggling, and offered assistance where needed. In addition, participants were told they
could raise their hands during the retellings if they had any questions or concerns about the procedure they had been instructed to use.

**Guided instruction lesson (expository).** During this lesson, the researcher modeled for participants the procedures they were to use for the retelling of the first paragraph of an expository passage based on the treatment condition they had been randomly assigned to. After the researcher modeled treatment condition procedures, the participants were instructed to read the passage silently. Then the researcher asked participants to practice retelling with a partner, following the guidelines that had been modeled for them. While the students were retelling with partners, the researcher prompted students if they were struggling, and offered assistance where needed. In addition, participants were told they could raise their hands during the retellings if they had any questions or concerns about the procedure they had been instructed to use.

**Collaborative lesson (narrative).** During this lesson, the researcher reminded the participants of their treatment condition procedures (visual (during reading), keyword cues (after reading), visual imagery (during reading) + keyword cues (after reading), or general memory instructions), before having them read a narrative passage silently. Immediately after reading, the researcher asked participants to practice retelling with a partner, following the guidelines for their treatment condition. While the participants were retelling with partners the researcher prompted students if they were struggling, and offered assistance where needed. In addition, participants were told they could raise their hands during the retellings if they had any questions or concerns about the procedure they had been instructed to use.
Independent practice lesson (expository). During this lesson, the researcher reminded the participants of their treatment condition procedures, before having them read an expository passage silently. Immediately after reading, the researcher asked participants to practice retelling with a partner, following the guidelines for their treatment condition. While the participants were retelling with partners, the researcher prompted students if they were struggling, and offered assistance where needed. In addition, participants were told they could raise their hands during the retellings if they had any questions or concerns about the procedure they had been instructed to use.

The scripted instructional lesson protocols for each of the four instructional lessons for the four treatment conditions are provided in Appendix D.

Immediate-post assessment procedures. One week after the fourth instructional lesson, participants’ were administered immediate-post assessments to examine the effectiveness of treatment condition strategy use on student performance on narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge. All immediate-post assessments were individually administered to each participant, by the researcher, in small conference rooms at the participant’s perspective school. For each participant, the researcher recorded the reading and recall times for both the narrative and expository passage. During the immediate-post assessments, the researcher hand recorded and audiotaped participants’ free recalls and cued recall responses.

All immediate-post assessment measures were based on one narrative and one expository passage, both of which were obtained from the QRI-4 (Leslie & Caldwell,
The two passages utilized for the immediate-post assessment were written at the third grade readability level according to the Spache Readability Formula (Spache, 1953). For the immediate-post assessments, participants were randomly assigned to silently read either the narrative or expository passage first to control for order effects. Before beginning the assessment, the researcher reminded the participant of the strategy they had been practicing using during the instructional lessons. The researcher then informed participants that they would be practicing using that strategy with her today by reading two different passages, rendering free recalls of all they could remember, answering some questions, and completing some multiple-choice vocabulary questions about words in the passages. To begin the assessment, the researcher provided a brief introduction to the passage the participant had been assigned to read first. After the participant had finished reading, they rendered a free recall of all they could remember from the passage.

In order to examine the effect of treatment condition strategy use, participants in the keyword cues (after reading), and visual imagery (before reading) + keyword cues (after reading) treatment conditions utilized keyword cues while rendering free recalls of immediate-post assessment narrative and expository passages. The keyword cue lists for the narrative and expository passage utilized for immediate-post assessments are provided in Appendices E and F, respectively.

After the participant had rendered a free recall of the passage they had been randomly assigned to begin with, the researcher asked the participant the comprehension (cued recall) questions that accompanied the passage. In administering the cued recall assessments, the researcher would ask the participant the question, and then write down
the participant’s verbal response. All of the participants’ verbal renderings of cued recall responses were audio taped. After the participant had completed the cued recall assessment for the first passage, the researcher provided them with a brief introduction of the second passage, and then followed the same procedures described above. After rendering free recalls and answering the cued recall questions for the second passage, the participant was administered the immediate-post assessment of contextually relevant vocabulary knowledge. Specific procedures for each of the treatment conditions for immediate-post assessments are provided in Appendix J.

**Key informant reports.** Two weeks after the fourth instructional lesson, twenty randomly selected participants (5/treatment condition), rendered key informant reports regarding their perceptions of treatment instruction. The interviews were conducted by the researcher and were audio-recorded. All of the key informant reports were transcribed by the researcher, and analyzed using a content analysis approach. The researcher-developed questions for the key informant reports are provided in Appendix H.

**Delayed-post assessment procedures.** Six weeks after the fourth instructional lesson, participants met individually with the researcher for delayed-post assessments to examine main effects of treatment condition on student performance on (a) retention of immediate-post assessment narrative and expository measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge, and (b) transfer of strategy knowledge on measures of memory (free recall) and explicit and implicit comprehension (cued recall) of a newly encountered expository text.
**Delayed-post assessment retention procedures.** For retention measures, the students were randomly assigned to retell all they could remember about either the narrative or expository passage they had read in the immediate-post assessment, and then answer the immediate-post assessment explicit and implicit comprehension (cued recall) questions for that passage. All free and cued recall measures were audio taped. Recall times were recorded by the researcher. The participant then followed the similar procedure with either the immediate-post narrative or expository passage, depending on which passage they had been randomly assigned to. Finally, the participant was administered the same contextually relevant vocabulary assessment utilized in the immediate-post assessment. Specific procedures for each of the treatment conditions for delayed-post assessments of retention are provided in Appendix K.

**Delayed-post assessment transfer procedures.** After completing the delayed-post retention assessments outlined above, participants were asked to read a newly encountered expository passage, “Cats: Lions and Tigers in Your House”, to examine participants’ transfer of treatment condition strategy knowledge on expository measures of memory (free recall) and explicit and implicit comprehension (cued recall). All delayed-post assessments of transfer were audio taped. In addition, the researcher recorded reading and recall times for each participant. Before beginning the delayed-post assessment of transfer, the researcher reminded the participant of the strategy they had been practicing using during the instructional lessons. The researcher then informed participants that they would be practicing using that strategy by reading a new passage, rendering free recalls, and then answering some questions about what they read. To begin
the assessment, the researcher provided a brief introduction to the passage. After the participant had finished reading, they rendered a free recall of all they could remember from the passage. Specific procedures for delayed-post assessment measures of transfer of treatment condition strategy use are provided in Appendix L.
CHAPTER FOUR

RESULTS

This experimental study examined and compared the effects of explicit strategy training in the use of (a) visual imagery (during reading), (b) keyword cues (after reading), (c) visual imagery (during reading) + keyword cues (after reading), and (d) general memory instructions (before reading), on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text. The effects of treatment condition were explored through, (a) quantitative analyses of overall main effects of treatment condition on student performance on immediate-post and delayed-post assessment measures of the narrative and expository dependent variables outlined above, through a series of one-way MANOVAs, and (b) qualitative analyses of key informant reports regarding participants’ perceptions of their experience utilizing the strategy training they received and how those perceptions related to their performance on immediate/delayed-post assessments through content analyses.

This chapter presents the data findings, including (a) research questions, (b) summary of overall findings, (c) description of quantitative analyses of preintervention measures, (c) description of the quantitative findings for immediate-post and delayed-post assessment measures, and (d) description of the qualitative findings of key informant reports.
Research Questions

The major hypothesis in the present study is grounded in theoretical perspectives which support the notion that visual imagery (during reading) and keyword cues (after reading) play similar roles in the processing chains involved in comprehension, in particular, as potential retrieval strategies for aiding young readers’ comprehension of text (Paivio, 1971, 2007; Ericcson & Kintsch, 1995; Kintsch, 1998). Furthermore, that these two strategies, when used in combination, could interact in positive interconnected ways that result in enhanced memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text. Based on these assumptions, this study was conducted to explore the effects of explicit strategy training in four different treatment conditions: visual imagery (during reading), keyword cues (after reading), visual imagery (during reading) + keyword cues (after reading), and general memory instructions (before reading). The exploration and comparison of treatment condition effects were guided by the following two research questions:

1. What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative text?

2. What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of expository text?
3. What do key informant reports reveal about student perceptions of their experience utilizing the strategy training they received, and how do those differences relate to treatment condition performance on immediate-/delayed-post assessments?

For the study intervention, participants were randomly assigned to one of the four treatment conditions. Each condition entailed four separate instructional lessons. The researcher conducted all of the instructional lessons. The lessons were delivered in small groups of four to six students, in classrooms or conference rooms outside of the regular classroom setting. The four instructional lessons for each of the treatment conditions were identical in content and overall procedure. Scripted instructional lesson protocols used for explicit strategy training for each of the four treatment conditions can be found in Appendix D.

In order to examine the quantitative effects of treatment condition, participants were administered immediate-post assessments one week after their fourth instructional lesson, and delayed-post assessments six weeks after their fourth instructional lesson. The immediate-post assessments measured the effectiveness of treatment condition strategy use on student performance on narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge (multiple-choice assessment). The delayed-post assessments examined the effectiveness of treatment condition instruction on, (a) student retention of the narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant
vocabulary knowledge measured in the immediate-post assessment, and (b) student transfer of treatment condition strategy use to a newly encountered expository text on measures of memory (free recall) and explicit and implicit comprehension (cued recall).

Results from the immediate- and delayed-post assessments were analyzed by a series of parallel one-way MANOVAs to determine main effects of treatment condition differences on narrative and expository dependent variable measures. MANOVA procedures with significant $F$-values were followed by univariate analyses, and pot hoc multiple comparison analyses using Tukey’s HSD. Complete data sets were collected for 98 third-grade students who met the following criteria: (a) Fall 2010 MAP reading assessment scores within 1.5 SD above or below the NWEA established median for third-grade students at the onset of the school year, (b) teacher verification of third-grade reading ability, and (c) no documented learning disabilities in reading.

In order to examine the qualitative effects of treatment condition on students perception of strategy use and how those perceptions related to their group’s overall performance on immediate-/delayed-post assessments, 20 randomly selected participants (5/treatment condition) rendered key informant reports two weeks after their final instructional lesson. The reports were qualitatively analyzed by content analysis guidelines outlined by Taylor-Powell and Renner (2003).

**Summary of Overall Findings**

Multivariate analyses of immediate- and delayed-post assessments revealed significant main effects of treatment condition for narrative and expository dependent
variables. Follow-up univariate analyses on the MANOVAs, yielded significant overall treatment condition effects between groups for the following measures:

- immediate-post assessment narrative and expository measures of memory (free recall), and explicit and implicit comprehension (cued recall);
- delayed-post assessment retention measures of expository explicit and implicit comprehension (cued recall), and narrative implicit comprehension (cued recall);

and

- delayed-post assessment transfer measures of expository explicit comprehension (cued recall).

There were no significant univariate findings for narrative or expository contextually relevant vocabulary knowledge measures for the immediate- or delayed-post assessments. The strongest effect sizes were seen in immediate-post assessment narrative \( (F(3, 94) = 23.07, p < .01, \eta^2 = .42) \) and expository \( (F(3, 94) = 36.54, p < .01, \eta^2 = .54) \) measures of memory (free recall). The effect sizes of the narrative and expository measures that yielded significant \( F \) values during univariate analyses of immediate- and delayed-post assessment measures are provided in Tables 4.1 and 4.2.
Table 4.1.

*Effect Sizes of Narrative Measures That Yielded Significant Treatment Condition Effects*

<table>
<thead>
<tr>
<th>Narrative Dependent Measures</th>
<th>Memory $\eta^2$</th>
<th>Explicit Comprehension $\eta^2$</th>
<th>Implicit Comprehension $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate-Post</td>
<td>.42</td>
<td>.16</td>
<td>.10*</td>
</tr>
<tr>
<td>Delayed-Post Retention</td>
<td></td>
<td>.10*</td>
<td>.24</td>
</tr>
</tbody>
</table>

*There were no narrative measures for delayed-post transfer assessments.

Table 4.2.

*Effect Sizes of Expository Measures That Yielded Significant Treatment Condition Effects*

<table>
<thead>
<tr>
<th>Expository Dependent Measures</th>
<th>Memory $\eta^2$</th>
<th>Explicit Comprehension $\eta^2$</th>
<th>Implicit Comprehension $\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate-Post</td>
<td>.54</td>
<td>.16</td>
<td>.10*</td>
</tr>
<tr>
<td>Delayed-Post Retention</td>
<td></td>
<td>.10*</td>
<td>.24</td>
</tr>
<tr>
<td>Delayed-Post Transfer</td>
<td></td>
<td></td>
<td>.16</td>
</tr>
</tbody>
</table>

* Univariate results for this measure were significant, but post hoc analyses did not reveal any significant differences between treatment conditions.

Findings revealed the largest treatment condition effects were on immediate-post assessment measures of narrative and expository memory (free recall); where participants in both the keyword cues (after reading) and the visual imagery (during reading) +

83
keyword cues (after reading) treatment conditions significantly outscored their peers in the other two treatment conditions on the narrative and expository free recall measures. Similar post hoc findings were revealed for immediate-post assessment measures of narrative explicit and implicit comprehension (cued recall). In addition, participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions significantly outscored their peers in the general memory instructions (before reading) treatment condition on immediate-post and delayed-post assessment transfer measures of expository explicit comprehension.

While post hoc analyses of significant univariates never revealed any significant differences between the keyword cues (after reading) and visual imagery (during reading) + keyword cues (after reading) treatment conditions, the following findings revealed post assessment measures that yielded more significant differences for one condition than the other:

(a) delayed-post assessment retention measures of narrative implicit comprehension - Participants in the keyword cues (after reading) outscored their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions; while participants in the visual imagery (during reading) + keyword cues (after reading) significantly outscored their peers in the general memory instructions (before reading) treatment condition, but did not significantly outscore their peers in the visual imagery (during reading) treatment condition.
(b) delayed-post assessment retention measures of expository implicit comprehension - Participants in the visual imagery (during reading) + keyword cues (after reading) significantly outscored their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions; while participants in the keyword cues (after reading) significantly outscored their peers in the general memory instructions (before reading) treatment condition, but did not significantly outscore their peers in the visual imagery (during reading) treatment condition.

A summary of the significant post hoc multiple pairwise comparison findings for overall treatment condition effect on narrative and expository dependent measures of immediate- and delayed-post assessments are provided in Figure 4.1.
Figure 4.1. Significant Multiple Pairwise Comparison Findings of Immediate-/Delayed-Post Assessment Measures.

Qualitative analyses of key informant reports regarding strategy use provided insightful additions to the significant quantitative differences between treatment conditions discussed above. The reports were analyzed by the coding of ‘ideas’ into the following established thematic categories/subcategories: (a) strategy knowledge: procedural and conditional, (b) metacognitive awareness: general and comprehension monitoring, and (c) motivational factors: value, personal interest, collaboration, self-
efficacy, frustration/boredom. Analyses revealed that informants in the general memory instructions (before reading) treatment condition offered markedly fewer accounts of procedural and conditional knowledge regarding treatment condition strategy use than their peers in the other three treatment conditions; they did, however, offer almost as many accounts of general procedural knowledge for other, unrelated strategies (i.e. reread, read more, take notes).

In terms of metacognitive awareness, informants in the visual imagery (during reading) + keyword cues (after reading) were the only ones to render accounts of metacognitive awareness in relation to treatment condition strategy use.

Informant reports regarding perceived motivational factors as a result of their experience offered the following: (a) there were more accounts of perceived value in the experience than any of the other motivational factors; and, while informants in all four treatment conditions offered accounts of value, those in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) offered markedly more than their peers in the other two conditions, (b) informants in all four treatment conditions offered accounts of collaboration and personal interest/relevance, (c) participants in the keyword cues (after reading) and the general memory instructions (after reading) were the only ones to render accounts of increased self-efficacy, and (d) accounts of frustration/boredom, were rendered by a single informant in both the general memory instructions (before reading) and the keyword cues (after reading) treatment conditions.

**Results of Quantitative Analysis of Preintervention Measures.**
Prior to the study intervention, a series of ANOVAs were conducted to ensure that the random assignment of participants to treatment conditions had not resulted in significant preintervention differences between treatment conditions on the following potential confounding variables: (a) Fall 2010 MAP reading assessment scores, (b) study defined MAP-based reading ability levels, and (c) gender. In addition, at the onset of the study, the researcher administered a researcher-developed preassessment of contextually relevant vocabulary knowledge. The preassessment was a 53-item multiple choice assessment, that included words in the immediate-post assessment narrative and expository passages that had been identified by the Spache Revised Word List (Spache, 1974) as ‘unfamiliar words’ for children at the third-grade level. Univariate results revealed the following for each of the measures: (a) Fall 2010 MAP reading assessment scores, $F(3, 94) = .29, p = .83$, (b) MAP based reading ability levels, $F(3, 94) = .27, p = .85$, (c) gender, $F(3, 94) = .41, p = .75$), and (d) preassessment measures of narrative ($F(3,94) = 1.58, p = .20$), and expository ($F(3,94) = 1.29, p = .28$) contextually relevant vocabulary knowledge; indicating that there were no significant preintervention differences across treatment conditions on any of these preintervention measures.

Levene’s test of equality of variances conducted within the ANOVAs, revealed the following results: (a) Fall 2010 MAP reading assessment scores, $F(3, 94) = 1.78, p = .16$, (b) study defined MAP-based reading ability levels, $F(3, 94) = .20, p = .90$, (c) gender, $F(3, 94) = .22, p = .88$, and (d) preassessment measures of narrative ($F(3,94) = .30, p = .82$), and expository ($F(3,94) = .08, p = .97$) contextually relevant vocabulary
knowledge, indicated homogeneity of variance across treatment conditions for all the preintervention measures.

**Results of Quantitative Analyses of Immediate- and Delayed-Post Assessments**

In order to examine overall main effects of treatment condition, data were collected on student performance on narrative and expository dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge at two points in time, (a) immediate-post assessments given one week after the fourth treatment condition instructional lesson, and (b) delayed-post assessments given six weeks after the final treatment condition instructional lesson. A series of one-way MANOVAs were conducted on immediate- and delayed-post assessment measures to examine the following two research questions:

1. **What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and/or contextually relevant vocabulary knowledge of narrative text?**

2. **What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and/or contextually relevant vocabulary knowledge of expository text?**

All immediate- and delayed-post assessments were administered individually to participants by the researcher. The researcher recorded, and scored all the immediate- and delayed-post assessments.

**Immediate-post assessments.** Results of the 2 one-way MANOVAs that were conducted to examine overall treatment condition effects on immediate-post assessment
narrative and expository measures revealed a significant main effect for treatment condition strategy use on narrative (Wilks’s Λ = .54, $F(12, 241) = 5.31, p < .01, \eta^2 = .19$), and expository (Wilks’s Λ = .44, $F(12, 241) = 7.26, p < .01, \eta^2 = .24$) dependent measures. Levene’s test of equality of variance conducted within the MANOVAs revealed a lack of significance for all narrative and expository dependent measures, indicating homogeneity of variance within groups.

ANOVA results for the following narrative immediate-post assessment dependent measures were significant: (a) memory (free recall), $F(3, 94) = 23.07, p < .01, \eta^2 = .42$, (b) explicit comprehension (cued recall), $F(3, 94) = 5.84, p < .01, \eta^2 = .16$, and (c) implicit comprehension (cued recall), $F(3, 94) = 8.40, p < .01, \eta^2 = .21$. The ANOVA results for narrative contextually relevant vocabulary knowledge was nonsignificant ($F(3, 94) = .49, p = .70, \eta^2 = .02$). The univariate findings on immediate-post assessment narrative measures are provided in Table 4.3.

Table 4.3.

<table>
<thead>
<tr>
<th>Immediate-Post Narrative Measures</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23.07</td>
<td>&lt;.01*</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>5.84</td>
<td>&lt;.01*</td>
<td>.16</td>
</tr>
<tr>
<td></td>
<td>8.40</td>
<td>&lt;.01*</td>
<td>.21</td>
</tr>
<tr>
<td></td>
<td>.49</td>
<td>.70</td>
<td>.02</td>
</tr>
</tbody>
</table>

* Indicates a significant difference at the .05 level.

ANOVA results for the following expository immediate-post assessment dependent measures were significant: (a) memory (free recall) $F(3, 94) = 36.54, p < .01, \eta^2 = .54$, (b) explicit comprehension (cued recall), $F(3, 94) = 5.82, p < .01, \eta^2 = .16$, and
(c) implicit comprehension (cued recall), $F(3, 94) = 3.43, p = .02, \eta^2 = .10$. The ANOVA for expository contextually relevant vocabulary knowledge was nonsignificant, $F(3, 94) = .38, p = .77, \eta^2 = .01$. The univariate findings on immediate-post assessment expository measures are provided in Table 4.4.

Table 4.4.

Univariate Findings for Immediate-Post Assessment Expository Dependent Measures

<table>
<thead>
<tr>
<th></th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.54</td>
<td>&lt; .01*</td>
<td>.54</td>
</tr>
<tr>
<td></td>
<td>5.82</td>
<td>&lt; .01*</td>
<td>.16</td>
</tr>
<tr>
<td></td>
<td>3.43</td>
<td>.02*</td>
<td>.10**</td>
</tr>
<tr>
<td></td>
<td>.38</td>
<td>.77</td>
<td>.01</td>
</tr>
</tbody>
</table>

* Indicates a significant difference at the .05 level. ** The univariate was significant for this measure, but pairwise comparisons revealed no significant differences between treatment conditions.

Post-hoc tests were conducted for significant univariates of narrative and expository immediate-post assessment measures of memory (free recall) and explicit and implicit comprehension (cued recall) using Tukey’s HSD procedure, with $\alpha = 0.05$.

Results of the post hoc analyses multiple pairwise comparisons revealed that students in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than students in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions on (a) narrative and expository measures of memory (free recall), and (b) narrative measures of explicit and implicit comprehension (cued recall). Post hoc analyses also showed that students in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored
significantly higher than students in the general memory instructions (before reading) treatment condition on immediate-post assessment measures of expository explicit comprehension (cued recall). The means, standard deviations, and pairwise multiple comparison results for immediate-post assessment narrative and expository dependent measures are provided in Tables 4.5 and 4.6, respectively.

Table 4.5

*Means, Standard Deviations and Pairwise Comparisons of Immediate-Post Assessment Narrative Dependent Measures*

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Free Recall</th>
<th>Explicit Cued Recall</th>
<th>Implicit Cued Recall</th>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Visual</td>
<td>20.33&lt;sub&gt;b&lt;/sub&gt; (8.12)</td>
<td>3.38&lt;sub&gt;b&lt;/sub&gt; (1.21)</td>
<td>2.21&lt;sub&gt;b&lt;/sub&gt; (1.22)</td>
<td>3.46&lt;sub&gt;a&lt;/sub&gt; (1.64)</td>
</tr>
<tr>
<td>Keyword</td>
<td>30.19&lt;sub&gt;a&lt;/sub&gt; (7.23)</td>
<td>4.15&lt;sub&gt;a&lt;/sub&gt; (0.88)</td>
<td>3.08&lt;sub&gt;a&lt;/sub&gt; (1.06)</td>
<td>3.31&lt;sub&gt;a&lt;/sub&gt; (1.64)</td>
</tr>
<tr>
<td>Visual + Keyword</td>
<td>29.84&lt;sub&gt;a&lt;/sub&gt; (7.23)</td>
<td>4.20&lt;sub&gt;a&lt;/sub&gt; (7.23)</td>
<td>3.28&lt;sub&gt;a&lt;/sub&gt; (7.23)</td>
<td>3.44&lt;sub&gt;a&lt;/sub&gt; (7.23)</td>
</tr>
<tr>
<td>General Memory</td>
<td>17.00&lt;sub&gt;b&lt;/sub&gt; (6.62)</td>
<td>3.26&lt;sub&gt;b&lt;/sub&gt; (1.10)</td>
<td>1.91&lt;sub&gt;b&lt;/sub&gt; (1.24)</td>
<td>3.00&lt;sub&gt;a&lt;/sub&gt; (1.38)</td>
</tr>
</tbody>
</table>

*Note.* Means in the same column that do not share subscripts differ at p < .05 using Tukey’s HSD procedures. Maximum score for free recall = 55; explicit cued recall = 5; implicit cued recall = 4; vocabulary = 7.
Table 4.6  
**Means, Standard Deviations and Pairwise Comparisons of Immediate-Post Assessment Expository Dependent Measures**

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Free Recall M (SD)</th>
<th>Explicit Cued Recall M (SD)</th>
<th>Implicit Cued Recall M (SD)</th>
<th>Vocabulary M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>10.96b (5.31)</td>
<td>3.71a,b (.96)</td>
<td>2.50a (1.06)</td>
<td>2.37a (1.28)</td>
</tr>
<tr>
<td>Keyword</td>
<td>19.58a (5.74)</td>
<td>4.04a (.96)</td>
<td>3.08a (1.06)</td>
<td>2.42a (1.42)</td>
</tr>
<tr>
<td>Visual + Keyword</td>
<td>20.04a (4.37)</td>
<td>4.40a (.87)</td>
<td>3.20a (.96)</td>
<td>2.64a (1.52)</td>
</tr>
<tr>
<td>General Memory</td>
<td>7.74b (4.55)</td>
<td>3.30b (1.02)</td>
<td>2.48a (.95)</td>
<td>2.22a (1.35)</td>
</tr>
</tbody>
</table>

*Note.* Means in the same column that do not share subscripts differ at p < .05 using Tukey’s HSD procedures. Maximum score for free recall = 49; explicit cued recall = 6; implicit cued recall = 4; vocabulary = 5.

**Delayed-post assessments.** The delayed-post assessments examined the effectiveness of treatment condition instruction on, (a) student retention of the immediate-post assessment narrative and expository passage dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge, and (b) student transfer of treatment condition strategy use on newly encountered expository dependent measures of memory (free recall) and explicit and implicit comprehension (cued recall).
Delayed-post assessment measures of retention. In order to determine main effects of treatment condition for retention of immediate-post assessment narrative and expository dependent measures, two parallel one-way MANOVAs were conducted, one for narrative and one for expository dependent measures of, a) memory (free recall), b) explicit and implicit comprehension (cued recall), and c) contextually relevant vocabulary knowledge. MANOVA procedures with significant $F$-values were followed by univariate analyses and post hoc multiple comparison analyses. Results of the two MANOVAs revealed significant main effects for narrative (Wilks’s $\Lambda = .73$. $F(12, 241) = 2.60, p < .01, \eta^2 = .10$), and expository (Wilks’s $\Lambda = .68$. $F(12, 241) = 3.20, p < .01, \eta^2 = .12$) dependent measures. Levene’s test of equality of variance conducted within the MANOVAs revealed a lack of significance for all narrative and expository dependent measures, indicating homogeneity of variance within groups.

Follow-up ANOVAs for delayed-post assessment measures of retention yielded significant findings for (a) narrative measures of implicit comprehension (cued recall), $F(3, 94) = 7.55, p < .01, \eta^2 = .19$, and (b) expository measures of explicit ($F(3, 94) = 3.37, p = .02, \eta^2 = .10$) and implicit ($F(3, 94) = 9.99, p < .01, \eta^2 = .24$) comprehension (cued recall). Univariate findings for delayed-post assessment retention of immediate-post assessment narrative and expository dependent measures are provided in Tables 4.7 and 4.8, respectively.
Table 4.7

Univariate Findings for Delayed-Post Assessment Retention of Narrative Dependent Measures

<table>
<thead>
<tr>
<th>Delayed-Post Retention Narrative Measures</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>1.85</td>
<td>.14</td>
<td>.06</td>
</tr>
<tr>
<td>Explicit Comprehension</td>
<td>2.52</td>
<td>.06</td>
<td>.07</td>
</tr>
<tr>
<td>Implicit Comprehension</td>
<td>7.55</td>
<td>&lt; .01*</td>
<td>.19</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>1.36</td>
<td>.26</td>
<td>.04</td>
</tr>
</tbody>
</table>

* Indicates a significant difference at the .05 level.
Table 4.8

Univariate Findings for Delayed-Post Assessment Retention of Expository Dependent Measure

<table>
<thead>
<tr>
<th>Delayed-Post Retention</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
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<tbody>
<tr>
<td>Memory</td>
<td>.41</td>
<td>.75</td>
<td>.01</td>
</tr>
<tr>
<td>Explicit Comprehension</td>
<td>3.37</td>
<td>.02*</td>
<td>.10**</td>
</tr>
<tr>
<td>Implicit Comprehension</td>
<td>10.00</td>
<td>&lt;.01*</td>
<td>.24</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>.87</td>
<td>.46</td>
<td>.03</td>
</tr>
</tbody>
</table>

* Indicates a significant difference at the .05 level. **The univariate was significant for this measure, but pairwise comparisons revealed no significant differences between treatment conditions.

Post-hoc tests conducted for the significant univariates, were analyzed using Tukey’s HSD procedure, with $\alpha = 0.05$. Results of the post hoc multiple pairwise comparison analyses revealed that, (a) students in the keyword cues (after reading) and visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher on narrative measures of explicit comprehension (cued recall) compared to students in the visual imagery (during reading) and general memory instructions (before reading) treatment conditions, (b) students in the keyword cues (after reading) and visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than students in the general memory instructions (before reading) treatment condition, and (c) students in the visual imagery (during reading) + keyword cues (after reading) treatment condition scored significantly higher
than students in the general memory instructions (before reading) treatment condition.

The means, standard deviations, and multiple pairwise comparisons for narrative and expository delayed-post assessment measures of retention are provided in Tables 4.9 and 4.10, respectively.

Table 4.9

Means, Standard Deviations, and Pairwise Comparisons of Delayed-Post Assessment Retention of Narrative Dependent Measures.

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Free Recall M (SD)</th>
<th>Implicit Cued Recall M (SD)</th>
<th>Explicit Cued Recall M (SD)</th>
<th>Vocabulary M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>7.08&lt;sub&gt;a&lt;/sub&gt; (5.27)</td>
<td>1.79&lt;sub&gt;b&lt;/sub&gt; (1.29)</td>
<td>1.75&lt;sub&gt;a&lt;/sub&gt; (.99)</td>
<td>3.71&lt;sub&gt;a&lt;/sub&gt; (1.90)</td>
</tr>
<tr>
<td>Keyword</td>
<td>7.12&lt;sub&gt;a&lt;/sub&gt; (3.47)</td>
<td>2.58&lt;sub&gt;a&lt;/sub&gt; (1.21)</td>
<td>2.58&lt;sub&gt;a&lt;/sub&gt; (1.10)</td>
<td>3.46&lt;sub&gt;a&lt;/sub&gt; (1.48)</td>
</tr>
<tr>
<td>Visual + Keyword</td>
<td>8.72&lt;sub&gt;a&lt;/sub&gt; (4.17)</td>
<td>2.56&lt;sub&gt;a&lt;/sub&gt; (1.10)</td>
<td>2.40&lt;sub&gt;a&lt;/sub&gt; (.98)</td>
<td>4.00&lt;sub&gt;a&lt;/sub&gt; (1.47)</td>
</tr>
<tr>
<td>General Memory</td>
<td>5.91&lt;sub&gt;a&lt;/sub&gt; (3.54)</td>
<td>1.39&lt;sub&gt;b&lt;/sub&gt; (.99)</td>
<td>2.04&lt;sub&gt;a&lt;/sub&gt; (1.33)</td>
<td>3.13&lt;sub&gt;a&lt;/sub&gt; (1.29)</td>
</tr>
</tbody>
</table>

Note: Means in the same row that do not share subscripts differ at \( p < .05 \) using Tukey’s HSD procedure. Max. score for free recall = 49; explicit comprehension = 6; implicit comprehension = 4; vocabulary = 5.
Table 4.10
Means, Standard Deviations, and Pairwise Comparisons of Delayed-Post Assessment Retention of Expository Dependent Measures

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Free Recall M (SD)</th>
<th>Explicit Cued Recall M (SD)</th>
<th>Implicit Cued Recall M (SD)</th>
<th>Vocabulary M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>4.75a (3.37)</td>
<td>3.17a (1.24)</td>
<td>2.50b,c (1.02)</td>
<td>2.62a (1.44)</td>
</tr>
<tr>
<td>Keyword</td>
<td>5.54a (3.44)</td>
<td>3.58a (0.96)</td>
<td>3.19a,b (0.75)</td>
<td>2.50a (1.18)</td>
</tr>
<tr>
<td>Visual + Keyword</td>
<td>4.68a (2.98)</td>
<td>3.96a (1.10)</td>
<td>3.28a (0.79)</td>
<td>2.92a (1.29)</td>
</tr>
<tr>
<td>General Memory</td>
<td>4.95a (3.14)</td>
<td>3.04a (1.07)</td>
<td>1.96c (1.26)</td>
<td>2.35a (1.23)</td>
</tr>
</tbody>
</table>

Note. Means in the same row that do not share subscripts differ at p < .05 using Tukey’s HSD procedure. Maximum score for free recall = 49; explicit cued recall = 6; implicit cued recall = 4; vocabulary = 5.

Delayed-post assessment measures of transfer. In order to determine treatment condition effects of transfer of treatment condition strategy instruction to a newly encountered expository passage, a one-way MANOVA was conducted for passage dependent measures of memory (free recall), and explicit and implicit comprehension (cued recall). MANOVA procedures with significant $F$-values were followed by univariate analyses and post hoc multiple comparison analyses.

Overall treatment condition effects of transfer. Results of the delayed-post assessment MANOVA conducted to analyze overall treatment condition effect on student
transfer of strategy instruction to a newly encountered expository passage revealed significant treatment condition effects, Wilks’s $\Lambda = .78$. $F(9, 224) = 2.64, p < .01, \eta^2 = .08$. Levene’s test of equality of variance conducted within the MANOVAs revealed a lack of significance for expository dependent measures of memory (free recall), and implicit comprehension (cued recall). It should, however, be noted, that Levene’s test of equality of variance revealed a significant $F$-value for expository explicit comprehension (cued recall) measures ($F(3, 94) = 9.70, \alpha < .01$), indicating that homogeneity of variance within groups on this dependent measure could not be assumed.

ANOVAs on the significant dependent variables were analyzed as follow-up analyses to the MANOVA. The ANOVA for explicit comprehension (cued recall) was significant ($F(3, 94) = 5.74, p < .01, \eta^2 = .16$). The univariate results for delayed-post assessment transfer measures are provided in Table 4.11.

Table 4.11

Univariate Findings for Delayed-Post Assessment Transfer Expository Dependent Measures

<table>
<thead>
<tr>
<th>Delayed-Post Retention Expository Measures</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>2.03</td>
<td>.12</td>
<td>.06</td>
</tr>
<tr>
<td>Explicit Comprehension</td>
<td>5.74</td>
<td>&lt; .01*</td>
<td>.16</td>
</tr>
<tr>
<td>Implicit Comprehension</td>
<td>1.22</td>
<td>.31</td>
<td>.04</td>
</tr>
</tbody>
</table>
Since Levene’s Test of Equality of Error Variances yielded a significant result for explicit comprehension, post hoc analyses were run using Dunnett’s C test to account for the assumption of unequal variances across groups. Results of Dunnett’s C post-hoc analyses revealed that students in the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than students in the general memory instructions (before reading) treatment condition. The means, standard deviations, and multiple pairwise comparisons for delayed-post assessment dependent measures of newly encountered expository text are provided in Table 4.12.

**Table 4.12**

*Means, Standard Deviations, and Pairwise Comparisons of Delayed-Post Assessment Transfer Expository Dependent Measures*

<table>
<thead>
<tr>
<th>Treatment Condition</th>
<th>Free Recall M (SD)</th>
<th>Explicit Cued Recall M (SD)</th>
<th>Implicit Cued Recall M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>16.62\textsubscript{a} (7.25)</td>
<td>2.79\textsubscript{a,b} (1.32)</td>
<td>3.08\textsubscript{a} (0.93)</td>
</tr>
<tr>
<td>Keyword</td>
<td>15.00\textsubscript{a} (6.33)</td>
<td>3.35\textsubscript{a} (0.85)</td>
<td>3.31\textsubscript{a} (0.93)</td>
</tr>
<tr>
<td>Visual + Keyword</td>
<td>15.36\textsubscript{a} (5.99)</td>
<td>3.56\textsubscript{a} (0.58)</td>
<td>3.32\textsubscript{a} (0.80)</td>
</tr>
</tbody>
</table>

* Indicates a significant difference at the .05 level.
General Memory | 12.09<sub>a</sub> (6.47) | 2.57<sub>b</sub> (0.95) | 2.91<sub>a</sub> (0.79)

*Note.* Means in the same row that do not share subscripts differ at p < .05 using Dunnett’s C test. Maximum score for free recall = 47; explicit cued recall = 4; implicit cued recall = 4.

**Results of Qualitative Analysis of Key Informant Reports**

Key informant interviews were analyzed to explore the following research question:

> What do key informant reports reveal about student perceptions of their experience utilizing the strategy training they received, and how do those differences relate to treatment condition performance on immediate-/delayed-post assessments?

The reports were analyzed by content analysis guidelines outlined by Taylor-Powell and Renner (2003). Prior to analysis, the researcher, committee chair, and another committee member decided that the analysis would involve coding ideas, rather than sentences, because children this age very rarely express full ideas in just one sentence. In order to direct the content analysis, the researcher and another expert reader, independently reviewed various sources of research-based articles and books that outlined effective reading strategy instruction for elementary school children. Building on these sources, and their own expertise in the area of reading instruction, they each came up with their perceived purpose and possible themes and/or categories for each of each of the five interview questions. Then the researcher and the expert reader met to discuss their perceptions of purpose and possible themes/categories for each of the questions,
and discussed differences until they were able to reach 100% agreement on all five questions.

Next, the researcher and expert read met to begin the coding process for four (one per treatment condition) randomly chosen key informant reports, based on the initial perceptions of purpose and possible themes/categories. Originally, the questions were being viewed as individual sources of information, with separate, unique purposes, and different combinations of one themes/categories. During this initial coding analysis, it quickly became apparent that the first four questions, were inherently interwoven, all tapping into an overarching theme of, characteristics of good strategy users; and, each of the four questions, while unique in its individual purpose, offered an additive lens to each of the following categories describing characteristics of good strategy users outlined by Almasi ((2003): (a) strategy use knowledge, (b) metacognitive skills, and (c) motivational factors.

During the initial analysis, it also became apparent that since analyses involved the coding of ideas, rather than sentences, many times the ideas shared more than one category. Ideas that were relevant to more than one category were cross-indexed in their entirety to all relevant categories by highlighting the phrases within the idea that pertained to that particular category. Cross-indexing the ideas in this manner, offered a lens for examining relationships between the categories.

The fifth question on the key informant reports served a qualitatively different purpose, it was designed to offer a quantitative measure of interviewees’ memory (free recall) for any of the four instructional passages they had read during their strategy
lessons. Its overall purpose was to offer a quantitative measure to directly compare to the qualitative perceptions being rendered. As a result, for the purposes of these analyses, coding involved recording the number of propositions recalled for the narrative or expository passage they had chosen to retell. For narrative passages, propositions were coded as one of the following elements of story structure: (a) setting/background, (b) goal, (c) events, or (d) resolution. For expository passages, propositions were coded as either main ideas, or details.

In order to establish interrater reliability for the coding analyses guidelines established during the initial analysis discussed above, the researcher and other expert reader independently coded the four randomly selected key informant reports, in their entirety, based on the above categories. Comparison of their independent analyses resulted in an interrater reliability Cohen’s Kappa coefficient of 0.90. Table 4.13 below, provides an overview of the three established categories, subsequent subcategories, and coded examples for each.

Table 4.13

<table>
<thead>
<tr>
<th>Thematic Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category/Thematic category/Subcategory</td>
</tr>
<tr>
<td>Q1. We did work with a strategy called (visual imagery, keyword cues, visual imagery and keyword cues, or remembering to try to remember and understand all you read – general memory), and I am going to try to explain to second-graders how to use this strategy when reading. How would you explain how to use this strategy to second-graders?</td>
</tr>
</tbody>
</table>

**Strategy Knowledge**

**Procedural knowledge**

How do you use strategy?
PK1 – General

“You build sentences around the keyword cues. You have to add some things.”

“I would tell them to know how like when you are dreaming, you kind of imagine things, you just close your eyes and think about what you want to think about.”

PK2 – Other strategy

“I read the book over and over and over, until I get it all memorized in my head.”

Q2. Do you think you could ever use this strategy again?

Strategy Knowledge

Conditional knowledge

CK1 – General

“When and why would you use the strategy?”

“…because in chapter books there aren’t really a lot of pictures in them, and whatever they say or Whatever is going on, now I can use it to picture it in my head.”

CK2 – Acquiring content knowledge

“It helped me remember like liquids, it helped me to see how liquids only take shape of the container it is in.”

CK3 – Transfer

“Yes, I am using this now for my book report. It’s problems, solutions, what’s the main idea, main characters, setting and stuff. I am going to put down this list of names and keyword cues, and stuff and I’m going to use the names for the characters, and I am going to use the keyword cues for main ideas, solutions, and problems.”

Q3. Do you think our work together has helped you become a better reader? Yes/No

If Yes, “Can you tell me how are work together has helped you become a better reader?”

104
### Metacognitive Awareness

**MC1 - General**

<table>
<thead>
<tr>
<th>Has this strategy changed how you try to learn?</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Probably the keyword cues, because using them, it would like open up my mind, and make me think about how to use them. And, um, to do this, you have to think, and most people usually don’t think when they are trying to learn.”</td>
</tr>
<tr>
<td>“I think it would confuse me if I tried to use the keyword cues to study.”</td>
</tr>
</tbody>
</table>

**MC2 – Comprehension Monitoring**

<table>
<thead>
<tr>
<th>How can this strategy help you ‘fix’ things when you don’t understand what you are reading?</th>
</tr>
</thead>
<tbody>
<tr>
<td>“When I am reading my science, sometimes it helps me to go back and underline stuff I don’t understand, I could go back and under the keyword cues and try to make sentences with them.”</td>
</tr>
</tbody>
</table>

---

**Q3. Do you think our work together has helped you become a better reader?**

If Yes, “Can you tell me how are work together has helped you become a better reader?”

**Q4. Of all the things we did when working together what did you enjoy the most?**

What did you like the least?

### Motivational Factors

**MF1 - Value**

<table>
<thead>
<tr>
<th>Did you value anything from this experience?</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Yes, it helped me a lot because it just helped me stick it in my head and add details.”</td>
</tr>
<tr>
<td>“Every time I read with you, I learn new words.”</td>
</tr>
</tbody>
</table>

**MF2 – Personal interest/relevance**

<table>
<thead>
<tr>
<th>Did you associate any of this experience personally?</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I thought the stories we read together were really interesting to me. Especially, “Lights Out!”’, because I enjoy baseball, I have a guitar, and I also play basketball.”</td>
</tr>
</tbody>
</table>

**MF3 - Collaboration**

<table>
<thead>
<tr>
<th>Was the collaboration in</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
this experience motivating? “...because in chapter books there aren’t really a lot of pictures in them, and whatever they say or whatever is going on, now I can use it to picture it in my head.”

**MF4 – Self-efficacy**

Do you feel like you are a better reader/learner after this experience? “Cause I can understand it more, and after that, I am better at understanding the books that I read.”

**MF5 – Frustration/Boredom**

“Sometimes the links between cues are hard.”

“I didn’t like reading the one about the magician, it was hard.”

Qualitative analyses of the first four questions of the 20 key informant reports revealed the following for each of the three categories:

- **Strategy knowledge.** Interviewees in the visual imagery (during reading), keyword cues (after reading), and visual imagery (during reading) + keyword cues (after reading) offered almost identical numbers of accounts of general procedural knowledge, general conditional knowledge, conditional knowledge for acquiring content knowledge, and conditional knowledge of how to transfer strategy use to writing. While interviewees in the general memory (before reading) treatment condition rendered markedly fewer accounts of all of these types of strategy knowledge. In addition, interviewees in the general memory (before reading) treatment condition offered almost as many accounts of general procedural knowledge for other, unrelated strategies (i.e. reread, read more, take
notes) as their peers in the other three treatment conditions did for treatment condition-specific strategy use.

- **Metacognitive awareness/skills.** Interviewees in the visual imagery (during reading) and the keyword cues (after reading) treatment condition were the only ones to offer accounts of metacognition regarding treatment condition strategy use as a means of comprehension monitoring. One interviewee in the keyword cues (after reading) treatment condition did offer an account of metacognition regarding when and why they wouldn’t utilize keyword cues for learning.

- **Motivation.** There were more accounts of perceived value as a result of study participation, than any other of the motivational subcategories. Interviewees in all four treatment conditions expressed accounts of perceived value, with interviewees in the keyword cues (after reading) and visual imagery (during reading) + keyword cues (after reading) offering markedly more than their peers in the other two treatment conditions. While fewer in number, perceived accounts of motivation as a result of personal interest/relevance, and collaboration were also rendered by interviewees in all four of the treatment conditions.

  Interviewees in both the visual imagery (before reading) + keyword cues (after reading) and the general memory instructions (before reading) treatment conditions were the only ones to render accounts of perceived increases in their self-efficacy as a result of their participation in this study. There were single accounts from interviewees in both the keyword cues (after reading) and the
general memory instructions (before reading) treatment conditions of perceived frustration/boredom associated with strategy use and/or training.

Finally, there were no quantitative differences across the four treatment conditions on the number of details they could recall regarding a passage of their choice. These findings are not surprising, considering the nonsignificant findings observed for measures of narrative and expository memory (free recall) in the delayed-post assessments of retention and transfer.
CHAPTER FIVE
DISCUSSION

Chapter Five discusses the conclusions indicated by the data analyses presented in Chapter Four. This chapter includes (a) Purpose and Methods, (b) Data Analysis, (c) Limitations and Implications for Future Research, and (d) Conclusions.

Purpose and Methods

Literacy allows individuals to foster as individuals, and to function as responsible and productive citizens at the local, state, national, and international levels. According to Biancarosa and Snow (2004):

“American youth need strong literacy skills to succeed in school and in life. Students who do not acquire these skills find themselves at a serious disadvantage in social settings, as civil participants, and in the working world. Yet approximately eight million young people between fourth and twelfth grade struggle to read at grade level” (p. 3).

It can be assumed that comprehension is the ultimate goal in successful reading, particularly within the theoretical transfer of comprehension to application and task performance. Research findings have shown that the metacognitive and cognitive strategies needed for effective comprehension can be taught with explicit strategy training, and that instruction in their use can lead to gains in reading achievement (Dole, Nokes, & Drits, 2009). This study focused on explicit training in the use of visual imagery and keyword cues, two cognitive strategies that research has shown to be effective in aiding comprehension.
In order to explore and compare the effectiveness of these two strategies, participants were randomly assigned to one of the following treatment conditions: (a) visual imagery (during reading), (b) keyword cues (after reading), (c) visual imagery (during reading) + keyword cues (after reading), or (d) general memory instructions (before reading). In order to analyze main effects of treatment condition, this study implemented a post-test only sequential explanatory mixed methods design (Creswell & Plano Clark, 2006). This design allowed for quantitative analysis of treatment condition effects on third-grade readers’ performance on immediate-/delayed-post assessment measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge of narrative and expository text; and, a qualitative lens for viewing those differences.

The study quantitatively analyzed student performance on immediate-/delayed-post assessment narrative and expository dependent measures through a series of parallel MANOVAs conducted on narrative and expository dependent measures of immediate-/delayed post assessments. Complete data sets were collected and quantitatively analyzed for 98 third-grade students, who were recruited from eight different classrooms across three schools in Upstate South Carolina. In addition, the study analyzed twenty (5 participants/treatment condition) key informant reports using coding analysis guidelines outlined by Taylor & Powell (2003) for qualitative differences in students’ perceptions of their strategy use experience in relation to treatment condition performance on immediate-/delayed-post assessments.

Prior to the study, the researcher and her committee chair identified the following
preintervention, potential confounding variables: (a) Fall 2010 MAP reading assessment scores, (b) MAP-based reading ability levels, (c) gender, and (d) contextually relevant vocabulary knowledge. Participant data for the first three variables were obtained from the classroom teachers. In order to assess the fourth variable, student knowledge of contextually relevant vocabulary terms found in the narrative and expository immediate-post assessment passages, the researcher administered a researcher-developed preassessment of contextually relevant vocabulary knowledge. The preassessment was designed to assess participant knowledge of key terms found in the immediate-post assessment narrative and expository passages. A series of one-way ANOVAs were conducted to ensure there were no significant preintervention differences between treatment conditions for any of these measures. Results of the ANOVAs confirmed no preintervention differences between treatment conditions for any of the four potential moderating variables.

Participants in all four of the treatment conditions received four instructional lessons (one lesson/week) in treatment condition strategy use. The instructional lessons were conducted by the researcher, and carried out in small groups of four to six, at the participants’ respective schools. Two narrative and two expository passages (one for each of the four lessons) were utilized for the instructional lessons. All four passages used for the lessons were written at the third-grade readability level according to the Spache Readability Formula (Spache, 1953).

During each instructional lesson, the researcher, (a) introduced the passage, (b) progressed through an explicit script of strategy instruction based on treatment condition,
and (c) guided students in their use of their treatment condition strategy as they rendered free recalls of the passages with partners. The four instructional lessons were organized in the following manner based on Pearson and Gallagher’s (1983) “gradual release of responsibility” model: (a) researcher modeled lesson – narrative, (b) guided instruction lesson – expository, (c) collaborative lesson – narrative, and (d) independent practice lesson – expository. The four instructional lessons for all of the treatment conditions identical in content, time allocated for partner retellings, and overall procedure.

In order to examine the effects of treatment condition, participants were administered immediate-post assessments one week after their fourth instructional lesson and delayed-post assessments six weeks after their fourth instructional lesson. The immediate-post assessments measured the effectiveness of treatment condition strategy use on student performance on narrative and expository passage-dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge. The delayed-post assessments examined the effectiveness of treatment condition on, (a) student retention of the immediate-post assessment narrative and expository passage dependent measures, and (b) student transfer of treatment condition strategy use to a newly encountered expository text on measures of memory (free recall) and explicit and implicit comprehension (cued recall). Results of the immediate-/delayed-post assessments were analyzed through a series of parallel, one-way MANOVAs. Significant multivariate F-values were followed-up by univariate analyses and post hoc multiple pairwise comparison analyses.

In addition to the quantitative analyses discussed above, this study qualitatively
analyzed key informant reports that were rendered two weeks after participants’ final instructional lesson. The reports were analyzed by coding analysis methods outlined by Taylor and Powell (2003).

**Data Analysis**

**Main Effects of Treatment Condition**

A series of parallel one-way MANOVAs were performed to test for significant treatment condition effects for immediate-/delayed-post assessment narrative and expository dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and contextually relevant vocabulary knowledge. Follow-up univariate and post hoc multiple comparison analyses were conducted for all significant multivariate F-values. These analyses were conducted to answer the following two research questions:

1. *What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and/or contextually relevant vocabulary knowledge of narrative text?*

2. *What are the main effects of treatment condition on third-grade readers’ memory (free recall), explicit and implicit comprehension (cued recall), and/or contextually relevant vocabulary knowledge of expository text?*

The research questions inherently addressed three separate queries regarding effects of treatment condition, (a) immediate-post assessment – effect of treatment condition on strategy use on student performance on narrative and expository dependent measures of memory (free recall), explicit and implicit comprehension (cued recall), and
contextually relevant vocabulary knowledge, (b) delayed-post assessment retention – effect of treatment condition on student retention of immediate-post assessment narrative and expository dependent measures, and (c) delayed-post assessment transfer – effect of treatment condition on transfer of strategy use on participants’ memory (free recall), and explicit and implicit comprehension (cued recall) of a newly encountered expository text.

Multivariate analyses revealed the greatest effect sizes for immediate-post assessment measures of narrative and expository memory (free recall), with participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scoring significantly higher than their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions. It should be noted, that participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions were utilizing passage-specific keyword cue lists while rendering free recalls in order to examine the effect of treatment condition on strategy use.

Not only did participants in both of these treatment conditions score significantly higher on the memory (free recall) measures, they also had significantly higher recall times than their peers in the other two treatment conditions; revealing that participants who were utilizing keyword cues (after reading) to render free recalls were able to spend significantly more time discussing larger amounts of passage-specific information.

In terms of Ericsson & Kintsch’s (1995) CI Model, these findings might be explained by the possibility that the participants in the visual imagery (during reading)
and the general memory instructions (before reading) treatment conditions were rendering free recalls relying heavily on information stored in their ST-WM, a relatively small amount of quickly retrievable information; while participants in the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions were possibly utilizing the keyword cue lists as mental hooks to activate the overall textual representation they had formed in their LT-WM.

Further support for this comes from the dependent measures in this study that yielded the next largest effect sizes: (a) immediate-post assessment narrative implicit comprehension, and (b) delayed-post assessment retention of immediate-post assessment narrative and expository measures of implicit comprehension. All three measures were dealing with implicit comprehension, the first with cued recall of a narrative passage right after reading it and rendering a free recall of it, the other two dealing with cued recall measures assessing student retention of both narrative and expository dependent measures of immediate-post assessment implicit comprehension, four weeks after reading the passages.

For immediate-post narrative implicit comprehension measures, participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions. It should be noted, that while the univariate for immediate-post assessment expository implicit comprehension was significant, post hoc analyses of
multiple pairwise comparisons yielded no significant differences between treatment conditions on this measure.

For delayed-post assessment *retention* measures of narrative implicit comprehension, participants in the keyword cues (after reading) significantly outscored their peers in both the visual imagery (during reading) *and* the general memory instructions (before reading); and, participants in the visual imagery (during reading) + keyword cues (after reading) treatment condition significantly outscored their peers in the general memory instructions (before reading) treatment condition. For delayed-post assessment *retention* expository implicit measures, the visual imagery (during reading) + keyword cues (after reading) treatment condition significantly outscored their peers in both the visual imagery (during reading) *and* the general memory instructions (before reading) treatment conditions; and, the participants in the keyword cues (after reading) significantly outscored their peers in the general memory instructions (before reading) treatment condition.

These findings suggest (a) an advantage to the utilization of keyword cues (after reading) for student *retention* of narrative implicit comprehension, and (b) an advantage to the combined use of visual imagery (during reading) + keyword cues (after reading) for student *retention* of expository implicit comprehension. These findings could be explained by, (a) the findings from a study by Pressley (1976), that found that 8-year old readers, who were instructed to stop and create mental images after reading short segments before moving on, scored significantly higher than their peers who were not instructed to stop after short segments on measures of cued recall, combined with (b)
findings from several studies showing the effectiveness of young readers’ utilization of visual imagery for concrete vs. abstract words (Hargis & Gickling, 1978; Levin & Pressley, 1978; Pressley, 1977).

Based on the findings in the Pressley (1976) study, it is possible that if students in this study had been instructed to stop, after reading designated segments of the narrative passage, they may have been able to utilize visual imagery more effectively as an aid to comprehension for the narrative text utilized in this study. Additionally, a plausible explanation for this study’s findings regarding participant retention of narrative and expository implicit comprehension could be explained through the findings of several studies showing the effectiveness of young readers’ utilization of visual imagery for concrete vs. abstract words (Hargis & Gickling, 1978; Levin & Pressley, 1978; Pressley, 1977). Based on these empirical findings, it is possible that the factual, concreteness inherent in the main ideas and details of expository text are easier for young readers to effectively “visualize”, then many of the descriptive, abstract descriptions of characters, settings, goals, and resolutions inherent in narrative text. Furthermore, in terms of DCT, it is possible that participants who were utilizing visual imagery (during reading) + keyword cues (after reading), were able to make specific, concrete connections between their “imagens”, and the “logegens”, provided in the form of the keyword cue lists; hence, allowing them to more effectively incorporate them into an overall meaning-making structure of topic information and details of expository text.

A notable point to make in terms of the significant comprehension findings discussed above is that, all three of the significant implicit comprehension findings had
larger effect sizes than any of the significant immediate-/delayed-post narrative or expository explicit comprehension findings revealed in this study. Once again, in terms of Ericsson & Kintsch’s (1995) CI Model, these findings might be explained through the nature of storage of these mental hooks in LT-WM; which, in the context of the theory involves encoding as an overall comprehensive tool, pulling together the contextual message of the text along with any additional elaborative information available from the reader’s prior knowledge bank. Furthermore, the findings suggest that participants who utilized keyword cues (after reading) to render free recalls of the narrative and expository immediate-post assessment passages had formed more, stable mental hooks in their LT-WM, than their peers not utilizing the keyword cues, resulting in more effective delayed retrieval of passage information.

The following measures of explicit comprehension yielded significant post hoc findings: (a) immediate-post assessment narrative and expository measures, and (b) delayed-post assessment transfer expository measures. For immediate-post narrative explicit comprehension, participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions. For the immediate- and the delayed-post assessment transfer expository measures of explicit comprehension, participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions
significantly outscored their peers in the general memory instructions (before reading) treatment condition.

A notable point to make in terms of the significant comprehension findings discussed above is that, all three of the significant implicit comprehension findings had larger effect sizes than any of the significant immediate-/delayed-post narrative or expository explicit comprehension findings revealed in this study. Once again, in terms of Ericsson & Kintsch’s (1995) CI Model, these findings might be explained through the nature of storage of these mental hooks in LT-WM; which, in the context of the theory involves encoding as an overall comprehensive tool, pulling together the contextual message of the text along with any additional elaborative information available from the reader’s prior knowledge bank.

**Key Informant Reports**

Twenty, randomly selected study participants (5 participants/treatment condition), met individually with the researcher two weeks after their final instructional lesson, in order to render key informant reports regarding their perceptions of treatment condition strategy use. Key informant reports were analyzed using coding analysis guidelines outlined by Taylor & Powell (2003). The following established thematic categories/subcategories were used to code ideas of participants’ perceptions of their experience: (a) strategy knowledge – procedural and conditional, (b) metacognitive awareness/skills – general and comprehension monitoring, and (c) motivational factors – value, collaboration, personal interest/relevance, self-efficacy, and frustration/boredom. These qualitative analyses were conducted to answer the following research question:
What qualitative differences are there between treatment conditions in key informants reports about their experience utilizing the strategy training they received and how do those differences relate to treatment condition performance on immediate-/delayed post assessments?

**Strategy knowledge.** Analyses revealed that informants in the general memory instructions (before reading) treatment condition offered markedly fewer accounts of procedural and conditional knowledge regarding treatment condition strategy use than their peers in the other three treatment conditions; they did, however, offer almost as many accounts of general procedural knowledge for other, unrelated strategies that were not practiced during the four instructional lessons (i.e. reread, read more, take notes). It is not surprising that informants in this treatment condition offered other, unrelated strategy knowledge considering that the purpose of their treatment condition was to essentially serve as a control condition in the study, being instructed to simply, “Read passages and try to remember and understand as much as they could so they could talk about it with a partner”. What is insightful is the nature of the other, unrelated strategies they gave accounts of (i.e., rereading, read more, take notes), none of which included more specific strategies known to be effective in aiding comprehension (i.e. visual imagery, predicting, self-questioning, making connections to prior knowledge,…). The following account rendered by an informant in the general memory instructions (before reading) treatment condition exemplifies the typical accounts rendered by informants in this treatment condition regarding strategy knowledge,
“I just read the book over and over and over, until I got it all memorized in my head.”

Considering that participants in this treatment condition did not receive specific explicit strategy use instructions during this studies four instructional lessons, it is reasonable to assume that the accounts they were rendering regarding strategy knowledge were based on their existing strategy knowledge base; which from the nature of the accounts suggest a limited “toolkit” for the integration of the multiple cognitive factors/skills involved in effective comprehension.

More specifically to this study, while informants in the general memory instructions (before reading) treatment condition did render accounts of collaboration as a motivational factor, none of them rendered accounts of procedural or conditional strategy knowledge regarding summarizing or collaborative discussion with a partner; both of which they utilized during the instructional lessons when rendering free recalls with a partner. A possible explanation for their lack of perceived strategy knowledge concerning summarizing and collaborative discussion could be that the researcher was not explicitly stating them as a strategy for comprehending. According to Duffy (2002) the nature of a teacher’s explanation strongly influence’s direct instruction of strategies, and one of the actions teachers should take in effective explicit strategy instruction is to, “make explicit ties between the strategy being taught and its application in a story, ensuring that the newly learned strategy was immediately applied in that day’s reading selection” (p. 33). Yet, interestingly, informants from the other three treatment conditions, who were not explicitly instructed to purposefully utilize the summarizing and collaborative discussions
inherent in all of the instructional lessons as a comprehension strategy either, all rendered accounts of treatment condition strategy knowledge in direct relation to collaborative discussion as a means of aiding their comprehension. The following account, rendered by an informant from the keyword cues (after reading) treatment condition illustrates an example of the informant’s relation of strategy knowledge to collaborative discussion,

“If I was reading a section on fossils, than I could, if my teacher had given me a word list, then I could go through it with a partner, and it would help me to understand fossils more.”

Perhaps the mental hooks, that participants in the other three treatment conditions formed during strategy use, provided concrete anchors in their LT-WM; affording them a more holistic, and stable overall textual representation of the passages. Having this anchored, overall meaning making structure may have allowed participants to put more cognitive resources into elaboration of overall meaning during the collaborative discussions; hence, enriching their comprehension of the passages in ways not experienced by participants in the general memory instructions (before reading).

Three accounts of transfer of conditional strategy knowledge to writing were rendered by single informants in the visual imagery (during reading), keyword cues (after reading), and visual imagery (during reading) + keyword cues (after reading) treatment conditions.

**Metacognitive awareness/skills.** In terms of metacognitive awareness/skills, informants in the visual imagery (during reading) + keyword cues (after reading) were
the only ones to render accounts of metacognitive awareness in relation to treatment condition strategy use. As one informant accounted,

“I would read the “message” (passage) and try to comprehend it. Then, I would try to use the keyword cues to tell about it. If I got to some I couldn’t use, then I would know to go back and reread where the cues were at to help me understand.”

A possible explanation that informants in the visual imagery (during reading) + keyword cues (after reading) were the only ones to render accounts of metacognitive awareness/skills as a result of strategy use is the fact that they were the only ones trained in the combined use of two strategies. Having two choices, rather than just one, may have afforded them the metacognitive awareness to consider more than one action to take when struggling with comprehending the text. As Almasi (1983) describes in her explanation of metacognition, perhaps having choices in strategy use provided informants in this treatment condition “a moment of metacognitive awareness that prompts a consideration of various strategic actions” (p. 11).

**Motivational factors.** Informant reports regarding perceived motivational factors as a result of their experience offered the following: (a) there were more accounts of perceived value in their experience utilizing treatment condition strategies, than any of the other motivational factors; and, while informants in all four treatment conditions offered accounts of value, informants in both the keyword cues (after reading) *and* the visual imagery (during reading) + keyword cues (after reading) offered markedly more than their peers in the other two conditions, (b) informants in all four treatment
conditions offered accounts of collaboration and personal interest/relevance, (c) participants in the keyword cues (after reading) and the general memory instructions (after reading) were the only ones to render accounts of increased self-efficacy, and (d) accounts of frustration/boredom, were rendered by a single informant in both the general memory instructions (before reading) and the keyword cues (after reading) treatment conditions.

In terms of value, not only did informants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions offer quantitatively more accounts of this motivational factor than their peers in the other two treatment conditions, they also offered qualitatively different accounts. The majority of their accounts regarding value dealt with how their strategy use, (a) helped them learn new words, and (b) helped them learn content material (i.e., facts about spiders and beavers). The following quote from an informant in the keyword cues (after reading) treatment condition illustrates such an account,

“Every time I read with you, it helps me learn new words, so I can get higher in my reading levels.”

On the other hand, the majority of accounts of value from informants in the visual imagery (during reading) and the general memory instructions (before reading) dealt with either having a “special” pull-out time for practicing reading, or learning to make pictures in their head (informants in the visual imagery [during reading] treatment condition). The following two quotes illustrate these types of accounts,

“Spending time here, I have never had a “pull out” for reading before.”
“I learned how to make all kinds of pictures in my head when I am reading.”

A possible explanation for the difference in the quantity and qualitative nature of perceived value accounts might be explained by the differences in cognitive effort that participants in both the keyword cues (after reading) and visual imagery (during reading) + keyword cues (after reading) put into learning to utilize the keyword cues (after reading). Having them utilize the keyword cues to retell the passages, might have made them more accountable for their meaning making process, by not affording them the luxury of only collaborating on the information they could easily retrieve. Instead, the keyword cue lists “bound” them into trying to make sense of specific details and concepts in the passage before moving on the next row of cues. On the other hand, participants in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions were afforded, the less cognitively taxing route of simply rendering what they could and were motivated to share.

Informants in the general memory instructions (before reading) and in the keyword cues (after reading) treatment conditions were the only ones to render accounts of perceived increased self-efficacy as a result of their experience. A possible explanation for why there were no informant accounts in the other two treatment conditions, is that the use of visual imagery as a comprehension strategy is commonly accepted and often introduced as a strategy to young readers in today’s classrooms. In fact, in this study, all participants in these two treatment conditions had at least a declarative knowledge of what visual imagery was, and working levels of procedural knowledge regarding it’s use. Therefore, maybe participants in both the visual imagery (during reading) and the visual
imagery (during reading) + keyword cues (after reading) treatment conditions, simply saw this as time for practicing a skill they already had; and, even though participants in the visual imagery (during reading) + keyword cues (after reading) treatment condition were being taught a new strategy in combination with visual imagery, it was not viewed as a “newly” acquired strategy to add to their resume of comprehension strategies.

Accounts of perceived personal interest/relevance and collaboration as motivational factors were rendered by informants in all four of the treatment conditions; the quantity and qualitative nature of these accounts were similar across all four treatment conditions. Finally there was one account of perceived frustration from an informant in the keyword cues (after reading) treatment condition regarding their difficulty in trying to utilize some of the keyword cues, and a single account of perceived boredom from an informant in the general memory instructions (before reading) treatment condition regarding a narrative passage they read during the researcher modeled instructional lesson.

**Classroom Applications**

According to Snow and Sweet (2003): Comprehension involves three elements, the reader, the text, and the activity all of which occur within an overarching sociocultural perspective (p. 2-3), as depicted in Figure 5.1
Findings from this study suggest that training young readers in the use of keyword cues (after reading) has the potential to positively enhance all three of these elements. In terms of the text, listening to students as they attempt to retell the story or information they have just read to partners using the keyword cues allows educators to quickly gauge their student’s overall clarity of the text they have just read (i.e. are the majority of them struggling with particular vocabulary terms in the text, is there a pattern of common classroom misconceptions concerning the topic, are the students having trouble making connections between the keyword cues as a result of poor organization of information within the text or students’ lack of strategies for dealing with extracting information from
that type of text). In addition, having students practice this after reading strategy with partners. Another important finding from this study was that students in the keyword cues treatment conditions had significantly higher immediate-/delayed-post assessment comprehension scores for both narrative and expository text, suggesting that the use of this particular after reading, collaborative comprehension may help students succeed and appreciate the ‘act’ of reading in general. In terms of the reader element, qualitative analyses revealed that participants who received training in the use of keyword cues after reading reported perceived motivational factors in relation to reading as a result of their strategy training. Finally, the use of keyword cues after reading appears to have the potential to offer educators a means for providing a collaborative, supportive, scaffolded, and non-competitive means for assessing and instructing young readers to become proficient comprehenders of both narrative and expository text.

**Limitations and Implications for Future Research**

There are threats to reliability in this study, which could jeopardize incorrect generalization of study findings. The first deals with the reliability of the contextually relevant vocabulary knowledge measures. This assessment was a multiple-choice, researcher-developed assessment. The researcher developed these measures as a means to assess the main effects of treatment condition on participants’ contextually relevant vocabulary knowledge of key terms found in the immediate-post assessment expository and narrative passages. Both of these passages were obtained from the *QRI-4* (Leslie & Caldwell, 2006), because this source offered passages that are generally familiar to young
elementary school children in organization and curricular content, as well as passage specific measures of student memory (free recall) and explicit and implicit comprehension (cued recall) with pre-established measures of validity and reliability. Since the QRI-4 offered no established measures for vocabulary knowledge of the passages, the researcher utilized the Spache Revised Word List (Spache, 1974) to identify all terms within the narrative and expository passage that were considered “not familiar words” to children at the third-grade level and below. The analyses using Spache’s Revised Word List (1974) resulted in the identification of 53 terms. In every effort to assure validity and reliability of this measure, the researcher and two other expert readers analyzed each of the 53 multiple-choice items based on the defined criteria described in Chapter Three. In order to control for the “ceiling effect”, the researcher administered this 53-item preassessment of contextually relevant vocabulary knowledge to all study participants, eliminating all items that 50% or more of the participants got correct. Furthermore, in order to control for the “guess factor” that is inherent in multiple-choice assessments, the researcher included an “I’m not sure” stem for each item; the researcher explicitly told participants before administering the preassessment that it was not for a grade, and that if they chose the “I’m not sure stem” for an item, it would not be counted against them in any way; rather, it would help the researcher know what types of passages would be the best for them to be reading during their time together.

Following the guidelines described above, the resulting assessment utilized to examine main effects of treatment condition on participants’ contextually relevant vocabulary knowledge, consisted of twelve key terms, seven from the narrative passage,
and five from the expository passage. In terms of validity, one must also consider the length of time between assessments, and whether or not participants were exposed to outside sources of obtaining vocabulary knowledge of the key terms; thus masking the true effects of treatment condition strategy use on more immediate acquisition of contextually relevant vocabulary knowledge.

In addition, during the generation of the keyword cue lists utilized for this study, the intentional insertion of key vocabulary terms was not a precedent. This, along with the validity and reliability issues discussed above, could have masked significant effects of treatment condition for the acquisition of contextually relevant vocabulary knowledge. An interesting future study, would involve the generation of keyword cue lists that intentionally included targeted passage-specific vocabulary terms, in order to examine the effects.

All preassessments, instructional lessons, immediate-/delayed-post assessments were conducted by the researcher at the participants’ respective schools, in small classroom and/or conference rooms outside of the regular classroom setting. The instructional lessons were carried out in small groups of four to six students, and all immediate-/delayed-post assessments were administered individually to participants. While this design was implemented in order to control for teacher and setting effects, it does lend caution to generalization of observed treatment condition effects to the regular classroom setting. As Duffy (2002) describes, the teaching of explicit strategy use is not based solely on the delivery of research-supported strategy scripts, but on other factors, including the nature of a teacher’s explanation regarding strategy use. While this study
does provide scripted protocols of treatment condition instructional lessons in regard to strategy use, there can be no guarantee that the nature of other teachers’ explanation of those procedures will produce the same effects observed in this study. In addition, one cannot generalize that explicit strategy instruction regarding treatment condition strategy use carried out in a regular classroom setting will have the same significant effects observed in this study. Future studies of treatment condition strategy use outlined in this study will need to be carried out in the regular classrooms of many different teachers in order to make those generalizations.

Another caution in the interpretation of findings from this study, deal with generalization of observed treatment condition effects to the likelihood of future strategy use. According to Garner (1990) there are five reasons why readers do not use strategies, (a) a meager knowledge base, (b) personal attributes that don’t support strategy use, (c) lack of metacognitive awareness/skills, (d) primitive routines, and (e) minimal ability to transfer strategy knowledge (in Almasi, J. F., 2003, p. 13). Qualitative analyses of key informant reports indicate that participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions had perceived, (a) increases in their procedural and conditional knowledge bases regarding strategy use, (b) motivational factors for strategy use (value, personal interest/relevance, and collaboration, and (c) accounts of transfer of strategy use to writing. In addition, informants in the visual imagery (during reading) + keyword cues (after reading) treatment conditions rendered accounts of perceived metacognitive awareness skills; and, informants in the keyword cues (after reading) treatment condition
rendered accounts of increased self-efficacy as a result of strategy training. The stability of these perceived accounts would have to assessed over longer periods of time, in order to make generalizations regarding their effects on future strategy use.

The main effects of treatment condition reported in this study were based on student performance on narrative and expository dependent measures of one narrative and two expository passages written at the third-grade readability level (Spache, 1974). While these passages were obtained from a well-established qualitative reading inventory, that is commonly utilized to assess reading achievement in school-age children (QRI-4), one needs to use caution in generalizing the observed effects of treatment condition in this study to other text formats. More research is needed examining the effects of treatment condition strategy training outlined in this study on student performance on narrative and expository dependent measures of a variety of text formats (i.e. basal readers, chapter books) before one can generalize the significant effects of training students in the utilization of both keyword cues (after reading) and visual imagery (during reading) + keyword cues (after reading) observed in this study.

Finally, this study intervention consisted of only four instructional lessons in explicit strategy use, the effects of treatment condition with extended instruction in treatment condition strategy use is needed in order to examine the additive and long-term main effects reported in this study’s findings.

**Conclusions**

Results of this research suggest that training third-grade readers in the strategic use of both keyword cues (after reading) and visual imagery (during reading) + keyword
cues (after reading) can aid student memory (free recall), and explicit and implicit comprehension (cued recall) of narrative and expository text. This study revealed while both treatment conditions are effective in raising students’ performance on these measures, training students in the combined use of visual imagery (during reading) + keyword cues (after reading) had no significant advantage over training students in the use of keyword cues (after reading) on student performance of the narrative and expository measures, except in the instance of delayed-post assessment retention measures of expository implicit comprehension. These findings may best be explained by Collins Block & Duffy (2008) on their stance on deciding what strategies to teach readers:

“For instance, imagery is really a matter of using text cues in combination with background knowledge to predict the image that the author wants the reader to see, with the reader modifying that image as subsequent monitoring reveals new text cues requiring new predictions about that image. Similarly, finding the main idea is primarily a matter of using cues the author provides in the text to predict what is most important, with the reader modifying that idea as subsequent monitoring reveals new text cues requiring new predictions about what is most important” (p. 29).

As this quote, and findings from this study suggest, it may be the reader’s ability to utilize keyword cues within the text, as a means of integrating, elaborating on, and predicting about the information they are reading that determines the effectiveness of a reader’s strategic use of visual imagery (during reading).
The largest effect sizes associated with treatment condition strategy use were observed in immediate-post assessment measures of memory (free recall), where participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions. Not only did participants in both of these treatment conditions score significantly higher on the memory (free recall) measures, they also had significantly higher recall times than their peers in the other two treatment conditions; revealing that participants who were utilizing keyword cues (after reading) to render free recalls were able to spend significantly more time discussing larger amounts of passage-specific information. Based on Ericsson & Kintsch’s (1995) CI Model, it is possible that participants in the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions were possibly utilizing the keyword cue lists as mental hooks to activate the overall textual representation they had formed in their LT-WM.

The next largest treatment condition effect sizes were revealed for the following implicit comprehension (cued recall) measures: (a) immediate-post assessment narrative implicit comprehension, and (b) delayed-post assessment retention of immediate-post assessment narrative and expository measures of implicit comprehension.

Like the findings for immediate-post assessment memory (free recall) measures discussed above, the observed significant findings for implicit comprehension could also be explained in terms of Ericsson and Kintsch’s (1995) CI Model. Within the context of
this theory, effective comprehension involves the encoding and storage of mental hooks in LT-WM in a way that allows a reader to pull together the contextual message of the text along with any additional elaborative information available from the reader’s prior knowledge bank. Therefore, it is plausible that the utilization of passage-specific keyword cue lists during the immediate-post assessment free recalls, aided participants in these two treatment conditions in the formation of more stable mental hooks within their LT-WM, ultimately allowing for more effective activation and retrieval of encoded passage information at a later date.

The following significant differences between treatment conditions were revealed for explicit comprehension (cued recall) measures: (a) participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than their peers in both the visual imagery (during reading) and the general memory instructions (before reading) treatment conditions on immediate-post assessment narrative measures, and (b) participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions scored significantly higher than their peers in the general memory instructions (before reading) treatment condition on immediate-post assessment and delayed-post assessment transfer expository measures. Once again, in terms of Ericsson & Kintsch’s (1995) CI Model, it is possible that participants in the these two treatment conditions were able to utilize the keyword cue lists as an encoding comprehension tool, aiding them in the formation of mental hooks in their LT-WM, for more effective recall of topic information.
Qualitative analyses of key informant reports regarding participants’ perception of strategy use added further insight into the quantitative findings discussed above. Informants in the visual imagery (during reading), the keyword cues (after reading), and the visual imagery (during reading) + keyword cues (after reading) treatment conditions rendered markedly more accounts of procedural and conditional knowledge than their peers in the general memory instructions (before reading) treatment condition; reinforcing the observed effects of treatment condition in the first three groups on student performance on immediate-/delayed-post assessments in relation to participants in the general memory instructions (before reading) treatment condition.

In addition, while informants in all four treatment conditions offered accounts of the following motivational factors; (a) perceived value, (b) collaboration, and (c) personal relevance/interest; participants in both the keyword cues (after reading) and the visual imagery (during reading) + keyword cues (after reading) treatment conditions offered markedly more accounts of perceived value than peers in the other two treatment conditions. In addition, their accounts of perceived value were qualitatively different, stating value in perceived content and vocabulary knowledge acquisition as a result of strategy use, versus their peers in the other two treatment conditions who perceived value accounts typically dealt with being selected for a pull out time to practice reading and/or learning how to make images while reading.

The above findings revealed that third-grade participants trained in strategy use of keyword cues (after reading), whether individually or in combination with strategy training of visual imagery (during reading) scored significantly higher on immediate-
delayed post assessment narrative and expository measures of memory (free recall), and explicit and implicit comprehension (cued recall) than their peers in the other two treatment conditions. In addition, participants in these two treatment conditions rendered more perceived accounts of value as a result of their training; indicating more motivation for future strategy use.
APPENDICES

Appendix A

Preassessment of Contextually Relevant Vocabulary Knowledge

Example:

They might discuss it.

- discover
- decide on
- talk about
- be upset about
- I'm not sure

STOP

1. Sarah wants to predict what will happen next.

- proceed with
- listen about
- make a guess about
- learn more about
- I'm not sure

2. The burst of laughter scared the child.

- calming sound
- normal sound
- steady sound
- sudden sound
3. My brothers **fear** spiders.
   - are afraid of
   - feel safe around
   - free
   - like handling
   - I'm not sure

4. He cried out like a boy in **trouble**.
   - thought
   - true excitement
   - danger
   - real sadness
   - I'm not sure

5. The car turned **sharply** to miss hitting the cat in the road.
   - with a slow turning motion
   - with a steady curving motion
   - with a quick change in direction
   - while staying straight
   - I'm not sure
6. Sarah has a new **goal** for the summer.
   - plan with no aim
   - plan without a desired end
   - plan that happens on purpose
   - plan with no intent
   - I'm not sure

7. The **dolphin** jumped over the waves.
   - blue whale
   - swordfish
   - jellyfish
   - water mammal
   - I'm not sure

8. The boy **swam** for hours that day.
   - stroked through the waves
   - rafted over the waves
   - surfed on top of the waves
   - waded through the waves
   - I'm not sure

9. The pirates tried hard to keep the treasure **hidden**.
10. She was a **swimmer**.
   - person that loves the ocean
   - person that does not breathe air
   - person not afraid of sharks
   - person able to use hands and legs to move in the water
   - I'm not sure

11. They stopped at the **doorway** to rest.
   - closed off area
   - blocked area
   - passage area
   - forbidden area
   - I'm not sure

12. The storm began **suddenly**.
   - as suggested
   - as planned
13. The **beaver** likes to cool off in the pond.
   - mammal that cuts down trees
   - mammal that lives in the ocean waters
   - mammal that swims with flippers
   - mammal that eats lobsters
   - I'm not sure

14. Some things are hard to **locate**.
   - bury
   - find
   - return
   - remove
   - I'm not sure

15. Jack will need to search for the next clue **elsewhere**.
   - in another place
   - right there
   - in the same place
16. He was in an angry **state** after taking the test.

- territory
- argument
- condition
- conversation
- I'm not sure

17. He had a wood **supply** for the winter.

- shortage
- storage
- sale
- demand
- I'm not sure

18. We made it home **safely**.

- free from danger
- unprotected
- still at risk
- trapped
- I'm not sure
19. The boy was in the pond.
   - small body of water
   - river
   - gulf
   - lake
   - I'm not sure

20. She decided she wanted to play the flute.
   - instrument without holes
   - instrument with strings
   - instrument shaped like a pipe
   - instrument you shake
   - I'm not sure

   - stillness
   - ruin
   - ending
   - being
   - I'm not sure
22. A pulse of music came from the speakers.
   - sudden and powerful sound
   - calm and soothing sound
   - variety
   - low and long sound
   - I'm not sure

23. Steve always gathers the food for our camping trips.
   - makes a list of
   - brings together
   - makes plans for
   - guards carefully
   - I'm not sure

24. Do you believe what happened?
   - doubt
   - dislike
   - trust
   - fear
   - I'm not sure

25. Ice forms when water gets cold.
26. The rescuers used **sonar** to find the trapped people.

- picture signals
- light signals
- hand signals
- sound signals
- I'm not sure

27. **Floods** can do a lot of damage.

- oceans
- sandstorms
- overflows of water
- drainage areas
- I'm not sure

28. I **realized** I had a lot of work to get done for my project.

- did not know
- understood
29. After the hurricane, people made a **dam** to protect the homes nearby.
   - bridge over water flow
   - barrier to water flow
   - road around water
   - tunnel under water flow
   - I'm not sure

30. It's good to spend time at the **library**.
   - building where people do science
   - building where people make laws
   - building where people put on big plays
   - building where people borrow books
   - I'm not sure

31. The **canals** were clogged after the storm.
   - water passage that is built
   - back roads
   - underground tunnels
32. John felt **emotional** after failing the test.

   - empty of feelings
   - strong feelings
   - no feelings
   - no cares
   - I'm not sure

33. He **cannot** help her.

   - could try to
   - does not want to
   - is not able to
   - can make time to
   - I'm not sure

34. The cows moved **closer**.

   - a long distance away
   - apart
   - quietly
   - nearer
35. The **furry** animal was shivering.
   - uncovered
   - hairy
   - smooth
   - shaved
   - I'm not sure

36. He was **curious** about airplanes.
   - interested in investigating
   - confused
   - bored from
   - tired of learning about
   - I'm not sure

37. **Builders** have to plan carefully.
   - people who take things apart
   - people who tear things down
   - people who break things
   - people who put things together
   - I'm not sure
38. Pushing strongly, he moved the piece of furniture across the room.
   - softly
   - with little power
   - with no effort
   - in a forceful motion
   - I’m not sure

39. They built a fire.
   - made
   - tore down
   - put out
   - blew up
   - I’m not sure

40. I like to take long walks on the beach.
   - boardwalk
   - docks
   - ocean
   - sandy ocean shore
   - I’m not sure

41. Litter can hurt the environment.
o inside of our bodies
o outside surroundings
o moon
o outside pollution
o I'm not sure

42. The hunter began to **mimic** the eagle's call.
   o identify
   o ignore
   o copy
   o report
   o I'm not sure

43. He had a **busy** day at work.
   o boring
   o prompt
   o very active
   o brisk
   o I'm not sure

44. The ball **bounced** and then landed in bounds.
   o glided
45. The **stream** was full of animal life.
   - flowing water
   - lake
   - ocean
   - pond
   - I'm not sure

46. What types of **objects** are in many classrooms?
   - ideas
   - things you can touch
   - arguments
   - common rules
   - I'm not sure

47. If they leave, they will **lose** their place in line.
   - keep
   - find
   - have to give up
48. **Surely**, they thought she made the right choice.
   - without trust
   - without certainty
   - with hesitation
   - without doubt
   - I'm not sure

49. There are **twigs** all over my yard.
   - small limbs
   - small weeds
   - small leaves
   - small pieces of bark
   - I'm not sure

50. Father **gently** threw the ball.
   - used a lot of force when he
   - used great strength when he
   - used great care when he
   - used a strong grip when he
51. The fallen branches formed a **mound** in the yard.
   - raised area
   - valley
   - pit
   - deep hole
   - I'm not sure

52. The show starts next **weekend**.
   - Winter
   - Sunday
   - Wednesday
   - June
   - I'm not sure

53. The boy stayed overnight at the **lodge**.
   - place that is uncovered
   - place outside
   - place exposed to the outdoors
   - place to live in
   - I'm not sure
Appendix B

Instructional Lesson Passages and Keyword Cue Lists

1. Modeled Lesson - Narrative

“The Magician’s Hat”

Sal sat down in his seat with a groan. "I love good magic shows," he told his friend Nick, "but all these carnival show magicians ever do is pull rabbits from a hat. How hard is that?"

The Amazing Maxine walked on to the stage. "Ladies and Gentlemen! Girls and boys! Welcome to the most amazing magic show on Earth! First, I must find my magician's top hat." The audience watched while Maxine searched through her trunk. Yards of silky red cloth fell out of her trunk. Bunches of sweet-smelling flowers and rainbow-colored streamers piled up on the stage.

Finally, Maxine pulled out a tall, gray cowboy hat. "I guess this will have to do," she said. Maxine dropped the hat on the table, waved her silver magic wand over it, and yelled, "ABRACADABRA!"
"Surprise!" Sal said. "Here come the rabbits." But it was Sal who was so surprised that he couldn't even speak. Maxine had pulled out a horse with a western saddle! The audience clapped and cheered, but Maxine shouted, "No! No! No! This is not right!"

Maxine looked in the trunk again, but all she could find was a bright blue French beret. "This time she just has to pull out a rabbit," Sal decided. Maxine waved her silver magic wand over the beret and shouted, "ABRACADABRA!" Then she struggled as she pulled out the Eiffel Tower! But to the spellbound audience Maxine yelled, "No! No! No! This is not right!" Rummaging deeply in the trunk, she finally found her magician's hat. Maxine placed the silky hat on the table and waved her magic wand. "ABRACADABRA!" She reached gently into the hat and pulled out... a fluffy white rabbit. "Now this is a real magic trick!" she winked.

“The Magician's Hat”
Sal
magic show
rabbits from a hat
Amazing Maxine
magician's top hat
searched
trunk
cowboy hat
magic wand
ABRACADABRA!
horse with western saddle
No! No! No!
French beret
magic wand
ABRACADABRA!
  Eiffel Tower
  That is not right!
  rummaging
  magician's hat
  magic wand
ABRACADABRA!
fluffy white rabbit
Now this is a real magic trick!

**Keyword Cue List Statistics for** “The Magician’s Hat”:
- 291 total words in passage
- 23 keyword cue phrases = 7.9%
- 53 keywords = 18.2%

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2. Guided Lesson - Expository

“Guide Through the Wild”

Imagine you are hiking down a trail on the African plain. A safari guide is leading your group. He reaches into his pack and takes out a sock. He shakes dust from it into the air. "This is an ash bag," he explains. "It helps me test the wind direction." Gray wisps of ash float away from the woods. "That is good," says the guide. "We're walking downwind. Our scent is blowing away from the woods, so animals in the woods will not catch our scent as we pass. And that is just what we want!"

The guide suddenly stops and puts a finger to his lips. All you hear is the snap of a twig. But the guide's trained ear hears much more. "Wait," he whispers. Instantly, a huge elephant comes crashing through the woods. And it is right in front of you! "Do not worry," says the guide. "We are in the animal's awareness zone." The guide knows what zones are safe for his group to view wild animals.
Your safari guide has learned all about animal tracks. He knows what animals are around by the footprints left behind. The prints also tell him how long ago the animal went by. That is important because you do not want to get too close to a hungry lion!

Do you want to know how you got the bumpy, red rash on your leg? Or if the snake you saw was poisonous? Or, if the hippo, staring at you is going to attack? Just ask your safari guide. Guides study Africa's plants and animals for a long time just so they can answer these questions. It's their job. And it's not an easy job. But don't you feel much better having a skilled safari guide along on your trip through Africa?

“Guide Through the Wild”

hiking
trail
African plain
safari guide
sock
ash bag
wind direction
wisps of ash float
that is good
animals in the woods
not catch our scent
snip of a twig
elephant comes crashing
awareness zone
animal tracks
how long ago
hungry lion
rash on leg
snake
poisonous
hippo staring
attack
study
plants and animals
It's not an easy job.

Keyword Cue List Statistics for “Guide Through the Wild”:
301 total words
25 keyword cue phrases = 8.3%
59 keywords = 19.6%

3. Collaborative Lesson - Narrative

“Lights Out!”

Victor Caruso wanted to play in a rock band. He had an electric guitar that used
to belong to his older brother, Danny. One summer night, Victor picked up his guitar and
plugged the amplifier into the wall. All of a sudden, the lights in his room went off. He
tried to turn them back on, but it was no use. Victor looked out his window, and the
whole neighborhood was dark. "I knew my amplifier was powerful, but not this
powerful," he thought.

Night after night, the electricity kept going off at the same time. Air conditioners
stopped, computers and TVs turned off. Worried officials held meetings and electricians
checked meters and wires. But nobody could figure out why the blackouts were
happening. One evening, Victor and his brother, Danny, were playing basketball. Victor had the ball. "Only our neighborhood goes dark," he said. "What if there's something in another neighborhood using a lot of energy? And that is making our lights go out," Danny added.

The boys decided to check out other neighborhoods. They did not know for sure what they were looking for. But it should happen around 8 p.m.

On their way home one night, they smelled popcorn. They saw a baseball field nearby. The boys decided to stop and watch the game. As it started to get dark, the outdoor floodlights switched on. Danny looked at his watch. "It's 8 o'clock," he said. Victor threw his cap in the air. "That is it!" he shouted. "We solved the mystery!"

The next morning, Victor went to talk with Mrs. O'Brien an official at Town Hall. "I think I know why the lights are going out in my neighborhood," he said. Mrs. O'Brien agreed to have the wiring at the baseball field inspected. Sure enough, faulty wiring in the floodlights was causing the blackouts in Victor's neighborhood.

"Lights Out!"
Victor
rock band
electric guitar
older brother
plugged the amplifier
lights off
looked out window
dark
not this powerful
night after night
same time
why
basketball
only our neighborhood
another neighborhood
using a lot of energy
smelled popcorn
baseball field
watch the game
floodlights
8 o'clock
cap in the air
solved
Mrs. O'Brien
Town Hall
inspected
faulty wiring caused the blackouts

Keyword Cue List Statistics for “Lights Out!”:
310 total words
27 keyword cue phrases = 8.7%
62 keywords = 20%

4. Independent Lesson - Expository

“Spiders on the Move”

You are walking in the desert and see a small hole in the ground. Eight hairy legs reach out that are as long as your finger. Then you see a fat, fuzzy, brown body. It is a tarantula!

Tarantulas are spiders that live in warm places, such as Mexico, South America, and the southwestern United States. Most tarantulas live in the ground in holes called burrows.
Tarantulas use leg-like feelers to tell where they are going. They can't see very well, even with eight eyes. They also move very slowly. So how do they catch their dinner without becoming dinner for someone else?

Tarantulas hunt at night. First, they find a place to hide and sit very still to wait for their prey. This way it can feel vibrations, or movements, as the prey walks by. The tarantula runs to the prey and tries to pin it down. Then the spider pushes its fangs into its victim and shoots out poison. The prey dies, and the tarantula has its dinner.

Lots of spiders, like black widows, live above the ground. They make their webs in dark corners or under rocks. That is because they are shy. But do not let that fool you. The black widow's bite can be deadly.

Black widows have eight eyes and legs like tarantulas. But unlike tarantulas, their bodies are shiny and smooth. They are about the size of a pea. They live in almost every state. So you might see one hanging in the corner of your garage!

The male black widow has yellow or red marks on his back and the female has a red hourglass shape on her belly. A black widow does not hunt like tarantulas. It just waits for an insect to get caught in its web, and then spins it in its silk web and poisons it with its fangs.

“Spiders on the Move”

fuzzy, brown body
tarantula
warm places
burrows
leg-like feelers
can't see well
slow
Hunt at night

Vibrations

Prey

Pin

Fangs

Poison

Black widows

Above the ground

Dark corners

Shy

Deadly

Eight like tarantulas

Shiny and smooth

Pea

Every state

Yellow or red marks

Red hourglass

Does not hunt

Web

Spins

Poisons

Fangs

Both are spiders, but they live and hunt differently

**Keyword Cue List Statistics for “Spiders On the Move”:**

311 total words

30 keyword cue phrases = 9.6%

61 words = 19.6%
## Appendix C

### Spache Readability Levels of Instructional Lesson and Immediate-/Delayed-Post Assessment Passages

#### 1. Instructional Lesson Passages.

<table>
<thead>
<tr>
<th>Instructional Lesson</th>
<th>Spache Readability Level</th>
<th>Total Number of Words</th>
<th>Number of Sentences</th>
<th>Average Number of Words per Sentence</th>
<th>Number of Words Not Matched on Spache Word List</th>
<th>Percentage of Words Not Matched on Spache Word List</th>
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<tbody>
<tr>
<td>Modeled Lesson (Narrative) “The Magician's Hat”</td>
<td><strong>3.1</strong></td>
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<td>22</td>
<td>9.09</td>
<td>23</td>
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2. Immediate-/Delayed-Post Assessment Passages.

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<th>Assessment</th>
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<th>Total Number of Words</th>
<th>Number of Sentences</th>
<th>Average Number of Words per Sentence</th>
<th>Number of Words Not Matched on Spache Word List</th>
<th>Percentage of Words Not Matched on Spache Word List</th>
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<tr>
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<td>10.0</td>
<td>20</td>
<td>10.0%</td>
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<tr>
<td>“The Friend”</td>
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<tr>
<td>Immediate-/Delayed-Post Retention (Expository)</td>
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<td>“The Busy”</td>
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Appendix D

Treatment Condition Scripted Protocols for the Researcher Modeled Instructional Lesson

The scripted procedures for each treatment condition’s research modeled instructional lessons are provided below:

I. Visual Imagery (During Reading). The four instructional lessons for the visual imagery (during reading) treatment condition were structured in the following manner:

   1. Researcher modeled lesson (narrative) – “The Magician's Hat”

What the researcher said to the participants is bold-faced and in quotation marks.

"Today we are going to be reading a story about a magic show titled "The Magician's Hat”, and I think you'll like it. When you finish we will talk about it.
When you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You visualize when you are reading, by making pictures in your head about describing and action words you read about, to help you “see” what happens and how it happens. Then, you can add what you already know about the story to make pictures in your head. Now, I am going to show you a sentence. I want you to read the sentence and make a picture in your head about what is happening."

The researcher directed them to the board where she had written the following sentence: An elephant holds its ears straight out to look even bigger to its enemy.

"What kind of picture did you make in your head?"
Researcher allowed student's to respond.

"Here is a picture that the authors chose to illustrate this sentence, did the picture you made in your head look anything like this? Was it different?"

The researcher let students respond. After listening to a couple volunteered answers, the researcher proceeded:

"Now, you are going to practice making pictures in your head while you read to help you understand and remember what you have read. While you are reading you can look at the pictures... they can help you make pictures in your head about all the things that happen in the story."

"The story we will be reading today is about a boy named Sal who goes to a magic show."

The researcher pointed to an illustration of Sal.
"Sal goes to a magic show and things happen that he never expected. He thinks that all magicians do is pull fluffy white rabbits out of a hat. But to Sal's surprise, this isn't what happens at this magic show. Read and find out what does happen when the magician, the Amazing Maxine, can't find her magician's hat."

"Remember to try and make pictures in your head to help you understand and remember what you are reading. When you are finished, turn your story over and wait quietly for the others to finish. Are there any questions before we begin?"

Once everyone finished and the researcher had collected all the stories she modeled retelling the story by saying:

"This is a great story that I could retell to someone else. I am going to think about this story and the pictures I made in my head and I am going to use those pictures to help me retell the story to you."

"The title of the story is, "The Magician's Hat."

"This is a story about a boy named Sal who liked magic shows; but, he wasn't very excited about this one because he thought that all carnival magician's did was pull rabbits out of a hat. The show starts, and the Amazing Maxine began searching through her trunk for her magician's top hat. First, she pulls out a gray cowboy hat. She waves her silver magic wand over it, shouting, "ABRACADABRA". To the crowd’s surprise, she pulls out a horse with a western saddle. Upset, she shouts, No! No! No! This isn't right! She keeps searching in her trunk and pulls out a blue French beret. She waves her magic wand and shouts, "ABRACADABRA". This time she pulls out the Eiffel Tower. As the crowd cheers, she says, "This isn't
right!" Maxine rummages through her trunk again and finds her magicians hat. She waves her wand over it and pulls out a fluffy white rabbit. Winking, she says to the crowd, "Now this is a real magic trick!"

"Now, you each get a chance to use the pictures you made in your head to retell the story to a partner."

The researcher had them count off in 1’s and 2’s and then partnered them.

"Today, the 1's will go first. When 1 is finished retelling the story, 2 will get a chance to retell the story. Remember to start with the title of the story and then think about the pictures you made in your head to help you retell the story. When you and your partner finish, sit quietly until all the pairs are finished. Are there any questions?"

The researcher provided wait time for any questions.

"If there are no other questions, I would like the 1's to begin retelling now."

As the partners were retelling, the researcher monitored and provided explicit guidance as needed.

"I hope you all enjoyed the story, “The Magician's Hat”. You all did a fine job of using the pictures you made in your head to help you retell the story."

II. **Keyword Cues (After Reading).** The four instructional lessons for the keyword cues (after reading) treatment condition were structured in the following manner:

1. **Researcher modeled lesson (narrative)** – “The Magician's Hat”

What the researcher said to the participants is bold-faced and in quotation marks.
"Today we are going to be reading a story about a magic show titled, "The Magician's Hat", and I think you'll like it. When you finish we will talk about it."

"The story we will be reading today is about a boy named Sal who goes to a magic show." The researcher pointed to an illustration of Sal.

"Sal goes to a magic show and things happen that he never expected. He thinks that all magicians do is pull fluffy white rabbits out of a hat. But to Sal's surprise, this isn't what happens at this magic show. Read and find out what does happen when the magician, the Amazing Maxine, can't find her magician's hat."

"Remember to try to understand and remember what you read. When you are finished, turn your story over and wait quietly for the others to finish. Are there any questions before we begin?"

Once everyone was finished reading, the researcher collected all the stories and modeled retelling the story by saying:

"This is a great story that I could retell to someone else. A good way to remember what you read is to focus on keywords from the story in the order that they appeared. You can use these words to help you use your own words to talk about the plot, or major events in the story. They can also help you remember about characters and the setting of the story. I am going to show you how you can use keywords to retell the story. I have a list of keyword cues for the story, "The Magician's Hat". I'll show you how I use these words to help me retell the story. I am NOT going to just read the list of keyword cues -- I am going to use these words to retell the story in my own words."
With the keyword cues in front of her, the researcher demonstrated how to use the keyword cues to retell the story, by moving her finger down the list of cues as she used each, in order from top to bottom, to retell the story. The researcher retold the story as follows:

"The title of the story is, "The Magician's Hat"

"This is a story about a boy named Sal who liked magic shows; but, he wasn't very excited about this one because he thought that all carnival magicians did was pull rabbits out of a hat. The show starts, and the Amazing Maxine began searching through her trunk for her magician's top hat. First, she pulls out a gray cowboy hat. She waves her silver magic wand over it, shouting, "ABRACADABRA". To the crowd’s surprise, she pulls out a horse with a western saddle. Upset, she shouts, No! No! No! This isn't right! She keeps searching in her trunk and pulls out a blue French beret. She waves her magic wand and shouts, "ABRACADABRA". This time she pulls out the Eiffel Tower. As the crowd cheers, she says, "This isn't right!" Maxine rummages through her trunk again and finds her magicians hat. She waves her wand over it and pulls out a fluffy white rabbit. Winking, she says to the crowd, "Now this is a real magic trick!"

"Now, you each get a chance to use the keyword cues to retell the story to a partner."

The researcher partnered them and had them count off in 1's and 2's.

"Today, the 1's will go first. When 1 is finished retelling the story, they will hand the list of keyword cues to 2, and 2 will get a chance to retell the story."
Remember to start with the title of the story and to use the keyword cues to help you retell the story. When you and your partner finish, sit quietly until all the pairs are finished. Are there any questions?"

The researcher provided wait time for questions. Then, the researcher passed out a copy of the keyword cues, 1 copy for each partner team to share. The child who was retelling held the list of keywords.

“If there are no other questions, I would like the 1's to begin retelling now."

As the partners were retelling, the researcher monitored and provided explicit guidance as needed.

"I hope you all enjoyed the story, “The Magician's Hat”. You all did a fine job of using the keyword cues to help you retell the story.”

III. Visual Imagery (During Reading) + Keyword Cues (After Reading). The four instructional lessons for the visual imagery (during reading) + keyword cues (after reading) treatment condition were structured in the following manner:

1. Researcher modeled lesson (narrative) – “The Magician's Hat”

What the researcher said to the participants is bold-faced and in quotation marks.

"Today we are going to be reading a story about a magic show titled "The Magician's Hat”, and I think you'll like it. When you finish we will talk about it. When you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You visualize when you are reading, by making pictures in your head about describing and action words you read about, to
help you “see” what happens and how it happens. Then, you can add what you already know about the story to make pictures in your head. Now, I am going to show you a sentence. I want you to read the sentence and make a picture in your head about what is happening."

The researcher directed them to the board where she had written the following sentence: An elephant holds its ears straight out to look even bigger to its enemy.

"What kind of picture did you make in your head?"

Researcher allowed student's to respond.

"Here is a picture that the authors chose to illustrate this sentence, did the picture you made in your head look anything like this? Was it different?"

The researcher let students respond.

After listening to a couple volunteered answers, the researcher proceeded:

"Now, you are going to practice making pictures in your head while you read to help you understand and remember what you have read. While you are reading you can look at the pictures... they can help you make pictures in your head about all the things that happen in the story."

"The story we will be reading today is about a boy named Sal who goes to a magic show."

The researcher pointed to an illustration of Sal.

"Sal goes to a magic show and things happen that he never expected. He thinks that all magicians do is pull fluffy white rabbits out of a hat. But to Sal's
surprise, this isn't what happens at this magic show. Read and find out what does happen when the magician, the Amazing Maxine, can't find her magician's hat."

"Remember to try and make pictures in your head to help you understand and remember what you are reading. When you are finished, turn your story over and wait quietly for the others to finish. Are there any questions before we begin?"

Once everyone was finished reading, the researcher collected all the stories and modeled retelling the story by saying:

"This is a great story that I could retell to someone else. Another good way to remember and understand what you have read is to focus on keywords from the story in the order that they appeared. You can use these words to help you use your own words to talk about the plot, or major events in the story. They can also help you remember about characters and the setting of the story. I have a list of keyword cues for the story, “The Magician's Hat”. Now, I am going to show you how I use the pictures I made in my head while reading, and these keyword cues to retell this story. I am NOT going to just read the list of keyword cues -- I am going to use these words to retell the story in my own words."

With the keyword cues in front of her, the researcher demonstrated how to use the keyword cues to retell the story, by moving her finger down the list of cues as she used each, in order from top to bottom, to retell the story. The researcher retold the story as follows:

"The title of the story is, “The Magician's Hat”.

175
"This is a story about a boy named Sal who liked magic shows; but, he wasn't very excited about this one because he thought that all carnival magicians did was pull rabbits out of a hat. The show starts, and the Amazing Maxine began searching through her trunk for her magician's top hat. First, she pulls out a gray cowboy hat. She waves her silver magic wand over it, shouting, "ABRACADABRA". To the crowd’s surprise, she pulls out a horse with a western saddle. Upset, she shouts, No! No! No! This isn't right! She keeps searching in her trunk and pulls out a blue French beret. She waves her magic wand and shouts, "ABRACADABRA". This time she pulls out the Eiffel Tower. As the crowd cheers, she says, "This isn't right!" Maxine rummages through her trunk again and finds her magician's hat. She waves her wand over it and pulls out a fluffy white rabbit. Winking, she says to the crowd, "Now this is a real magic trick!"

"Now, you each get a chance to use the pictures you made in your head and the keyword cues to retell the story to a partner."

The researcher partnered them and had them count off in 1's and 2's.

"Today, the 1's will go first. When 1 is finished retelling the story, they will hand the list of keyword cues to 2, and 2 will get a chance to retell the story. Remember to start with the title of the story and to use the pictures you made in your head along with the keyword cues to help you retell the story. When you and your partner finish, sit quietly until all the pairs are finished. Are there any questions?"
The researcher provided wait time for questions. Then, the researcher passed out a copy of the keyword cues, 1 copy for each partner team to share. The child who was retelling held the list of keywords.

“If there are no other questions, I would like the 1's to begin retelling now.”

As the partners were retelling, the researcher monitored and provided explicit guidance as needed.

"I hope you all enjoyed the story, “The Magician's Hat”. You all did a fine job of using the pictures you made in your head and the keyword cues to help you retell the story.”

IV. General Memory Instructions (Before Reading). The four instructional lessons for the general memory instructions (before reading) treatment condition were structured in the following manner:

1. Researcher modeled lesson (narrative) – “The Magician's Hat”

What the researcher said to the participants is bold-faced and in quotation marks.

"Today we are going to be reading a story about a magic show titled, “The Magician's Hat”, and I think you'll like it. When you finish we will talk about it. "The story we will be reading today is about a boy named Sal who goes to a magic show."

The researcher pointed to an illustration of Sal.

"Sal goes to a magic show and things happen that he never expected. He thinks that all magicians do is pull fluffy white rabbits out of a hat. But to Sal's
surprise, this isn't what happens at this magic show. Read and find out what does happen when the magician, the Amazing Maxine, can't find her magician's hat."

"I'd like you to try your best to understand and remember what you read, so that you can talk about the story with a partner afterwards. When you are finished, turn your story over and wait quietly for the others to finish. Are there any questions before we begin?"

Once everyone was finished and the researcher had collected all the stories she said:

"This is a great story that I could retell to someone else. I am going to show you how I use all the information I remember and understood from this passage to retell the story."

"The title of the story is, "The Magician's Hat"

"This is a story about a boy named Sal who liked magic shows; but, he wasn't very excited about this one because he thought that all carnival magician's did was pull rabbits out of a hat. The show starts, and the Amazing Maxine starts searching through her trunk for her magician's top hat. First, she pulls out a gray cowboy hat. She waves her silver magic wand over it, shouting, "ABRACADABRA". To the crowd’s surprise, she pulls out a horse with a western saddle. Upset, she shouts, No! No! No! This isn't right! She keeps searching in her trunk and pulls out a blue French beret. She waves her magic wand and shouts, "ABRACADABRA". This time she pulls out the Eiffel Tower. As the crowd cheers, she says, "This isn't right!" Maxine rummages through her trunk again and
finds her magicians hat. She waves her wand over it and pulls out a fluffy white rabbit. Winking, she says to the crowd, "Now this is a real magic trick!"

"Now, you each get a chance to retell the story to a partner."
The researcher partnered them and had them count off in 1's and 2's.

"Today the 1's will go first. When 1 is finished telling the story, 2 will get a chance to retell the story. Remember to start with the title of the story and to tell as much as you remember about the story. When you and your partner finish, sit quietly until all the pairs are finished. Are there any questions?"
The researcher provided wait time to answer any questions.

"If there are no other questions, I would like the 1's to begin retelling now."
As the partners were retelling, the researcher monitored and provided explicit guidance as needed.

"I hope you all enjoyed the story, “The Magician's Hat”. You all did a fine job of retelling all the information you learned and could remember from the story."
Appendix E

Immediate-Post Assessment Narrative Measures

“The Friend”

Once upon a time there was a boy named Mark. Mark loved to go to the ocean and play his flute. One day he was playing his flute when a school of dolphins swam by. They leaped in the air every 30 seconds. He could almost predict when they would leap again. That day he decided he wanted to learn more about dolphins. Mark went to the library.

The next weekend he took a boat and rowed out to where he had seen the dolphins before. He started playing his flute, trying to mimic the pulsed sounds he had heard on tapes of dolphin sounds. He had learned that they make two kinds of pulsed sounds. One kind is called sonar. It is used to locate dolphins and objects. The other kind of sound is a burst pulse. It tells the emotional state of the dolphin. Mark was trying to mimic sonar. Soon, he saw the roll of the dolphins. The boat bounced in the waves as the dolphins came closer. They seemed curious about the sounds coming from the boat. Suddenly, the boat tipped sharply and Mark fell out. Somehow he held on to his flute. Mark was a good swimmer, but he was too far from land to swim.
He tried to mimic the sound of a dolphin in trouble. Maybe then the dolphins would help him to land. Kicking strongly, he kept himself up above the water. He blew high, burst pulse sounds. Just when he was about to go under water, he felt a push against his leg. Again and again a dolphin pushed him gently to shore. Mark could not believe what was happening. He got safely to shore, although the boat was never seen again. As he sat on the beach, still shaking from fear, he realized that he had reached his goal. He had surely learned a lot about dolphins that day!

“The Friend”

Mark  
ocean  
flute  
school of dolphins  
predict  
library  
rowed out  
playing flute  
mimic the pulsed sounds  
heard on tapes  
two kinds  
sonar  
locate dolphins and objects  
burst pulse  
emotional state
boat bounced
dolphins came closer
boat tipped
fell out
held onto flute
kicking strongly
blew high, burst pulse sounds
push
his leg
gently to shore

Mark learned a lot about dolphins that day

Keyword Cue Statistics for “The Friend”:
319 total words
26 keyword cue phrases = 8.15%
63 keywords = 19.7%

Free Recall Assessment.

Subject: ________________

Reading Time: __________ Recall Time: __________

Setting/Background

_____ There was a boy
_____ named Mark
_____ Mark loved
_____ to go
_____ to the ocean
_____ and play his flute.
_____ A school
_____ of dolphins swam by.
_____ They leaped.
_____ every 30 seconds

Goal
Events

Mark wanted to learn more about dolphins.

Mark went to the library where he had seen the dolphins. He played the flute to mimic sounds pulsed sounds of dolphins. One sound is sonar and is used to locate things. Another kind is a pulse a burst pulse that tells the emotional state of the dolphin. Mark saw the roll of the dolphins. The boat bounced in the waves as the dolphins came closer. The boat tipped. Mark fell out. He held onto his flute. Mark was a good swimmer but he was too far from land. He tried to mimic the sound of the dolphin in trouble so the dolphin would help him. Kicking strongly he kept himself above water. He blew sounds. A dolphin pushed him to shore.
Resolution
_____ He got safely
_____ for shore.
_____ He realized
_____ he had learned a lot
_____ about dolphins.

54 ideas

Number of ideas recalled _______

Other ideas recalled, including inferences:

Cued Recall Assessment

Subject: ________________

1. What instrument did Mark play? (explicit) the flute

2. Where did Mark go to learn more about dolphins? (explicit) the library

3. How did Mark learn more about the dolphin sounds? (implicit) he read about them; or he listened to tapes. If the student says, "He went to the library," ask, "How did that help him learn about dolphins?"

4. What two kinds of sounds do dolphins make? (explicit) sonar, or sounds to locate objects, and burst pulse, or sounds to indicate emotions

5. Why was Mark trying to mimic sonar? (implicit) to see if the dolphins would come to him

6. Why did the boat tip over? (implicit) the dolphins came close enough to cause waves
7. What did Mark do to save himself? (implicit) he tried to make a burst pulse sound like a dolphin in trouble, hoping a dolphin would come to help him. If the student says, "He kicked strongly," ask, "What other thing did Mark do?"

8. How did Mark get to shore? (explicit) a dolphin pushed him to shore

Appendix F

Immediate-Post Assessment Expository Measures

“The Busy Beaver”

Have you ever heard someone say "busy as a beaver"? Beavers are very busy animals and they are master builders. This furry animal spends its life working and building. As soon as a beaver leaves its family, it has much work to do.

First, the beaver must build a dam. It gathers sticks, leaves, and mud to block a stream. The beaver uses its two front teeth to get the sticks. The animal uses its large flat tail to pack mud into place. A pond forms behind the dam. The beaver spends most of its life near this pond. In the middle of the beaver's pond is a large mound. This mound of mud and twigs is the beaver's lodge or house. The beaver's family is safe in the lodge because it is well hidden. The doorway to the lodge is under the water. After the lodge is built, the beaver still cannot rest. More trees must be cut down to be used as food for the coming winter. Sometimes there will be no more trees around the pond. Then the beaver
has to find trees elsewhere. These trees will have to be carried to the pond. The beaver might build canals leading deep into the forest.

All this work changes the land. As trees are cut down, birds, squirrels, and other animals may have to find new homes. Animals that feed on trees lose their food supply. The pond behind the dam floods part of the ground. Animals that used to live there have to move. However, the new environment becomes a home for different kinds of birds, fish, and plants. All this happens because of the very busy beaver.

“The Busy Beaver”
master builders
build a dam
block a stream
front teeth
get sticks
flat tail
pack mud
pond forms
large mound
house
doorway
under the water
cannot rest
food
find trees elsewhere
build canals
changes land
other animals
lose their food supply
pond floods
have to move
new environment

All this happens because of the busy beaver!

**Keyword Cue Statistics for “The Busy Beaver”:**
- 281 total words
- 23 keyword cue phrases = 8.19%
- 56 words = 19.93%

**Free Recall Assessment**

**Main Idea**

— Have you heard
— "busy as a beaver"?
— Beavers are animals
— busy animals
— and builders
— master builders.

**Details**

— As soon as a beaver leaves its family,
— it has much work to do.
— The beaver builds a dam.
— It uses sticks,
— leaves,
The beaver uses its teeth to get sticks. The animal uses its tail to pack mud. A pond forms behind the dam. The beaver spends its life near the pond. The beaver's home is a mound in the pond. The family is safe because its lodge is well hidden. The doorway to the lodge is under the water. Trees are cut down to be used as food for the winter. Sometimes there will be no trees around the pond. The beaver has to find trees and carry them to the pond. The beaver might build canals.

Main idea

This changes the land.

Details

As trees are cut, birds, squirrels, and animals have to find new homes. Animals lose their food supply. The pond floods the land. Animals have to move. A new environment becomes home for different birds and fish.
49 ideas

Number of ideas recalled _______

Other ideas recalled, including inferences:

---

**Cued Recall Assessment**

1. What is this passage mainly about? (implicit) how a beaver keeps busy; or what a beaver does

2. According to the passage, what are the beaver's front teeth used for? (explicit) to get the sticks.

3. Describe the beaver's tail? (explicit) large and flat

4. Why does the beaver build a dam? (implicit) to make a pond; or to make a place for his lodge

5. What is the beaver's house or lodge made of? (explicit) mud and sticks
6. Why is the doorway to the beaver's house under the water? (implicit) it is safer and more hidden; *or* so enemies can't get in

7. What does the beaver eat during the winter? (explicit) trees

8. Why might some people dislike beavers? (implicit) they change the land by flooding; they drive out animals; *or*, they cut down too many trees

---

**Appendix G**

Immediate-Post Assessment of Contextually Relevant Vocabulary Knowledge

**Subject:** ________________

**Example:**

They might **discuss** it.

- discover
- decide on
- talk about
- be upset about
- I'm not sure
1. He was in an angry **state** after taking the test.
   - territory
   - argument
   - condition
   - conversation
   - I'm not sure

2. **Surely**, they thought she made the right choice.
   - without trust
   - without certainty
   - with hesitation
   - without doubt
   - I'm not sure

3. They stopped at the **doorway** to rest.
   - closed off area
   - blocked area
   - passage area
   - forbidden area
   - I'm not sure

4. The hunter began to **mimic** the eagle's call.
   - identify
   - ignore
5. A biography tells the story of a person's **life**.

   - stillness
   - ruin
   - ending
   - being
   - I'm not sure

6. The fallen branches formed a **mound** in the yard.

   - raised area
   - valley
   - pit
   - deep hole
   - I'm not sure

K7. After the hurricane, people made a **dam** to protect the homes nearby.

   - bridge over water flow
   - barrier to water flow
   - road around water
   - tunnel under water flow
   - I'm not sure
8. The rescuers used **sonar** to find the trapped people.
   - picture signals
   - light signals
   - hand signals
   - sound signals
   - I'm not sure

9. **I realized** I had a lot of work to get done for my project.
   - did not know
   - understood
   - failed to see
   - was not certain if
   - I'm not sure

10. The **canals** were clogged after the storm.
    - water passages that are built
    - back roads
    - underground tunnels
    - man-made lakes
    - I'm not sure

11. Sarah has a new **goal** for the summer.
    - plan with no aim
    - plan without a desired end
    - plan that happens on purpose
12. John felt **emotional** after failing the test.

- empty of feelings
- strong feelings
- no feelings
- no cares
- I'm not sure
Researcher: "I've really enjoyed working with you, you're a fine reader and very cooperative. I'd like to ask you a few questions about the work we've been doing over the past couple of weeks. If you have any questions, or anything is unclear, feel free to let me know and I will help you. I will be recording what we are getting ready to talk about for my project. Ok, now let's talk about what we've been doing."

1. We did work with a strategy called (visual imagery, keyword cues, visual imagery and keyword cues, remembering to try to remember and understand all you read), and I am going to try to explain to second-graders how to use this strategy when reading. How would you explain how to use this strategy to second-graders? I will provide wait time, if need be researcher will prompt participant with the following:
   • Can you tell me anything else?
   • Can you explain anymore about what you meant by that?

2. Do you think our work together has helped you become a better reader? Yes/No
   If Yes, "Can you tell me how are work together has helped you become a better reader?" Provide wait time, if need be researcher will prompt participant with the following:
   • Can you explain how that made you become a better reader?

3. Of all the things we did when working together what did you enjoy the most? What did you like the least? After each response ask, "Why did you enjoy that and why didn't you like that?"
4. Do you think you could ever use this strategy again? Yes/No
   If yes, "When might you use this strategy again?"
5. Think about all of the things we've read together, and choose which was your favorite. Now tell me everything you can remember about it.

Appendix I

Delayed-Post Assessment Transfer

“Cats: Lions and Tigers in Your House”
House cats, lions, and tigers are part of the same family. When animals are part of the same family, they are alike in many ways. House cats are like lions and tigers in many ways, too. When kittens are first born, they drink milk from their mothers. Lions and tigers drink milk from their mothers, too. When kittens are born, they have claws, just like big cats. Claws are used by lions, tigers, and kittens to help them keep away enemies. As kittens get bigger, they learn to hunt from their mother. House cats hunt in the same way that lions and tigers do. They hide and lie very still. When the animal they are hunting comes close, they jump on it and grab it by the back of the neck. Cats kill other animals by shaking them and breaking their necks.

Lions, tigers, and house cats show when they are afraid in the same ways, too. Their fur puffs up, making them look bigger. They hiss and spit, too. Those are their ways of saying, "I'm afraid, don't come closer."

A cat's tongue has many uses. Because it is rough with little bumps on it, it can be used as a spoon. A cat drinks milk by lapping it. Because of the bumps, the milk stays on the tongue until the cat can swallow it. If you feel the top of a cat's tongue, it is rough. This makes the tongue good for brushing the cat's hair. Lions and tigers clean themselves with their tongues just like house cats do.

Free Recall Assessment

Subject: ________________
Recall Scoring Guide for Expository/Narrative Assessment Passage

Main Idea

_____ Cats,
_____ lions,
_____ and tigers
_____ are part of the same family.
_____ They are alike
_____ in many ways.

Details

_____ When kittens are first born,
_____ they drink milk
_____ from their mothers.
_____ Lions
_____ and tigers
_____ drink milk
_____ from their mothers.
_____ Kittens have claws.
_____ Lions,
_____ tigers,
_____ and kittens use claws
_____ to keep away enemies.
_____ Cats hunt
_____ in the same way
_____ that lions
_____ and tigers do.
_____ They jump on the animal
_____ and grab it
_____ by the neck.
_____ Cats kill animals
_____ by breaking their necks.
_____ When lions,
_____ tigers,
_____ and cats are afraid,
_____ their fur puffs up.
_____ They hiss
_____ and spit.
Because a cat's tongue is rough with bumps, it can be used as a spoon.

A cat drinks milk by lapping it. Because of the bumps, the milk stays on the tongue until the cat can swallow it.

Lions and tigers clean themselves with their tongues just like cats.

47 ideas

Number of ideas recalled ________

Other ideas recalled, including inferences:

Cued Recall Assessment

1. What is this passage mostly about? (implicit) that cats, lions, and tigers are alike in many ways
2. How are lions, tigers, and cats alike? (explicit) any one of the ways presented in the story: Milk from their mothers as babies; they have claws; the way they hunt; the way they show fear; or the uses of their tongues

3. What is another way that lions, tigers, and cats are alike? (explicit) any other of the above responses

4. What is still another way that lions, tigers, and cats are alike? (explicit) any other of the above responses

5. What does a cat do when it is scared or trapped in a corner? (implicit) it would hiss, spit, or puff up

6. Why is it important for cats to have claws when they're born? (implicit) for protection from their enemies

7. Why is the top of a cat's tongue rough? (implicit) because of the bumps on it; or so it can drink

8. Why doesn't milk fall off a cat's tongue? (explicit) because of the bumps that make cups on the tongue

Appendix J

Immediate-Post Assessment Procedures
The scripted procedures for immediate-post assessment procedures for each of the four treatment conditions are provided below:

I. Visual Imagery (During Reading). The immediate-post assessment procedures for the visual imagery (during reading) treatment condition were structured in the following manner:


What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a story titled, "The Friend", and I think you'll like it. When you finish we will talk about it. Remember, when you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You visualize when you read describing and action words that help you “see” what happens and how it happens."

"Like we have been doing in our other sessions, you are going to practice making pictures in your head while you read. Then you are going to use the pictures you made in your head to help you tell me about the story you just read."

"The story you will be reading today is about a boy named Mark who wants to learn about dolphins. Mark loved going to the ocean to play his flute. One day when Mark was playing his flute by the ocean he saw a school of dolphins leaping up out of the water. As he watched the dolphins leaping in the water he decided he wanted to learn more about them. Read and find out what Mark learned about dolphins and what happened when he goes out to sea in search of the dolphins.”
"Remember to try and make pictures in your head to help you understand and remember what you are reading. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Now, I would like you to use the pictures you made in your head to retell the story to me. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using the pictures you made in your head to help you tell me about the story, “The Friend”. Now I am going to ask you a few questions about the story you just read."

2. Expository immediate-post assessment procedures – “The Busy Beaver”

What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a passage titled, "The Busy Beaver", and I think you'll like it. When you finish we will talk about it. Remember, when you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You visualize when you read describing and action words that help you “see” what happens and how it happens."

"Like we have been doing in our other sessions, you are going to practice making pictures in your head while you read. Then you are going to use the pictures you made in your head to help you tell me about all the things you learned."
"The story you will be reading today is about beavers, and why they are such busy animals. This passage is about the busy life of beavers. It tells about all the work the beaver does to build his home and gather food. Read and find out how all that work effects the land and animals that live around the beaver."

"Remember to try and make pictures in your head to help you understand and remember what you are reading. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Now, I would like you to use the pictures you made in your head to tell me about everything you learned about beavers. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using the pictures you made in your head to help you tell me all you learned about “The Busy Beaver”. Now I am going to ask you a few questions about the passage you just read."

2. **Keyword Cues (After Reading).** The immediate-post assessment procedures for the keyword cues (after reading) treatment condition were structured in the following manner:

1. **Narrative immediate-post assessment procedures – “The Friend”**

What the researcher said to the participants is bold-faced and in quotation marks.
"Today you will be reading a story titled, "The Friend", and I think you'll like it. When you finish we will talk about it."

"Like we have been doing in our other sessions, when you are finished reading, you are going to use a list of keyword cues from the story to help you retell all you can remember about the story."

"The story you will be reading today is about a boy named Mark who wants to learn about dolphins. Mark loved going to the ocean to play his flute. One day when Mark was playing his flute by the ocean he saw a school of dolphins leaping up out of the water. As he watched the dolphins leaping in the water he decided he wanted to learn more about them. Read and find out what Mark learned about dolphins and what happened when he goes out to sea in search of the dolphins."

"Remember to try to understand and remember what you read. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Here is a list of keyword cues for the story you just read. Now, I would like you to use this list of keywords to help you tell me about everything you remember about the story. Remember not to just read the list of keyword cues; but, instead, use them to retell everything you remember about the story in your own words. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:
"You did a fine job of using the keyword cues to help you tell me about the story, “The Friend”. Now I am going to ask you a few questions about the story you just read."

2. Expository immediate-post assessment procedures – “The Busy Beaver”. What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a passage titled, "The Busy Beaver", and I think you'll like it. When you finish we will talk about it. “Like we have been doing in our other sessions, when you are finished reading, you are going to use a list of keyword cues from the story to help you retell all you can remember about the story."

"The story you will be reading today is about beavers, and why they are such busy animals. This passage is about the busy life of beavers. It tells about all the work the beaver does to build his home and gather food. Read and find out how all that work effects the land and animals that live around the beaver.”

"Remember to try to understand and remember all that you are reading about. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

" Here is a list of keyword cues for the passage you just read. Now, I would like you to use this list of keywords to help you tell me about everything you learned about the passage you just read. Remember not to just read the list of keyword cues; but, instead, use them to retell everything you remember about the passage in
your own words. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using the keyword cues to help you tell me about all that you learned about “The Busy Beaver”. Now I am going to ask you a few questions about the passage you just read."

3. Visual Imagery (During Reading) + Keyword Cues (After Reading). The immediate-post assessment procedures for the visual imagery (during reading) + keyword cues (after reading) treatment condition were structured in the following manner:


What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a story titled, "The Friend", and I think you'll like it. When you finish we will talk about it. Remember, when you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You visualize when you read describing and action words that help you “see” what happens and how it happens."

"Like we have been doing in our other sessions, you are going to practice making pictures in your head while you read. Then you are going to use the pictures you made in your head, along with a list of keyword cues to help you tell me about the story you just read."
"The story you will be reading today is about a boy named Mark who wants to learn about dolphins. Mark loved going to the ocean to play his flute. One day when Mark was playing his flute by the ocean he saw a school of dolphins leaping up out of the water. As he watched the dolphins leaping in the water he decided he wanted to learn more about them. Read and find out what Mark learned about dolphins and what happened when he goes out to sea in search of the dolphins."

"Remember to try and make pictures in your head to help you understand and remember what you are reading. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Here is a list of keyword cues for the story, "The Friend". Now, I would like you to use the pictures you made in your head, along with the keyword cues to help you retell all you remember about the story to me. Remember not to just read the list of keyword cues; but, instead, use them to retell everything you remember about the story in your own words. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using the pictures you made in your head, along with the keyword cues to help you tell me about the story, "The Friend". Now I am going to ask you a few questions about the story you just read."

2. Expository immediate-post assessment procedures – “The Busy Beaver”

What the researcher said to the participants is bold-faced and in quotation marks.
"Today you will be reading a passage titled, "The Busy Beaver", and I think you'll like it. When you finish we will talk about it. Remember, when you are reading, a good way to understand and remember what you are reading is to make pictures in your head. You visualize when you read describing and action words that help you "see" what happens and how it happens."

"Like we have been doing in our other sessions, you are going to practice making pictures in your head while you read. Then you are going to use the pictures you made in your head, along with a list of keyword cues to help you tell me about the passage you just read."

"The story you will be reading today is about beavers, and why they are such busy animals. This passage is about the busy life of beavers. It tells about all the work the beaver does to build his home and gather food. Read and find out how all that work effects the land and animals that live around the beaver."

"Remember to try and make pictures in your head to help you understand and remember what you are reading. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Here is a list of keyword cues for the passage, “The Busy Beaver”. Now, I would like you to use the pictures you made in your head, along with the keyword cues to help you retell all you remember and learned from the passage. Remember not to just read the list of keyword cues; but, instead, use them to retell everything you remember about the information in the passage in your own words. While you
are retelling, I am going to be recording so that I don’t miss anything that you are
telling me. Are there any questions before we begin?”

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using the pictures you made in your head, along with
the list of keyword cues to help you tell me all you learned about “The Busy Beaver”.
Now I am going to ask you a few questions about the passage you just read.”

4. General Memory (Before Reading). The immediate-post assessment procedures for
the general memory (before reading) treatment condition were structured in the following
manner:


What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a story titled, "The Friend", and I think you'll
like it. When you finish we will talk about it.

“Like we have been doing in our other sessions, when you are reading, I want
you to try to understand and remember as much as you can about the story, so that
you can tell me all about it when you are done.”

"The story you will be reading today is about a boy named Mark who wants
to learn about dolphins. Mark loved going to the ocean to play his flute. One day
when Mark was playing his flute by the ocean he saw a school of dolphins leaping
up out of the water. As he watched the dolphins leaping in the water he decided he
wanted to learn more about them. Read and find out what Mark learned about
dolphins and what happened when he goes out to sea in search of the dolphins.”
"Remember to try to understand and remember what you read. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Now I would like you to tell me everything you can remember about the story, “The Friend”. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using all the information you understood and remembered from the passage to help you tell me about the story, “The Friend”. Now I am going to ask you a few questions about the story you just read."

2. Expository immediate-post assessment procedures – “The Busy Beaver”

What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a passage titled, "The Busy Beaver", and I think you'll like it. When you finish we will talk about it.

“Like we have been doing in our other sessions, when you are reading, I want you to try to understand and remember as much as you can about the information in the passage, so that you can tell me all about what you learned when you are done.”

"The story you will be reading today is about beavers, and why they are such busy animals. This passage is about the busy life of beavers. It tells about all the work the beaver does to build his home and gather food. Read and find out how all that work effects the land and animals that live around the beaver.”
"Remember to try to understand and remember all that you are reading about. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Now I would like you to tell me everything you learned from the passage, "The Busy Beaver". While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of using all the information you understood and remembered about the passage to tell me about all you learned from reading, "The Busy Beaver". Now I am going to ask you a few questions about the passage you just read."
Appendix K

Delayed-Post Assessment Retention Procedures

The scripted procedures for delayed-post assessment measures of retention procedures for each of the four treatment conditions are provided below:

I. Visual Imagery (During Reading). The delayed-post assessment measures of retention procedures for the visual imagery (during reading) treatment condition were structured in the following manner:

1. Narrative delayed-post assessment measures of retention procedures – “The Friend”. What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the story we read the last time we met, “The Friend”. It was about a boy named Mark who wanted to learn more about dolphins, and the adventure he went on to do that. And, like we have practiced together, while you were reading the story you made pictures in your head, and then used those pictures to help tell me about all that you remembered about the story. Now, I would like you to tell me everything you can remember about the story, “The Friend”. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you could remember about the story, “The Friend”. Now I am going to ask you a few questions about the story."
2. Expository delayed-post assessment measures of retention procedures –

“The Busy Beaver”

What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the passage we read the last time we met, “The Busy Beaver”. It was about how beavers are such busy animals, and how all the work they do affects the land and animals that live near the beaver. And, like we have practiced together, while you were reading the passage you made pictures in your head to help you understand and remember the information in the passage. Now, I would like you to tell me everything you remember learning from that passage. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you learned from the passage, “The Busy Beaver”. Now I am going to ask you a few questions about the passage."

2. Keyword Cues (After Reading). The delayed-post assessment measures of retention procedures for the keyword cues (after reading) treatment condition were structured in the following manner:


What the researcher said to the participants is bold-faced and in quotation marks.
"Remember the story we read the last time we met, “The Friend”. It was about a boy named Mark who wanted to learn more about dolphins, and the adventure he went on to do that. And, like we have practiced together, after you were done reading the story you used a list of keyword cues to help tell me about all that you remembered about the story. Now, I would like you to tell me everything you can remember about the story, “The Friend”. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you could remember about the story, “The Friend”. Now I am going to ask you a few questions about the story."

2. Expository delayed-post assessment measures of retention procedures – “The Busy Beaver”. What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the passage we read the last time we met, “The Busy Beaver”? It was about how beavers are such busy animals, and how all the work they do affects the land and animals that live near the beaver. And, like we have practiced together, after you were done reading the passage you used a list of keyword cues to help tell me about all that you learned from the passage. Now, I would like you to tell me everything you remember learning from that passage. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"
Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you learned from the passage, “The Busy Beaver”. Now I am going to ask you a few questions about the passage."

3. Visual Imagery (During Reading) and Keyword Cues (After Reading). The delayed-post assessment measures of retention procedures for the visual imagery (during reading) and keyword cues (after reading) treatment condition were structured in the following manner:


What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the story we read the last time we met, “The Friend”? It was about a boy named Mark who wanted to learn more about dolphins, and the adventure he went on to do that. And, like we have practiced together, while you were reading the story you made pictures in your head to help you understand and remember what the story was about. Then, when you finished reading, you used a list of keyword cues, along with the pictures you made in your head to help tell me about all that you remembered about the story. Now, I would like you to tell me everything you can remember about the story, “The Friend”. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"
Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you could remember about the story, “The Friend”. Now I am going to ask you a few questions about the story."

2. Expository delayed-post assessment measures of retention procedures –
“The Busy Beaver”

What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the passage we read the last time we met, “The Busy Beaver”? It was about how beavers are such busy animals, and how all the work they do affects the land and animals that live near the beaver. And, like we have practiced together, while you were reading the passage you made pictures in your head to help you understand and remember the information in the passage. Then, when you finished reading, you used a list of keyword cues, along with the pictures you made in your head to help tell me about all that you learned from the passage. Now, I would like you to tell me everything you remember learning from that passage. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you learned from the passage, “The Busy Beaver”. Now I am going to ask you a few questions about the passage."
4. General Memory Instructions (Before Reading). The delayed-post assessment measures of retention procedures for the general memory (before reading) treatment condition were structured in the following manner:


What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the story we read the last time we met, “The Friend”? It was about a boy named Mark who wanted to learn more about dolphins, and the adventure he went on to do that. And, like we have practiced together, while you were reading, you tried your hardest to understand and remember all that you could, so you could retell the story to me. Now, I would like you to tell me everything you can remember about the story, “The Friend”. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you could remember about the story, “The Friend”. Now I am going to ask you a few questions about the story."


What the researcher said to the participants is bold-faced and in quotation marks.

"Remember the passage we read the last time we met, “The Busy Beaver”? It was about how beavers are such busy animals, and how all the work they do
affects the land and animals that live near the beaver. While you were reading, you tried your hardest to understand and remember all that you could, so you could tell me everything you learned from the passage. Now, I would like you to tell me everything you remember learning from that passage. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:

"You did a fine job of telling me everything you learned from the passage, “The Busy Beaver”. Now I am going to ask you a few questions about the passage."
Appendix L

Delayed-Post Assessment of Transfer Procedures

The scripted procedures for delayed-post assessment measures of transfer procedures were identical for participants in all four treatment conditions, and are provided below:

**Expository delayed-post assessment measures of transfer procedures – “Cats: Lions and Tigers in Your House”**

What the researcher said to the participants is bold-faced and in quotation marks.

"Today you will be reading a passage titled, "Cats: Lions and Tigers in Your House", and I think you'll like it. When you finish we will talk about it.

"This passage is about how house cats, lions, and tigers are all part of the same family. Read and find out how all of them are alike."

"Remember to use everything we have practiced and learned together to help you remember and understand the information, so that you can tell me everything you have learned from reading the passage. Are there any questions before we begin?"

Once the subject had finished reading the passage, the researcher said:

"Now, I would like you to tell me everything you remember learning from this passage. While you are retelling, I am going to be recording so that I don't miss anything that you are telling me. Are there any questions before we begin?"

Once the subject had rendered their free recall, the researcher said:
"You did a fine job of telling me all you learned from reading “Cats: Lions and Tigers in Your House”. Now I am going to ask you a few questions about the passage you just read."
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227


