Using Systematic Prompt Fading to Program a Self-Questioning Strategy with Elementary Students with Disabilities

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USING SYSTEMATIC PROMPT FAADING TO PROGRAM A SELF-QUESTIONING STRATEGY WITH ELEMENTARY STUDENTS WITH DISABILITIES

A Dissertation
Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy in
The School of Education

by
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I will never forget my response when my grandfather used to ask me when I was going to go back to school to get my Ph.D. “No way Paw-Paw! That requires so much research! I hate research,” was my response. I am sure he is laughing in heaven right now. I have been going to school for almost twenty years earning degrees, getting certifications, or for professional growth. I cannot explain the reasoning other than I just truly love school. I love the collegiate life; the excitement and the possibilities that come with paving your own way and getting to decide what you study.

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“The dream that you have? It was put there on purpose by God. The God who loves you so much that He doesn’t just place the dream in your heart. He gives you the tools and the strength to work towards that dream and then watches in pure delight as you experience the joy of having that dream come true.”

Borrowed from a sweet friend
# TABLE OF CONTENTS

ACKNOWLEDGEMENTS .................................................................................................................. ii

LIST OF TABLES ........................................................................................................................... vii

LIST OF FIGURES ......................................................................................................................... viii

ABSTRACT ....................................................................................................................................... ix

CHAPTER 1. INTRODUCTION ....................................................................................................... 1
   Instructional Hierarchy .................................................................................................................... 3
   Reading Comprehension ............................................................................................................... 5
   Self-Questioning .......................................................................................................................... 6
   Systematic Prompt Fading .......................................................................................................... 8
   Statement of the Problem ........................................................................................................... 9
   Purpose of the Study .................................................................................................................... 10
   Research Questions ..................................................................................................................... 11

CHAPTER 2. REVIEW OF THE LITERATURE ................................................................................. 13
   Instructional Hierarchy ................................................................................................................ 13
   Acquisition and Fluency ............................................................................................................ 18
   Generalization and Maintenance ............................................................................................... 20
   Summary .................................................................................................................................... 38
   Rationale for Study ..................................................................................................................... 39

CHAPTER 3. METHODS .................................................................................................................. 41
   Participants ................................................................................................................................. 41
   Setting ....................................................................................................................................... 43
   Researcher/Data Collectors ....................................................................................................... 44
   Interobserver Agreement .......................................................................................................... 46
   Treatment Integrity .................................................................................................................... 46
   Social Validity ............................................................................................................................. 47
   Instrumentation ........................................................................................................................... 47
   Experimental Design ................................................................................................................ 51
   Dependent Variable .................................................................................................................. 53
   Independent Variable ............................................................................................................... 53
   Procedures .................................................................................................................................. 54
   Intervention Phases ................................................................................................................... 55
   Maintenance ............................................................................................................................... 62
   Data Analysis ............................................................................................................................. 62
Institutional Review Board Approval ............................................................. 63

CHAPTER 4. RESULTS .................................................................................. 65
- Initial Screening Data ............................................................................. 65
- Training of Data Collectors .................................................................. 66
- Interobserver Agreement and Treatment Integrity .................................. 66
- Descriptive Analysis of the Data .............................................................. 67
- Participant Data ..................................................................................... 67
- Results Across Participants ..................................................................... 77

CHAPTER 5. DISCUSSION ............................................................................ 79
- Results Summary .................................................................................. 80
- Relation to Previous Research ............................................................... 82
- Limitations and Future Research ............................................................ 85
- Overall Significance and Conclusion ..................................................... 92

REFERENCES ............................................................................................ 95

APPENDIX A. IRB APPROVAL ................................................................. 104

APPENDIX B. CONSENT FORM FROM SCHOOL DISTRICT .................... 105

APPENDIX C. CONSENT FORM FROM SCHOOL ADMINISTRATOR .......... 107

APPENDIX D. CONSENT FORM FROM PARENT OF PARTICIPANTS ........ 109

APPENDIX E. ASSENT FORM FOR PARTICIPANT ..................................... 112

APPENDIX F. EXAMPLE OF COMPREHENSION QUIZ .............................. 113

APPENDIX G. EXAMPLE OF TREATMENT INTEGRITY CHECKLIST ............. 116

VITA ............................................................................................................ 118
LIST OF TABLES

Table 3.1. Examples of Comprehension Questions.................................................................51
Table 4.1. Results of Data Collectors..................................................................................66
Table 4.2. Student 1 MS and PND Scores on Comprehension Quizzes in Each Phase........69
Table 4.3. Student 2 MS and PND Scores on Comprehension Quizzes in Each Phase........70
Table 4.4. Student 3 MS and PND Scores on Comprehension Quizzes in Each Phase.........72
Table 4.5. Mean Scores on Comprehension Quizzes in Each Phase......................................75
Table 4.6. PND Scores in Independent Practice Phases.......................................................75
LIST OF FIGURES

1. Number of Questions Answered Correctly by Student 1 on each Comprehension Quiz……..69
2. Number of Questions Answered Correctly by Student 2 on each Comprehension Quiz……..70
3. Number of Questions Answered Correctly by Student 3 on each Comprehension Quiz……..72
4. Number of Questions Answered Correctly by 3 participants on Comprehension Quizzes……..74
ABSTRACT

Standardized assessments are focused on integrating knowledge from multiple sources and developing composed written responses. This requires the students to be able to read and comprehend on grade level, within the various subject areas (reading, math, science, and social studies), which are skills students with disabilities struggle to do. The purpose of the study was to use a systematic prompt fading procedure as a vehicle to program a self-questioning strategy for students with disabilities. The intervention package occurred in seven phases: baseline, embedded questions training, embedded questions independent practice, self-questioning training, self-questioning independent practice, self-questioning fading, and maintenance. A systematic prompt fading strategy was utilized to teach the self-questioning strategy. Generalization effects of the comprehension strategy on novel texts were measured at each intervention stage. Maintenance probes were administered one week after the self-questioning condition has been concluded. A multiple baseline across participants experimental design was used. Participants were one third and two fourth grade students from a public elementary school in a southeastern parish in Louisiana who have been identified as having reading comprehension deficits. Results across participants demonstrated at gradual, but consistent increase in reading comprehension and question generation.
CHAPTER 1
INTRODUCTION

One of the major narratives to come out of No Child Left Behind (NCLB, 2004) was that the legislation was framed as a “Washington-oriented one-size-fits-all approach to education policy, with an overemphasis of standardized testing” (Wong, Wing, Martin, & Krishnamachari, 2017). In the early 2000’s, NCLB ushered in new standards for the way teachers are required to provide instruction. It put in place measures that shed light on achievement gaps among traditionally underserved students. Every Student Succeeds Act (ESSA) expounded on this and mandated that states must set achievement goals for students and must develop ways to measure their improvement. These new goals were supposed to help struggling students close the achievement gap. NCLB required that 100% of students would be proficient by 2014. “All students” includes students with disabilities which means that this subgroup must be educated using the same standards as well as assessed on their mastery of said standards. The Nation’s Report Card from 2017 stated that the average scaled score for fourth grade students identified with disabilities is 187. In order to achieve a rating of Basic, the student must have a minimum score of 210. Even with accommodations the above data from the NCES shows that students with disabilities are still not able to close the achievement gap enough to pass the statewide assessment. The 2011 report from the National Assessment of Educational Progress reported that only 7 to 11% of students with disabilities attain proficiency with regard to reading comprehension on standardized assessments (Joseph, Alber-Morgan, Cullen & Rouse, 2016). Standardized assessments are now focused on assessing integrated knowledge from multiple sources and genres to develop composed written responses. Haager and Vaughn (2013) explained in their article regarding implications for student learning disabilities and the CCSS there is now “a strong emphasis on engaging in a deep analysis of text, responding to it in
writing and speaking, and reading extensively” (Haager and Vaughn, 2013, p.5-6). This new way of teaching is designed to be aligned with the updated standardized testing formats and all students must address the standards set forth by each state. According to Haager and Vaughn (2013) the primary mission for teachers now is to provide students with the foundational reading, writing, listening, and speaking skills that lead to being able to learn from multiple genres of text. The expectation now for all students is to be able to draw upon multiple resources to engage with increasingly challenging concepts and vocabulary across multiple disciplines, which are skills students with disabilities have difficulty with. Throughout educational research it has been asserted that students with disabilities have long struggled with higher order thinking concepts such as analysis and synthesis of information (e.g. Haagar & Vaughn, 2013). With the implementation of CCSS the focus has shifted to concept learning, not skill-based learning.

As Common Core was introduced, there was a shift away from strategy-based reading comprehension instruction and a shift toward “close reading” of text. According to Common Core State Standards Initiative, the Common Core State Standards (CCSS) are a set of clear college- and career-ready standards for kindergarten through 12th grade in English language arts/literacy and mathematics that are consistent across states (www.corestandards.org). These standards are aligned to the expectations of colleges, workforce training programs, and employers. Close reading of text includes rereading, interpreting perspective, and providing additional text sources as evidence to support ideas (Haager & Vaughn, 2013). By fourth grade all students are expected to be able to refer to details and examples in a variety of text when explaining what a text says both explicitly and inferentially. Students with disabilities typically perform best with direct, skill-based instruction. Higher order thinking skills should be programmed using explicit steps that include teacher monitoring, fluency practice, and exposure
to novel experiences in order to generalize across subjects. Teachers should carefully scaffold instruction that will model and support the acquisition of these required skills (e.g., Hudson, Torgesen, Lane & Turner, 2012; Stanovich, Siegel & Gottardo, 1997; Torgesen et al., 2001).

**Instructional Hierarchy**

Students are believed to experience learning through stages. These stages are referred to as a learning hierarchy. The stages of learning are acquisition, fluency, generalization, and adaptation. For the purposes of this research study, generalization and adaptation were discussed together. The outcome of the two stages were considered to be the same thing. The last stage in the learning hierarchy will be referred to as maintenance. Maintenance is an important step in the stages of learning because a strategy or skill will not be effective or useful if the student is not able to maintain the appropriate level of performance over an extended period. Haring and Eaton (1978) took this notion of a “learning hierarchy” and proceeded to identify instructional procedures that could reliably improve performance at different proficiency levels for a variety of skills. As the field of education has evolved over the years, the Instructional Hierarchy (IH) has become a commonly used framework for intervention design (Ardoin & Daly, 2007). There is a significant body of research focusing on the importance of acquisition and fluency for success in reading. Much research has documented that improving the reading fluency of students with disabilities can have a positive impact on their reading comprehension (Markell & Deno, 1997; Swanson & O’Conner, 2009; Therrien & Kubina, 2006). Samuels et al. (2005) suggested that being able to decode and comprehend at the same time is important when striving for fluency. However, fluency is only one early step in the learning process. Special educators tend to vacillate between the acquisition and fluency stages before they move on to comprehension. Due to the current focus on rate as a measurement tool to assess reading
progress, some teachers consider improvement in reading fluency as an end goal of instruction. O’Brien et al. (2014) and Sabatini et al. (2014) suggested that some reading fluency is necessary for comprehension, however elevated levels of fluency may not necessarily contribute to the text processing that is needed for reading comprehension. This supports the point that Claessens, Engel, and Curran (2013) made when they suggested that perseverating on low-level reading skills past the point of facilitating comprehension denies students opportunities to learn the more advanced skills needed for success in content area learning. O’Connor (2017) conducted a study to examine how fluent a reader must be to achieve some level of reading comprehension. Her research reported that elementary students with disabilities improved their comprehension at a fluency rate of only 90 words correct on a fluency measurement tool. This supports past literature that asserts students do not have to achieve 100 accuracy on a fluency measure before they are able to comprehend a text.

The next two stages in the IH are generalization and maintenance. Daly et al. (1996) in their work, used acquisition and fluency as the foundation for subsequently promoting generalization. When students are learning new skills, they are expected to perform them fluently in different contexts throughout the school day and to maintain skill mastery in the long term. However, the most common error that occurs with generalization and maintenance is assuming that they are natural results of training (Stokes & Baer, 1977). Research suggests generalization should be programmed using explicit, strategy instruction. A skill is considered mastered if students can modify learned responses when faced with novel environmental demands. Over the last 30 years of research involving the IH, it has been widely acknowledged that the proficient performance of any skill involves multiple dimensions; accuracy (acquisition), accurate rate (fluency), accurate rate under novel experiences (generalization), and spontaneous
modification of the skill to meet new demands (adaptation). Haring and Eaton (1978) stated that no skill is mastered all at once.

**Reading Comprehension**

According to Baumert et al. (2001) word decoding and fluency are major components of reading, however reading comprehension is the element that is most tightly linked to the academic and professional success of students with disabilities. Shanahan et al. (2010) defined reading comprehension as “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language.” (p. 5) Some would define the main prerequisites for successful reading comprehension as the ability to decode and read fluently, as well as the use of active strategies to understand the meaning of printed text (Palincsar & Brown, 1984). Kintsch (1998) defined reading comprehension as that result of a systematic reading process that integrates basic as well as higher-order reading skills. Yet, studies have shown throughout the years that students with disabilities tend to struggle with reading comprehension and the difficulties become more prevalent as they get older when the focus shifts from “learning to read” to now “reading to learn” (Mastropieri, Scruggs, Bakken., & Whedon, 1996). Students with disabilities may face difficulties in comprehending text due to differences that often characterize or define the disability. According to Antoniou and Souvignier (2007) these deficits could include: (1) failing to recall strategies needed for comprehension, (2) not controlling their progress, nor adjusting or regulating the specific behaviors associated with comprehension, (3) not implementing and monitoring effective learning strategies spontaneously, (4) not applying sufficient text-comprehension strategies and (5) not recognizing a text’s structure. In short, they may lack many self-regulating skills that are essential in being able to comprehend.
Gajiria et al. (2014) asserted that even if a student’s decoding skills are proficient, they may still struggle with comprehension because they fail to read strategically. They further explain this concept by stating that strategic readers are able to identify and recall important information, use their background knowledge to make inferences, monitor their understanding of text, and use repair strategies when they fail to comprehend text. These are not skills that any student, especially students with disabilities, just “pick-up” as they go through school. Research has suggested that these cognitive strategies should be taught systematically.

According to Rosenshine (1995), a cognitive strategy is “a heuristic or guide that serves to support or facilitate the learner as she or he develops the internal procedures that enable them to perform the higher-level operations [such as reading comprehension]” (p. 266). Some examples of strategies that have been demonstrated effective with students with learning disabilities are recognizing text structure, cognitive mapping, and questioning strategies such as SQ3R (Survey, Question, Read, Recite, Review). The goal of these various strategies is to teach students how to interact with the content so that learning becomes more deliberate, self-directed, and self-regulated (Jitendra & Gajiria, 2011). All cognitive reading strategies require the student to read the text, ask questions, draw conclusions, find main ideas, clarify meaning, reread, and paraphrase or summarize key information. Another component to cognitive reading strategies is that all are taught initially using explicit instruction to provide a clear description of the strategy, teacher modeling, and corrective feedback, guided and independent practice. The cognitive strategy that will be utilized in this research study is self-questioning.

**Self-Questioning**

Self-questioning is a metacognitive strategy that requires the students to monitor their own comprehension by asking themselves a series of self-generated or teacher-provided
questions before, during, and after reading a passage (Rouse et al., 2014). Research has shown that it is the most effective monitoring and regulating strategy of all the various metacognitive strategies in its effect on reading comprehension (King, 1992; Rosenshine, Meister, & Chapman, 1996). An examination of the Common Core State Standards (CCSS; 2010) reveals an emphasis on question generation. Humphries and Ness (2015) cited a standard from second grade where students are expected to ask journalistic-type questions (who, what, where, when, why, and how) about explicit information in a text. The example that is relevant to this research study is found in the fourth grade CCSS. By the end of fourth grade, students are expected to ask closed-ended and open-ended questions, requiring inference skills and critical thinking: “Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text” (CCSS, RL & RI.4.1, p. 12 & 14). Lastly, one of the criteria that teachers are evaluated on is their students’ ability to not only generate questions but ask those questions to their peers.

Prior research has shown that self-questioning has been shown to increase comprehension by teaching students how to activate their prior knowledge, summarize the text, and check for understanding (Mastropieri, Scruggs, Bakken, & Whedon, 1996). Wong (1985) and Rosenshine et al. (1996) conducted literature reviews that supported self-questioning as an effective intervention. Wong offered that the studies with positive results provided effective training that included modeling, imitation, and reinforcement. Rosenshine et al. (1996) found that using prompts, progressing from simple to more complex tasks, modeling and think aloud, controlling the difficulty of the material and using checklists produced more positive results. Crabtree et al. (2010) also conducted a study with high school students with learning disabilities to answer three questions as they read. The participants all demonstrated immediate and substantial increases on
comprehension quizzes and retellings. However, early research typically utilized self-generated questions with students in higher grades and with students that did not have learning disabilities. Teacher-generated questions were typically implemented with students with disabilities. Initially, this is an effective intervention for students with disabilities because it provides the modeling and corrective feedback that they need to become fluent in a skill. Long-term, however, it might not be an effective intervention because the teacher is not always going to be there. The student should be able to generate his or her own questions to comprehend the text and be able to adapt the skill to meet the requirements of other settings and subjects.

Baer (1999) stated that students who learn to self-question with teacher-provided questions are not likely to automatically generalize the skill into developing their own questions. Attaining independence with self-questioning can help students with learning disabilities generalize important reading comprehension skills to a wide range of content areas in school and to post-school environments. To promote that shift from teacher-generated to student-generated, teachers should plan and implement systematic instruction that supports and reinforces that transition. One way to program for this transition is to use a systematic prompt fading procedure.

**Systematic Prompt Fading**

Systematic prompt fading is a procedure that emerged from applied behavior analysis. It is a procedure in which instructional support is gradually faded until the student can perform a skill independently. Reviews of research on effective literacy instruction have consistently reported that teaching behaviors that are most effective for helping students acquire reading skills are those founded in the dimensions of applied behavior analysis (e.g., National Reading Panel, 2000; Swanson & Hoskyn, 1998; Vaughn, Gerstein, & Chard, 2000). Although prompt fading
has been demonstrated to be an evidence-based practice in both behavior analysis and academic instruction, there has not been any research prior to Rouse et al.’s 2014 study that examined systematic prompt fading as a procedure for teaching students to generate their own questions to monitor their reading comprehension. This study used systematic prompt fading as a procedure to program self-questioning to improve reading comprehension. Once the students had achieved a fluency rate that allowed for experimental control the researcher then implemented the prompt fading procedure that transitioned the students from teacher-generated questions to student-generated questions and measured their ability to generalize and maintain the self-questioning skill over novel texts and an extended time lapse.

**Statement of the Problem**

The problem is that even if students with disabilities have sufficient decoding skills they continue to struggle with comprehension because they fail to read strategically (Gajiria, Jitendra, Sood, & Sacks, 2007). According to Gajiria et al. (2007), strategic readers are able to identify and recall important information, access their prior knowledge to make inferences, monitor their understanding of the text, and use repair strategies when they fail to comprehend what they are reading. Students with disabilities lack these self-regulation skills. They perform more effectively with explicit, strategy-based instruction that will guide them from the fluency stage to the generalization and maintenance stages of learning. While teacher-generated questions have support in the literature, students with disabilities will need to be strategically taught how to generate their own questions while reading. Baer (1999) said it best when he stated that “no one learns a generalized lesson unless a generalized lesson is taught.” (p. 1)

Special educators might serve students better if they shifted teaching from teacher-generated questions to student-generated questions because ultimately, it’s the student who will
be taking the test not the teacher. More importantly, it is the student that will continue through the levels of education to become more independent readers. Teachers should plan and implement systematic instruction that supports and reinforces the transition to independent self-questioning. Rouse et al. (2014) utilized the evidenced-based practice of systematic prompt fading. Systematic prompt fading had its roots in behavior analysis but has gradually become an effective strategy for teaching a variety of academic skills and increasing independent learning (e.g., Mayfield et al., 2008; Morton & Flynt, 1997; Peterson, McLaughlin, Weber, & Anderson, 2008; Rivera et al., 2002; Soluaga et al., 2008). While there are studies that support self-questioning strategies do improve reading comprehension for elementary students with disabilities, Rouse et al. (2014) found that prior to their research study there were no studies that used systematic prompt fading as a procedure for teaching students to generate their own questions to monitor their reading comprehension. (Chan, 1991; Gaultney, 1995; Johnson, Graham, & Harris, 1997; Taylor et al., 2002).

**Purpose of the Study**

The purpose of this study was to examine the effects of a self-questioning intervention with a prompt fading procedure on reading comprehension of third and fourth grade students with disabilities. This study was designed to be a conceptual replication of the Rouse et al. study from 2014. Mathews, Hirsch, and Therrien (2018) defined a conceptual replication as a study that “tests the same strategy or practice as the original study but purposefully adjusts some aspect of the original study, such as grade level or exceptionality.” (p. 268) Conceptional replications are more common in educational research because they can provide educators with a better understanding of how the intervention or strategy will prove effective across settings, participants, and contexts (Mathews et al., 2018). The components of the study that have been
altered from the original study are participants, the number of probes in the practice phases, the comprehension quizzes, the number of probes in the Self-Questioning Fading phase, and the amount of generalization probes administered.

In this study, students were given a either an expository nonfiction or narrative nonfiction grade level passage with a teacher-generated embedded question after each paragraph. Expository nonfiction and narrative nonfiction passages were chosen because much of content reading across all subject areas is nonfiction text, both during instruction and on standardized assessments (Rouse et al., 2014). Grade level standards are centered on students being able to read multiple types of expository texts then synthesizing it to compose a multi-paragraph essay or answer higher order questions. Students should be able to comprehend the text to answer the questions correctly and write an appropriate grade-level composition. According to Gunn (2008), empirically based instructional techniques and models of expository texts have received less attention in the cognitive literature as compared to those that are centered on narrative texts.

Once students demonstrated proficiency with answering the teacher-embedded questions correctly, the teacher-generated embedded questions were systematically faded and replaced with a prompt, such as a blank line, for the students to generate their own questions. Generalization probes were conducted at every condition phase. A maintenance probe was administered one week after the self-questioning condition has concluded.

**Research Questions**

This study was designed to answer the following research questions:

(1) What are the effects of self-questioning intervention package with prompt fading on the reading comprehension of students with disabilities?
(2) What is the effect of a self-questioning intervention package with prompt fading on the generalization of self-questioning to novel texts?
CHAPTER 2
REVIEW OF THE LITERATURE

Haring and Eaton (1978) first described the four stages of the Instructional Hierarchy (IH): acquisition, fluency, generalization, and maintenance. These four stages provide a useful theoretical framework from which to examine the outcome of an intervention (Ardoin & Daly, 2007). Haring and Eaton (1978) also stated that one should use the IH as a model for understanding instructional effects. It is using this framework that this section will be organized. The IH will be discussed first to give the reader an understanding of the history behind its conception and the different learning stages. Next, each learning stage will be discussed separately and the instructional strategy that will be used to move from one stage to the next. Acquisition and fluency will be discussed together due to their symbiotic nature. Next, generalization and maintenance will be discussed. This section will highlight the body of knowledge on reading comprehension and students with disabilities, the self-questioning strategy, and the systematic prompt fading procedure. Comprehension is included in this section because it is in the understanding of a skill or concept that will bring about generalization and maintenance. Research studies will be included that will introduce and explain the self-questioning strategy and why it has been shown effectiveness for improving comprehension and generalization. The systematic prompt fading strategy will be discussed using past research that supports its effectiveness in the generalization and maintenance of skills both in behavior analysis and in academics.

Instructional Hierarchy

Haring and Eaton (1978) developed the IH as a heuristic device for generating instructional treatments based on level of skill development (Daly, Lentz, & Boyer, 1996). The researchers developed it using behavior-analytic methods and principles. They were frustrated
with the status of education at the time and they recognized that academic responding, such as that in reading and math, could be strengthened more quickly if teachers were systematic in the way they structured antecedent prompts and managed consequences. The researchers focused on the variables that were able to be manipulated to change behavior and applied the model to academic achievement as the behavior-to-be-changed (Daly et al., 1996). According to Ardoin and Daly (2007), the hierarchy has informed intervention research in two ways. First, it has taught interventionists how to attend to student responding and the way responding changes as it is strengthened. Ardoin and Daly (2007) stated, “it emphasizes the way in which response frequency changes as a behavioral deficit, like a lack of reading behavior, is brought under appropriate stimulus control through instruction and then trained to generalize the other appropriate stimuli.” (p. 2) Second, is has taught us how to react to those changes in response to produce even stronger response repertoires that are more broadly generalizable. According to Ardoin and Daly (2007), the IH has provided a unique conceptualization of providing response prompts and establishing consequences based on timing, scheduling, and criteria for reinforcement. To sum it up, the IH has shed some much-needed light on “what to do when…”

It does not take a professor to understand that student responding, and instructional efforts should be inseparably and functionally linked. Haring and Eaton (1978) proposed that there needs to be an examination of potential intervention targets along a learning hierarchy continuum. The continuum looks like this: accuracy to fluency to generalization to maintenance. Each of these levels of responding can be viewed as a potential intervention target in and of itself and by refining the intervention targets according to the level of skill development, treatment selection becomes a function of general behavioral laws.
The first stage in the skill development process is **acquisition**. Acquisition as defined by Haring and Eaton (1978) as “the period between the first appearance of the desired behavior and the reasonable accurate performance of that behavior.” (p. 25) Students in this stage are typically slow and inaccurate when they respond. Haring and Eaton identified four strategies for prompting accuracy of responding: modeling, demonstration, prompting, and cueing. Modeling and prompting are the strategies of choice for improving accuracy of responding. Espin and Deno (1989) conducted a study that compared the effects of modeling versus prompting on sight word reading. The results showed that modeling was the more effective strategy. Other evidence-based practices that have been demonstrated to increase accuracy in decoding are listening passage preview (LPP) and phrase drill error correction (PD) (Daly & Martens, 1994; O’Shea, Munson, & O’Shea, 1984). Both interventions have been found to be effective individually but have also been demonstrated to increase accuracy and fluency when combined within an intervention package.

The second stage in the skill development process is **fluency**. Haring and Eaton (1978) asserted that once the student achieves accurate responding, they must be able to perform that skill rapidly and with proficiency. According to Parker and Burns (2004), students should transition from acquisition to fluency when they are able to read connected text with 93% accuracy or complete other academic tasks with 90% accuracy. The Instructional Hierarchy states that fluency is promoted through multiple opportunities to respond, followed by performance feedback and reinforcement for responding. Research has supported that fluency is often increased through drill and reinforcement (Haring & Eaton, 1978)
The third step in the Instructional Hierarchy is *generalization*. Haring and Eaton (1978) defined generalization as the process of displaying a recently acquired behavior either in multiple settings, or in the appropriate context. Generalization is when the student can display the behavior in response to environmental demands. The Instructional Hierarchy further suggests that after stimulus control is developed to allow for accurate and fluent responding, then generalization can be further promoted through practice. The practice involves opportunities to respond to newly learned stimuli when the stimuli are presented in different contexts. Generalization has been found to be more probable when stimulus control is strong. Research conducted by Daly, Martens, Kilmer, and Massie (1996) found that when students were instructed in texts where their accuracy and fluency are strong, they displayed greater generalization of accuracy and fluency to other texts.

One of the issues when looking at generalization of reading skills in research is that it is difficult to define and measure. Therefore, there is not a lot of literature specifically targeting generalization of reading skills as the focus of the study results; it is usually included within a study to measure fluency of a skill. Ardoin and Daly (2007) asserted that if a student fails to demonstrate generalization across stimulus conditions, it may be due to them not yet having developed sufficient fluency skills. The problem that interventionists and teachers have is that they assume generalization is just a natural result of training (Stokes & Baer, 1977). The Instructional Hierarchy emphasizes that generalization should not be expected as result of development and strengthening of stimulus control through accuracy and fluency-based instruction. We should program for generalization by providing students with sufficient practice opportunities. The goal is that the newly acquired skill will be generalized and maintained across all subject areas and contexts. However, research has suggested that students with
disabilities usually never reach the generalization stage. They tend to waiver between acquisition and fluency. The skills required for comprehension and generalization should be programmed and taught to students.

When students demonstrate their ability use a skill in multiple settings or contexts then the transition to generalization has occurred. Maintenance is the last step where the student should be able to modify the learned responses in the face of novel environmental demands. Haring and Eaton (1978) equates maintenance to problem-solving, henceforth teachers should provide students with as many novel experiences of applications of the skill as possible. Teachers can promote maintenance using explicit teaching, instruction on monitoring strategies, explicit generalization training, and attributional training (Chan, 1991). For students with disabilities to generalize and maintain skills they should be taught in a simple schema that can be easily learned and remembered (Souvignier & Mokhlesgerami, 2006).

For students with disabilities to be successful in all aspects of reading, not just comprehension, they should learn strategies through explicit instruction. Teachers should teach using small steps where they guide students through the initial practice (acquisition), provide practice with reinforcement, modeling, and corrective feedback (fluency), and provide a variety of novel experiences for the student to demonstrate mastery of the learned skill (generalization and maintenance). Research has supported that multicomponent strategy programs have been successful in improving students’ reading comprehension and self-monitoring strategies through explicit modeling then transferring the responsibility for choice and application of strategies to the student (Mastropieri, Scruggs, Bakken, & Whedon, 1996; Antoniou & Souvignier, 2007; Swanson, 1999a).
Acquisition and fluency are the first two stages in the Instructional Hierarchy. This is where students are exposed to modeling, repeated drill and practice, and corrective feedback. Teachers either tend to move quickly through these stages or linger on them. Some teachers feel that once a student demonstrates a skill several times that they are fluent at it and can progress to the next skill. Haring and Eaton stated this is not the case and repeated practice and modeling should occur until the student can demonstrate the behavior or skill consistently at a set level with a high degree of accuracy. Students with disabilities benefit from a lot of time and practice on most skills, which is why some teachers fall into the trap lingering in the acquisition and fluency stages. For example, teachers may believe that a student should be proficient at reading fluently on grade level before moving on to comprehension. It is for this reason that much research has been dedicated to investigating which skills and strategies are more effective for students with disabilities and in what combination. Carnine, Silbert, Kameenui, and Tarver (2004) stated that an emphasis on accuracy in early reading will help students develop habitual accuracy, which will in turn contribute to reading accurately without significant effort. Once the student has demonstrated consistent and accurate performance of the new skill, they should make the transition to the next stage, fluency.

Over the last 30 years of research, fluency has been viewed as a bridge that readers must cross to get from word recognition to comprehension (Carnine et al., 2004). In 1974, LaBerge and Samuels developed the theory of automatic information processing which has been used as a theoretical framework to explain the complex task of reading and has been used as a theoretical rationale for various instructional practices to improve reading accuracy and fluency. The theory states that there are two main components of fluent reading: accurate word decoding and
automaticity in word recognition (Schrauben, 2010). LaBerge and Samuels made the argument that letter encoding had to be automatized before word reading could be automatized. Samuels (1979) further explained saying that because a beginning reader’s attention is on decoding, it is not immediately available for comprehension, which makes the process of deriving meaning more difficult and slower. Once decoding becomes automatic, there is more room for the student to concentrate on comprehending the text. The students should be able to fluently read the passage and be comfortable with it before working on the higher-level cognitive skills required for comprehension. Baumert et al. (2001) asserted that while word decoding, and fluency are major components of reading, reading comprehension is the element that in most tightly linked to the academic and professional success of students with learning disabilities.

Skinner and Daly (2010) stated that generalization of reading skills means that the students are able to demonstrate said skills during untrained conditions. Generalization is more likely to occur if a student’s responding is accurate and fluent (Ardoin & Daly, 2007). When students can demonstrate accuracy and fluency, they are more likely to meet the demands that are present in the classroom and will be able to achieve academic success across all subject areas. Part of the dilemma lies in how to measure the effects of generalization accurately. Gibson et al. (2014) suggest that future research should establish procedures to ensure stable rates of responding on generalization passages before any criteria changes are implemented. Also, to address making sure that students will be able to generalize reading fluency to classroom materials, future research should test generalization probes in more naturalistic conditions such as using material found in the general education classroom as a second generalization probe.
Generalization and Maintenance

Once students show they have acquired a skill and can perform it with fluency, then most assume that the skill will be generalized and maintained to fit other settings and subjects. As recognized by Stokes and Baer (1977) this train and hope approach may be perilous for students with learning challenges including students with disabilities. Harris and Pressley (1991) stated that one of the striking shortcomings of the instructional literature on generalization and maintenance has been the failure to attend to developmental constraints on instructional benefits. They further explained that researchers know little about the breadth, depth, and course of the development of maintenance and generalization capabilities in children; instead relying on intuition as a guide in setting reasonable criteria and evaluating outcomes in the research (Harris, 1985, 1988).

Comprehension. According to Watson et al. (2012) reading comprehension is the most critical skill students need in order to be successful in school. When discussing the act of reading, there is the traditional view versus the cognitive view. Dole (1991) identified the traditional view of reading as “assumes a passive reader who has mastered a large number of subskills and automatically and routinely applies them to all texts.” (Dole et al., 1991, p. 242) He furthered that the cognitive view of reading “assumes an active reader who constructs meaning through the integration of existing and new knowledge and the flexible use of strategies to foster, monitor, regulate, and maintain comprehension.” (Dole et al., p. 242) When examining the cognitive view of the reading process, the emphasis should be on teaching a set of strategies students can use to comprehend the text. For students to be able to comprehend written material they are required to perform many cognitive processes such as making inferences, building “mental models” to represent the content of texts (Lorch Jr., & van den Broek, 1997; van den
Broek, 1988; van den Broek, Young, Tzeng, & Linderholm, 1999), making causal connections, knowledge of text structure, and summarizing. Pressley (2000) asserted that good readers are highly metacognitive, and they are aware of how their reading is going and some of the ways that texts can be difficult. Students with disabilities may not develop these skills naturally and if lacking will experience difficulties with comprehension. Gersten et al. (2001) offered that students with disabilities and struggling readers may have difficulty with the strategic processing of the text. The authors further elaborated stating that “they [students] might not realize that they should actively monitor their comprehension and consequently do not go back and reread passages that are confusing, as proficient readers do. In addition, they may not know when to use a strategy they, in fact, do possess.” (Gersten et al., 2001, p. 280) They will likely not improve comprehension simply by “reading more”.

Another difficulty that students with disabilities have with reading comprehension is identifying the specific text structures, especially in expository texts. Unlike narrative text that tends to follow predictable text structures, expository text structures are more complicated and varied. Meyer, Brandt, and Bluth (1980) found that readers who are unaware of text structure do not approach text with any plan of action. This means that when they are reading, they tend to retrieve information in a random way with no rationale to support what they extracted. Englert and Thomas (1987) found that students with disabilities could not distinguish between essential and nonessential material and tended to have difficulties formulating reasonable hypotheses based on what they read. Pressley stated that skilled readers actively look for information relevant to their goal for reading, relating important points in the text to one another, and constantly integrate new knowledge learned as they read. Teachers should teach students using highly structured and explicit instruction on comprehension strategies. Watson et al. (2012)
states that strategy-based instruction can provide the motivation students need to be more involved with the text because they know what they are listening for when they read.

There have been a several qualitative studies conducted that were designed to explicate the nature of comprehension strategy instruction in settings in which there was at least some evidence of effective comprehension instruction (Pressley, Johnson, Symons, McGoldrick & Kurita, 1989; Pressley & Harris, 1990; Pressley & Wharton-McDonald, 1997; Pressley, 2000). There were three programs studied and the research group found a core set of strategies being taught and the common elements are as follows: (a) prediction based on prior-knowledge activation, (b) question generation, (c) clarification-seeking when confused, (d) mental imagery, (e) relating prior knowledge to text content, and (f) summarization. The researchers also discovered commonalities in the ways that the comprehension instruction occurred: (a) instruction was long-term; (b) direct explanation and modeling of the strategies; (c) teacher coaching occurred as students practiced strategies, with coaching including mini-lessons that varied in their completeness depending on student needs; (d) students modeled the use of strategies for one another, frequently explaining to one another how they used strategies to process text; (e) the usefulness of strategies was emphasized as was information about when and where various strategies could be applied; and (f) teachers modeled use of strategies throughout the day.

Englert and Mariage (1991) used reciprocal teaching formats for the design of group interactions during instruction, as well as semantic mapping to assist students with disabilities in identifying text structures of expository passages. The purpose of the study was to report on the effectiveness of an instructional procedure known as POSSE, which was developed based upon previous research on reciprocal teaching with at-risk students by Palincsar and Brown (1986).
Like reciprocal teaching, POSSE relies upon the lesson dialogue and interactions among group members to promote internalization of strategies, development of self-regulation, and transfer of strategy control from teachers to students. The results from the study added to the literature that supports explicit strategy instruction with students with learning disabilities can yield significant improvement in reading comprehension.

Ritchey et al. (2017) evaluated the effectiveness of a short-term reading intervention on reading comprehension among fifth-grade students. The researchers asked the following question: What are the effects of a short-term intervention focused on reading comprehension of informational text for fifth-grade students with comprehension difficulties? The researchers used informational science texts and included a multiple component strategy for before, during, and after reading. An acronym, PLUG IN, was used to help participants remember the name and steps of the strategy. PLUG IN corresponds to the strategies taught: Previewing, Linking to what you know, Using fix-up strategies, Generating questions, In your own words, and Now, answer the questions. The results demonstrated that the participants did learn the strategy and implemented it while reading, however no generalization measures were taken to determine if they maintained the strategy.

Nelson and Manset-Williamson (2006) compared the impact of explicit, self-regulatory strategy instruction to instruction that was less explicit. They hypothesized that the intervention group receiving explicit, self-regulatory strategy instruction would possess greater reading self-efficacy, more adaptive reading attributions, and more positive affect for reading than the group receiving less explicit strategy instruction. The researchers based the hypothesis on the belief that those who received explicit instruction in comprehension strategies and self-regulatory behavior when using strategies would perceive themselves to have more control over their reading
outcomes when compared to the other group. The reading comprehension instruction was based on guided reading instruction and during the sessions, instructors modeled specific comprehension strategies, including prediction, summarization, and question generation, to enhance active and strategic reading. What made the Explicit Comprehension intervention different from the Guided Reading intervention was that no assumption was made that students would naturally begin to use the strategies independently if given repeated exposure. Instead, transfer of control of the strategies was explicitly moved from instructor to participant. These procedures were founded largely on the self-regulated strategy development model of Harris and Graham (1999). The strategies were taught using the following sequence: direct explanation, modeling, collaborative practice, and independent practice. Data for reading self-efficacy reported that participants in the Explicit Comprehension intervention did not make statistically significant gains in reading self-efficacy. The same was true for the reading attributions to strategy use. However, for the reading affect measures participants reported a statistically significant increase in positive affect for reading. The researchers found that the participants tended to overestimate their ability to correctly use the reading strategies. They noted that teachers need to be aware of this and try to plan instruction around modeling correct strategy choice without lowering the students’ self-efficacy by insinuating they are doing it wrong.

According to the National Reading Panel (2000), scientifically based research has determined the following specific comprehension strategies to be effective: monitoring comprehension, using graphic and semantic organizers, answering questions, generating questions, recognizing story structure, and summarizing. In the same report, the NRP also recommended the following guidelines for teaching comprehension strategies: explicit or direct instruction that includes explanation, modeling, guided practice, and application; cooperative
learning; and multiple strategy instruction. The goal being that students, especially students with disabilities, learn to use strategies flexibly and in other settings. Nelson and Manset-Williamson (2006) claimed that explicit strategy instruction may lead to enhanced self-regulation of reading strategy usage. Students who have an increase of self-regulation in reading will be able to employ the correct strategies that will enable them to be successful in comprehending the material as well as increasing their self-efficacy in other settings and with other type of texts. Given the importance of questioning and the critical need for students to improve the self-regulation of reading, the use of teaching self-questioning skills is a foundation for the current research.

**Self-Questioning Strategy.** There has been much debate over the years on the importance of constructed knowledge versus instructed knowledge in education. Which approach is the better approach for addressing reading competence? Harris and Pressley (1991) sought to bring the two approaches together when they discussed the use of cognitive strategy instruction as one intervention that could be successful at increasing student comprehension. Cognitive strategy instruction has some roots in constructivism when it cites the importance of students playing an active and collaborative role in their learning. However, it does not stay true to constructivism because it also recognizes the importance of explicit instruction from teachers to give the boundaries and rationales for the use of the strategy. It combines the elements of explicit teaching with scaffolding procedures (e.g., modeling, think-aloud, reciprocal teaching) and scaffolding tools such as procedural prompts and evaluation check. The cognitive view emphasizes the interactive nature of reading and the constructive nature of comprehension (Dole et al., 1991). No one ever “masters” the reading process; it requires constant learning and building in order to meet the demand for whatever task is presented. A cognitive view places the
importance on strategies, not skills. Pressley, Johnson, Symons, McGoldrick, & Kurita (1989) defined a strategy as “conscious, instantiated, and flexible plans readers apply and adapt to a variety of texts and tasks”. (Dole, p. 242) Harris and Pressley explained the components of self-instructional strategy development: (a) strategies, (b) knowledge about the use and significance, and (c) explicit self-regulation of strategic performance.

Self-questioning strategy is a type of cognitive strategy that has garnered research over the years. Wong (1985) reviewed 27 research studies published from 1965 to 1982. Only 3 of the reviewed studies included students with disabilities. He reported that 14 of the studies demonstrated increased reading comprehension outcomes. He noted the more positive results came from studies that included modeling, imitation, and reinforcement. Rosenshine et al. (1996) examined 26 research studies published between 1983 and 1992. Only 2 of the reviewed studies included students with disabilities. These reviewers found that studies that used prompts, progressed from simpler to more complex tasks, used modeling and think aloud, controlled for the difficulty of the material, and used cue cards produced positive student outcomes.

Joseph, Alber-Morgan, Cullen, and Rouse (2016) reviewed experimental that included the effects of self-questioning strategies on reading comprehension. The researchers found 35 experimental research studies that included K-12 students with (n=17) and without disabilities (n=18). The report indicated that there are a variety of strategies that are used to teach self-questioning and they are effective for improving reading comprehension performance. The recommended strategies were passage preview, question generation prior to reading, mnemonic devices, attention to main idea and details, teacher modeling and prompting, guided practice with corrective feedback, and incorporating self-regulation components including self-questioning. The authors conclusions were that academic strategies based in behavior analytic principles have
provided a strong and necessary but as yet insufficient research base. They specifically encourage the pursuit of generalization and maintenance strategies for promoting reading comprehension.

According to Ehren (2005), self-questioning may be a useful strategy for readers who can decode words but who do not understand or remember what they read. It does this by encouraging them to become active in their learning and helping them make inferences the author assumed they would make. This type of strategy focuses on both literal and inferential comprehension. There is extensive empirical evidence from the literature that supports the use of text comprehension strategies. National Reading Panel (2000) concluded that “the strongest scientific evidence for the effectiveness of a text comprehension intervention was found for the instructional technique of question generation” (Ch. 4, p. 45). Humphries and Ness (2015) stated that when students utilize self-questioning strategies, they are taking ownership of the types of questions posed, as well as how to locate the answers to their questions. Another finding is that it aids students with memory, recall, and identification and integration of main ideas through summarization. Students who generate their own questions show improvement in reading comprehension scores (Therrien & Hughes, 2008; Taboada & Guthrie, 2006). It is important that students can utilize this type of strategy because it will help them to integrate information within the passage, relate the information from the passage to prior knowledge, and help to monitor their understanding (Pressley, 2000).

Chan (1991) designed a study that provided instruction for students with reading disabilities in the use of a self-questioning strategy for the identification of main ideas. She chose to identify the main ideas to be the focus of instruction because it is a strategy that is critical to both reading comprehension and learning from text. The goal of the study was to
promote strategy generalization by means of teaching the participants to self-regulate their learning using self-questioning. The results indicated that informed training and self-instructional strategy training procedures were more effective than the demonstration-practice techniques for improving students' performance on identification of main ideas. Chan reported that the generalization instruction was more successful in promoting unprompted generalization of the newly acquired strategy across settings.

Botsas (2017) examined the differences between cognitive and metacognitive strategy use while reading narrative and expository texts. Cognitive strategies were defined as rehearsal and elaboration. Metacognitive strategies were defined as planning, monitoring, and regulating. The results supported the claim that students with learning disabilities are not strategic readers in general and they use fewer monitoring and regulating strategies, with no planning strategies. The participants used more cognitive strategies with narrative texts as opposed to the expository texts. The study supported the assumption that student with disabilities have difficulty comprehending expository texts. Narrative texts have certain textual structures, vocabulary that is used in everyday speech, and episodic cues. Expository texts have abstract and unfamiliar vocabulary and concepts that have high density. These types of texts require deeper, more efficient processing using more elaborate cognitive strategies.

Jitendra, Hoppes, and Xin (2000) investigated the effectiveness of a main idea strategy and self-monitoring instructional procedure for improving comprehension. The primary purpose of the study was to investigate the effects of a treatment package that incorporated main idea strategy instruction (Carnine, Silbert, & Kameenui, 1997) and a self-monitoring procedure with students with learning and behavioral disabilities. The second purpose of the study was to assess generalization effects of the strategy and finally assess maintenance of skill acquisition 6 weeks
after instruction was complete. Self-monitoring was incorporated throughout the main idea strategy instruction. Students were taught to use a self-monitoring card during independent practice to check their use of the main idea strategy. Results indicated that participants in the treatment group statistically outscored participants in the control group on post-test training items requiring selection and production responses and maintained their improved performance on the delayed post-test. Future research should look to compare post-test results of students with disabilities against students without disabilities.

Another study conducted by Hagaman, Casey, and Ried (2016) investigated the effects of the TRAP (Think before you read, Read a paragraph, Ask myself, “What was this paragraph mostly about” and Put it into my own words) paraphrasing strategy. The authors taught the strategy using the Self-Regulated Strategy Development model. The study sought to replicate previous studies conducted by Hagaman and Reid and to expand the literature on the RAP strategy by adding the “Think” component, by conducting the present study in a small group setting, and by measuring the effectiveness of the strategy when it was taught by preservice teachers. The study used a multiple baseline design across groups with multiple probes given during baseline. One out of the seven was identified as having specific learning disabilities and the remaining were in Tier II academic services indicating a concerning delay in reading development. The results of the study indicated that the TRAP paraphrasing strategy paired with strategy instruction using the SRSD model can improve reading comprehension. The researchers found the results using the small groups were similar to previous studies that used one-to-one designs.
Antoniou and Souvignier (2007) used a reading-strategy program to teach reading and self-regulation strategies to students with learning disabilities. The purpose of the study was to apply an instructional program that included explicit teaching of reading along with a self-regulation strategy to improve reading comprehension of students. The program included four concrete reading strategies: Thinking About the Headline, Clarification of Text Difficulties, Summarization-Narrative Texts, and Summarization-Expository Texts. There was also a self-regulation strategy presented as a reading plan along with a checklist. Reading comprehension results indicated a growth trend between pre- and post-test scores, \( t(71) = 1.72, p < .10 \). While it is not significant, it does confirm that the participants in the treatment group attained and maintained the content for reading comprehension strategies. The participants in the treatment group also showed a significant improvement in strategy knowledge, \( t(71) = 2.77, p = .007 \), and an effect size of .62, according to Cohen’s \( d \). There was no significant difference between the groups for reading self-efficacy. The results indicated that the students in the treatment group achieved significant long-term effects from the reading-strategy program.

Crabtree, Alber-Morgan, and Konrad (2010) conducted a study to extend the previous work of Taylor et al. in 2002. The study sought to examine the effects of self-monitoring and active responding on the reading comprehension of three participants with learning disabilities and significant attention problems. The self-monitoring intervention required the participants to read a story and stop reading at three pre-determined places in the text to monitor their story comprehension. As with Taylor et al. (2002), the study used a combination of explicit instruction of narrative story elements, a structured procedure for self-monitoring reading comprehension, and active student responding. A multiple baseline across participants design was used to examine the effects of structured self-monitoring on immediate recall and quiz accuracy. All
three participants were reported to have been diagnosed with learning disabilities and two of them were diagnosed as having ADHD. Results of the study demonstrated a functional relation between the structured self-monitoring intervention and increased reading comprehension for the participants. One limitation that was noted was that the passages that were chosen were narrative fiction stories, not expository texts. The researchers opined that future research should attempt to examine the extent to which the students can generalize self-monitoring to other kinds of reading assignments or settings, which is a deficit for many students with disabilities.

Berkeley et al. (2011) used a randomized experimental design to investigate the effectiveness of a self-questioning strategy using headings for improving student reading comprehension of social studies text. The researchers explicitly taught the participants how to use the headings and subheadings in adopted textbooks to create relevant comprehension questions and to answer them following each section. The headings and subheadings were used because they provided a more intensive support for students who have difficulty thinking of appropriate questions. In addition, each new heading provided a naturally occurring self-monitoring prompt for students to stop and answer their question for the previous section before moving on to subsequent sections. Among the 57 participants, 15.8% of the sample were identified for special education services for LD, other health impairment, hearing impairment, or 504 services. Results showed that students in the self-questioning group outperformed students in the typical practice condition for both measures of content knowledge with mean scores of 10.30 (SD = 3.54) versus 7.70 (SD = 2.11) on the multiple-choice test and 7.03 (SD = 3.16) versus 2.98 (SD = 1.87) on the open-ended items test. Results of the study lend support for explicit reading comprehension strategy instruction in general and replicate the findings of
previous researchers who have found positive effects for training students to use reading comprehension strategies.

Wood, Browder, and Flynn (2015) conducted a study where two classroom teachers taught three participants with moderate intellectual disabilities to generate questions about United States history. The purpose of the study was to examine the combined effects of a system of least prompts and a graphic organizer on the ability of the participants to generate and answer questions about the text. In addition, the study examined the generalization of these skills, taught initially in a special education classroom, to whole-group instruction in a fifth-grade classroom. A multiple-probe across participants single-case design was used. Once participants met the mastery criteria of 80% independent correct responses for 3 days, participants exited intervention and maintenance data were collected for: generating questions, identifying the location of the answer, and answering questions one time per week for the remainder of the intervention. Maintenance and generalization probes were taken after the comprehension instruction. The results of the study indicated a functional relation was established between the system of least prompts and graphic organizer intervention and the number of points earned for correctly generating and answering questions. The findings further supported the belief that students with disabilities can learn to generate and answer questions using systematic instruction.

Humphries and Ness (2015) utilized a case study design to explore the types of questions 4th and 5th grade students pose before, during, and after reading a narrative text. The purpose of the study was to see if the students were generating their own questions and what was the nature of said questions. The researchers focused on one research question: “What, if any, comprehension questions do 4th and 5th-grade students generate while independently reading narrative text?” The research study was framed around the metacognitive theory (Harris &
Hodges, 1995) and the think-aloud strategy as a verbal protocol analysis tool. Most students’ questions were classified as memory based (46%) and convergent thinking (45%) and only a total of 4 questions were evaluative thinking questions. It was also noted that most of the questions occurred during reading as opposed to before or after. While the data was promising that students can generate their own questions, it also supported previous research that those questions are merely surface level questions and are not meeting the CCSS. Further research needs to be committed to explicitly teaching higher-order question generation in order to equip students to meet the grade level demands of the CCSS.

Taylor, Alber, and Walker (2002) examined the comparative effects of story mapping and a modified self-questioning strategy on literal and inferential reading comprehension for students with disabilities. The authors discovered much research on story mapping and self-questioning but there were no studies that examined which strategy is more effective in increasing comprehension. The participants were five third through sixth grade students with learning disabilities (4 boys and 1 girl, ages 9-12). An alternating treatment design was used to compare the effects of three conditions on each student’s reading comprehension performance. Following the reading selections, the students either took the 10-question comprehension test, completed a story map then took the comprehension test, or orally answered 10 generic questions at three points during the intervention followed by the comprehension test. Students were assessed on the accuracy of the story maps and answers to the self-questioning prompts. Results showed there was no significant different between story mapping and self-questioning, meaning that neither one was more effective than the other. Future research implications the authors noted were that a study was needed to train students to generate their own questions instead of teacher-
created ones and also to conduct generalization and maintenance probes to determine if students continued to use the strategies across subjects and settings.

Teacher modeling and self-regulated use of any strategy is the core piece of effective instruction according to Pressley and Harris (1990). The research has indicated that students may ask questions if they are taught how. Self-instructional strategy development has been demonstrated to be effective in improving both academic performances and self-efficacy among many students with learning disabilities. Good cognitive strategy instruction encourages students to construct powerful cognitive strategies. The goal of productive instruction is to get the students to the point where they can demonstrate the skill or strategy in other settings independently. Ciardiello (1998) stressed that, “We need to train our students how to ask knowledge-seeking and hypothesis-generating questions. These types of questions have no standard responses and can be answered in many ways. They stimulate divergent thinking and encourage independent learning.” (Ciardiello, p. 212) There are several advantages to implementing cognitive strategy instruction such as the automatic use of the strategy should increase, with less effort required to activate and execute the procedure as it is practiced. Next, students should develop metacognitive knowledge about the strategy, such as an understanding of where and when to use it. The research also supports that teachers need to get away from modeling basic recall and story structure questions and focus on the analytic and evaluative questions in order to prepare students to meet the CCSS as well as succeed on statewide assessments.

**Systematic Prompt Fading.** Applied behavior analysis has substantially contributed to our understanding of how literacy skills are effectively taught to students in ways that other theoretical perspectives and approaches have not (Joseph, Alber-Morgan, & Neef, 2016). More
specifically, it has greatly contributed to the development of educational practices and technologies used in “defining literacy behaviors in observable and measurable terms, directly assessing literacy behaviors, directly observing the instructional environment, and implementing and evaluating evidence-based literacy instruction procedures (Dunlap, Kern, & Worcester, 2001). Modeling, prompting, and fading are conceptually systematic procedures for helping students acquire reading skills. Modeling involves overtly demonstrating how to perform a skill (e.g. listening passage preview when introduced to a new story). Prompting is providing a visual, auditory, or physical signal or cue for the student to perform the skill just acquired. When prompts are provided and systematically faded, students increase their momentum in remaining on task, even if they perceive the task to be challenging (Lutz, Guthrie, & Davis, 2006).

Students require direct strategy instruction in the form of modeling and procedural prompts in order to generate high-level questions (King, 1992).

Rouse, Alber-Morgan, Cullen, and Sawyer (2014) investigated the effects of a self-questioning package with systematic prompt fading on reading comprehension. There were two participants in the study (1 male, 1 female) that were in the fifth grade and both were considered to have learning disabilities. They were both receiving special education services. The participants in the study were given expository passages with an embedded question after each paragraph. As the participants demonstrated proficiency with answering the embedded questions during each intervention phase, the questions were systematically faded and replaced with a prompt for the participants to generate their own questions. The researchers’ goal was for the participants to be able to self-generate questions in order to increase their independence with content area text. There were seven phases: baseline, embedded questions training, embedded questions, self-questioning training, self-questioning, self-questioning fading, and
generalization/maintenance. During the embedded questions training phase, the researcher used modeling, guided practice, and immediate feedback to teach the participants how to answer the embedded questions. The participants were then expected to read the passages and answer the embedded questions independently in the embedded questions phase. Then the participants moved to the self-questioning training phase, where the embedded questions were systematically faded and replaced with a blank line to write an answer. The participants were trained to generate and answer questions using a “think-aloud” modeling process. During the self-questioning phase, the participants were given the passages with the four prompts to write a self-generated question and answer it. Results indicated that the female participant increased her number of comprehension questions completed correctly between baseline and generalization by 4.5 and the male participant increased by 3.3. The study did support that the prompt fading procedure was effective in helping the participants learn how to generate their own questions, which is what they need to be able to do especially when it comes to taking standardized assessments.

Peterson et al. (2008) utilized a similar approach to determine the effectiveness of using visual prompts with a model, lead, and test technique paired with a fading procedure. A secondary purpose of the study was to evaluate the use of the model, lead, and test from direct instruction procedures with a student with autism. The participant was introduced to two groups of places around the school campus over a period of three weeks. An event recording system was employed to record correct and errors. An ABCD single-subject-baseline design (Kazdin 1982) was used to evaluate the effects of using visual prompts and a fading procedure to learn “Where are you?” The five phases of this study were baseline, visual prompts paired with a model, lead test procedure, a fading procedure, and a no prompts phase. During the model, lead,
test procedure, the researcher took the student to each place and asked the question then showed a white board with the sentence prompt on it. During the fading procedure, the researcher would display the dry erase board with the answer on it but erase a word at each of the following trials, starting with the last word which was the location on campus. The final phase was the no prompt phase, and this served as the generalization probe across untrained settings phase. Data indicated improvements during the visual prompt phase and the fading prompt phase. The researchers reported that the procedure was not only successful in teaching the selected places employed in the study but appeared to generalize the concept of “where” to other places in the school.

Rivera, Koorland, and Fueyo (2002) taught a student to create his own picture prompts for basic sight word recognition and then used prompt fading procedures to provide near errorless sight word acquisition. The researchers used a repeated measures single-subject multiple probe design across behaviors. The participant wrote the words and drew picture prompts beginning with the first phase of treatment and by the third treatment phase only the word was written on the small index card. Following the final treatment phase, the student read the passage. The results indicated that the use of student-made pictures prompts helped the student internalize the words more effectively than just rote memorization.

Systematic prompt fading is grounded in applied behavior analysis for social behavior and has shown its value for academic behavior. This procedure has been demonstrated to be effective in teaching sight words to students with autism (Soluaga et al., 2008) as well as programming a self-questioning strategy to students with learning disabilities (Rouse et al., 2014). Fading prompts from teacher-initiated to student-initiated may lead to increased
generalization across skills and settings. Getting the students to perform a behavior both independently and strategically is the goal of any intervention.

**Summary**

In conclusion, for students with disabilities it is often a challenge for reading behaviors to come under stimulus control of new or novel materials. With the demands from CCSS and statewide assessment it is especially critical that conceptually systematic and conspicuous instructional methods be applied. These methods described by Carnine, Silbert, Kame’nui, and Tarver (2004), include targeting observable and measurable literacy behaviors, creating task analyses; modeling, prompting, and fading; providing frequent active response opportunities; giving performance feedback; using reinforcement contingencies; providing systematic review; and programming for generalization. Humphries and Ness (2015) stressed that the CCSS demand higher level questioning as early as the upper elementary grades. The 4th-grade standards require students “to generate questions with sophisticated cognitive operations, including predicting, hypothesizing, inferring, reconstructing, valuing, judging, defending, and justifying choices.” (Humphries & Ness, p. 559) The authors suggested to better prepare students for the demands of the CCSS and to encourage more metacognitive reading, teachers provide more explicit and direct instruction on how to ask higher-level questions.

The Instructional Hierarchy has been an invaluable tool for researchers and interventionists as a guide for implementing those applied behavioral principles that correspond to each stage of the learning hierarchy. Research has supported the use of explicit, systematic instruction at each stage to ensure proficiency. The value of explicit instruction is that it focuses on dividing learning tasks into small components. The effective teaching literature has investigated what effective teachers do and reported that the most competent teachers teach new
material in small steps, recognizing the limitations of working memory and time needs for processing new material (Rosenshine, 1995). In addition, the research also reports the importance of the development of well-connected networks of long-term memory depends on extensive, independent practice. One strategy that has been well documented as an effective strategy is the self-questioning strategy. Rosenshine, Meister, and Chapman (1996) reported that the instructional effects from student-generated questioning has been evident in their accuracy in answering test questions, better free recall of text, and identification of main ideas. Self-questioning is an effective cognitive strategy for interacting with the text and applying new knowledge. However, it is also a strategy that should be broken down into sequential steps with the addition of prompt fading. Combining systematic prompt fading into a self-questioning intervention package will provide the instruction and support students with disabilities need in order to internalize the strategy and take it with them once they leave special education.

**Rationale for Study**

The rationale for conducted the study was to the support and add to the literature about using systematic prompt fading to program a self-questioning strategy. The study was designed to be conceptual replication of the Rouse et al. (2014) study. There were several aspects of the present study that were different. The first two aspects that were different were the number of the participants and the screening process to find participants. In the original study there were only two participants. They were two, fifth grade students and they were chosen based on the special education teacher’s recommendation. In order to make the present study more powerful and to determine a functional relationship, three participants were used. They were screened using the *DIBELS Next* assessment in order to determine their levels of accuracy and comprehension. The participants had to be able to read accurately but be considered at risk for
comprehension. There was no systematic screening process used in the Rouse et al. (2014) study and since the purpose of the intervention was to increase reading comprehension, the current study wanted to make sure the participants demonstrated a deficit in reading comprehension in order to show a hypothesized increase by the conclusion of the study. Another facet that was different was the amount of questions used for the comprehension quizzes. The original study used only the 8 multiple-choice questions in order to provide an objective measure for reading comprehension. One of the suggestions for future research was to include questions that provided a more in-depth assessment of comprehension, such as open-ended questions. The present study included all 10 questions from the published comprehension quizzes. Each quiz had 2 to 3 open-ended questions that required an open-ended response. The present study wanted to utilize the open-ended questions to address the limitation cited by Rouse et al. (2014). Next, the Self-Questioning Training phase was designed to go through each ratio three times to ensure adequate guided practice time. Another way in which the present study was different was that it added a Self-Questioning Independent Practice phase where the participants had to ask/write the questions and then write the answers on the lines. The purpose of adding this phase was to ensure the participants could perform the strategy independently before moving on to fading the prompts. Finally, the prompts were systematically faded within the Self-Questioning Fading phase was different. Each ratio phase was implemented for three probes each again to ensure for adequate guided practice time. The present study also added a fourth fading phase of 0:4 to have the participants ask and answer the 4 questions independently. The purpose of extending the intervention phases was to make sure the participants had ample time to work through the Instructional Hierarchy stages in order to generalize and maintain the self-questioning strategy by the conclusion of the study.
CHAPTER 3
METHODS

The purpose of this chapter is to describe the methodological approach that was used in this research study. This study examined the achievement level of the participants on comprehension tests as they moved through the different intervention phases. This chapter will provide a detailed description of the research study’s participants and setting, the procedures for training of secondary data collectors, instrumentation, implementation of intervention phases, independent variable, dependent variable, research design, data analysis, and institutional review board approval.

Participants

Three students from a suburban elementary school in Southeast Louisiana served as participants. The participants were selected from a third and fourth-grade resource classroom as well as third and fourth grade regular education classrooms using purposeful sampling to determine which students exhibited measurable reading comprehension deficits. This is a change from Rouse et al.’s study because that study used two, fifth-grade students that were chosen based off the teacher’s recommendation. Prior to data collection, the researcher obtained parental permission by sending a consent form attached to a cover letter. (Appendix D) The screening process began once parental consent forms were returned. First, the researcher discussed with the special education teacher how many third and fourth grade students were on her caseload to determine the number of potential subjects. The initial number was 13 so the researcher expanded the search to third and fourth grade classrooms on the same campus. The researcher determined reading comprehension deficits from screening the students using reading comprehension CBM scores from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) Next assessment instruments (Good & Kaminski, 2002). The researcher also
conducted the *DIBELS Next* Oral Reading Fluency (ORF) probes to determine each student’s instructional reading level. The *DIBELS Next* assessment was chosen as the screening instrument because its purpose is to assess early literacy proficiency and identify at-risk students through brief, criterion-referenced measures. DIBELS and *DIBELS Next* assessments have a long research history to establish the reliability and validity of the instruments (Good, et al., 2004). Since we were particularly interested in assessment of oral reading fluency for the current study, the DORF (*DIBELS Oral Reading Fluency*) renamed the Test of Oral Reading Fluency (TORF) was utilized. The technical adequacy of the TORF has been examined in multiple studies since the 1980’s. Hosp, Hosp and Howell (2007) reported on a study by Tindal, Martson, & Deno (1983) to examine the test-retest reliabilities of elementary students and found the range of test-retest reliability from .92 to .97; alternate-form reliability of different reading passages drawn from the same level ranged from .89 to .94. Good et al., (2004) reposted the criterion-related validity was studied in eight separate studies in the 1980’s reported coefficients ranging from .52 to .91 (Good et al., 2004; Good & Jefferson, 1998). The selected measure represents a well-documented instrument for the purposes of the current study.

Once the initial screening data were collected, the researcher selected three students to make the final number of participants for the study that most closely align together according to CBM and oral reading fluency scores considered for below grade level. The final participants were a fourth grade male that has been identified as having a learning disability and receives reading and math instruction in the resource room, a fourth grade female that is receiving 504 services in the regular education setting, and a third grade female that has been identified as having a learning disability and receives reading and math instruction in the resource room.
Student 1 was a 10-year-old male currently enrolled in the fourth grade. He had been identified as having a specific learning disability due to his deficits in Oral Expression, Listening Comprehension, and Reading Fluency as defined by Louisiana (LA) Bulletin 1508. He had never been retained. He received special education instruction in the resource room for ELA and Math.

Student 2 was a 9-year-old female currently enrolled in the third grade. She had also been identified as having a specific learning disability due to her deficits in Math Problem Solving as defined by LA Bulletin 1508. She was retained in Kindergarten. She received special education instruction in the resource room for ELA and Math.

Student 3 was a 10-year-old female currently enrolled in the fourth grade. She had been identified as having Dyslexia and meets the criteria to receive 504 accommodations. She was retained in first grade. She received all instruction in the regular education classroom with the accommodations of small group testing and extended time.

Setting

Data were collected in an elementary special education resource room 4 to 5 days each week for two to three 30-minute sessions, which is an increase from 2 to 3 sessions that were employed in the original study of Rouse et al. (2014). The increase in data collection was due to the limited time constraints of the data collection time frame. The classroom was in the main school building. It was in the fourth-grade hallway situated in between two fourth grade regular education classes. The classroom was 24 square feet by 24 square feet. The door was located at the front of the classroom. The desks were arranged in three groups of 6 desks. There were two kidney-shaped tables with three chairs each that were used for small group instruction: one was for the teacher, located in the front of the classroom across from the door; and the second was in
the back corner of the classroom on the same wall as the door. The paraprofessional used that table. The teacher’s desk was in the back corner of the classroom by a set of windows across from the paraprofessionals table. Data collection was done at the paraprofessional’s table where the researcher faced the classroom and the subjects faced the wall. Sessions were conducted at the same time the special education was providing large group instruction to the other students.

**Researcher/Data Collectors**

The author of this study was the principal researcher and primary data collector, she will be referred to as the researcher throughout this document. The author was a doctoral student with 17 years of special education teaching experience. She implemented the trainings and experimental procedures in all conditions. There were two secondary data collectors to collect Interobserver Agreement (IOA) data, two special education teachers at the school. There were also two secondary collectors to record treatment integrity data, the special education teacher in the classroom and the paraprofessional in the classroom. The research procedures began once all consent forms were received from the school district, school administrator, and parents. (Appendices B, C, & D) This research project was proposed to the researcher’s Institutional Review Board after the researcher met with her graduate committee and received approval. (Appendix A)

**Training of Data Collectors.** Prior to beginning data collection, the researcher trained the data collectors on how to score the comprehension quizzes. The training was conducted individually in the teachers’ classrooms during their scheduled planning period. The first phase of the training was to model the data collection procedure for the teachers. The purpose of the study was explained to the data collectors and that the purpose of the training was to ensure that the teacher(s) were familiar with the contents of the testing instrument and the correct procedure
for scoring the comprehension quizzes. A copy of the reading passage was given to the teacher(s), so they could follow along as the researcher read. The researcher modeled for the teacher what the students will have to do to complete the comprehension quiz. Once the researcher had read the passage aloud, she gave the teacher(s) a copy of the comprehension quiz to follow along with. The researcher completed the comprehension quiz then showed the teacher the answer key that will be used to score the responses. Scoring the comprehension quiz using the answer key and how to record the final score on the paper, number correct over total number were modeled three times before moving to the guided practice phase.

The second phase of training consisted of guided practice where the researcher and teacher(s) scored the comprehension quiz concurrently. The researcher passed out the reading passages and took turns reading the passage with the teacher. Once complete, the teacher was given the comprehension quiz and completed the quiz with the researcher. A copy of the answer key was provided, and the quiz was scored together with the researcher. This phase continued until the researcher and the teacher achieved 90% or higher IOA on three consecutive sessions.

The third and final phase of the training was the independent phase. The researcher passed out the reading passage and the researcher and the teacher took turns reading the passage aloud. Next, the researcher passed out the comprehension quiz and the researcher and the teacher completed the quiz independently. Once the quiz had been completed, an answer key was provided, and the researcher and the teacher scored their quizzes independently. The teachers were considered trained when IOA had been demonstrated at 90% or higher on three consecutive sessions. Results of the training are in Table 1 in Chapter 4.
Interobserver Agreement

Interobserver agreement (IOA) was assessed during all phases of the research study. According to Cooper, Heron, and Heward (2007), IOA refers to “the degree to which two or more independent observers report the same observed values after measuring the same events” (p. 113). Two special education teachers at the school site served as the secondary data collectors and they independently scored at least 88% percent of the comprehension quizzes to determine IOA. Agreements and disagreements were examined on an individual basis and were discussed between the researcher and the observers. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements, then multiplying by 100. In order to obtain valid interobserver agreement results there must have been 25% IOA at 85% or higher scoring accuracy on the comprehension quizzes (Cooper et al., 2007). If the scoring accuracy fell below 85% then the researcher would have to retrain and reestablish agreement until it reaches 85%.

Treatment Integrity

According to Peterson et al. (1982), treatment integrity refers to the degree to which treatments are implemented as planned, designed, or intended. It is also concerned with the accuracy and consistency with which interventions are implemented. Treatment integrity data were collected through all phases of this study. The special education teacher and the paraprofessional in the classroom were the secondary observers and were trained prior to data collection. Prior to the data collection sessions, they were trained on how to use the checklists by observing the researcher. Each data collector was given the integrity checklists and recorded whether the researcher implemented each step correctly. The integrity checklists varied depending on the intervention phase and consisted of 7 to 10 sequential intervention steps.
Treatment integrity was calculated by adding the number of steps the researcher completed correctly, then dividing by the total number of steps, and finally multiplying by 100.

**Social Validity**

A social validity survey was administered to the subjects after the maintenance probe 1 week after the initial data collection phases. According to Alberto and Troutman (2006), social validity relates to the participants’ satisfaction or acceptability of the program or procedure they participated in. The researcher assessed social validity by developing a brief interview that asked the participants what they liked or disliked, and what they learned during the intervention phases. Next, the researcher administered a short survey to the special education and regular education teachers to determine if they noticed a change in student performance in their classroom. The teachers rated their observations of the students’ performance on activities that involved reading comprehension from 1 (no change noticed) to 5 (a significant change) for 5 items. For item 6, the teachers were provided space to write comments and specific changes in the students’ performance.

**Instrumentation**

**Screening.** The subjects were screened using two instruments. The *Dynamic Indicators of Basic Early Literacy Skills Next* (DIBELS; Good & Kaminski, 1996, 2002a; Kaminski & Good, 1996) Oral Reading Fluency (ORF) and Maze CBM measures were administered by the researcher. The ORF measure was used to determine each student’s instructional reading level which was needed to select the correct reading passages that were used throughout the different phases of the intervention package. The Maze CBM was used to determine the reading comprehension level each student is functioning on.
DIBELS Next Oral Reading Fluency, 6th ed. (Good, Gruba, & Kaminski, 2002; Good, Kaminski, & Smith, 2002; Kaminski & Good, 1998). The ORF is a standardized, individually administered test of accuracy and fluency with connected text. The purpose is to measure a student’s ability to effortlessly translate letters to sounds and then sounds to words. According to DIBELS Next, the fluent reader is one where the decoding processes are automatic and requires no conscious attention. When a student has this then they are able to focus their attention on the comprehension and meaning of the text. It is administered in grades first through sixth. It is designed to (a) identify students who may need additional instructional support, and (b) monitor progress toward instructional goals. The passages are calibrated for each grade level. Students have one minute to read each passage. The following are considered errors while reading: words omitted, substitutions, and hesitations of more than three seconds. ORF is scored by the number of correct words per minute. Students were considered for inclusion in the study if they were able to read with greater than 92% accuracy with less than 68 words correct per minute on a third-grade level and with greater than 93% accuracy with less than 72 words correct per minute on a fourth-grade level. These were the scores that were noted to be at-risk on the winter probe. According to DIBELS Next, these criteria place the student in the at-risk range for most likely will need intensive academic support.

DIBELS Next Maze, 6th ed. (Good, Gruba, & Kaminski, 2002; Good, Kaminski, & Smith, 2002; Kaminski & Good, 1998). The Maze is a measure of reading fluency and reading comprehension. It is a reading fluency task in that the responses are timed for three minutes, and the stronger the reader, the more maze items they will read. It is also an indicator of reading comprehension in that the students must be able to understand what they are reading in order to correctly complete the sentences. The Maze instrument is administered to grades 2 through 8.
The students are asked to read a passage silently for three minutes. The passage is structured so that approximately every seventh word is blank, with a maze of options (i.e., three possible word choices for the blank). The maze requires the students to choose the correct word as they read the passage. The score is the number of correct words circled over the total number of circled words. Students were considered for inclusion in the study with a score of less than 7 words correct on a third-grade probe and less than 12 words correct on a fourth-grade probe. According to DIBELS Next, a score of less than a 7 or 12 on a winter probe puts the student at risk for needing intensive support.

**Baseline, Generalization, Maintenance, and Intervention Phases.** The Readworks website was where the reading passages and comprehension quizzes came from (https://www.readworks.org/). The reading passages were adapted from the website to eliminate illustrations, format the passage in paragraph form etc. Expository texts that focused on non-fiction, Social Studies concepts were chosen because the story content is similar to what the participants are expected to read during reading instruction and on the statewide assessment. Expository text is nonfiction that is meant to inform, analyze, explain, or give additional detail about a topic. This type of text is typically what students read then write a research analysis composition on. The reading level of the passages was selected based off the initial ORF screening probes. Scores can be found Chapter 4 under Initial Screening Data.

The number of words in each passage ranged from 200 to 500. None of these passages were timed so the participants were able to read them with minimal assistance for decoding. The primary researcher was present to provide support for error correction when the students read the passages aloud. The passages were determined to be on a beginning third grade to beginning fourth-grade level according to the Flesch Kinkaid reading levels. This was also different from
the Rouse et al. (2014) study because the reading levels of the passages were on a second-grade level. That was the determined independent reading levels of the two participants.

There were 59 passages selected for the study. Once the reading passages were selected, they were assigned to each intervention phase. For each condition, the primary researcher retyped the passages so that each was divided into four sections to allow room for the prompts. For the embedded training and independent practice conditions, the embedded questions were inserted after each section followed by “Answer: __.” During the self-questioning training phase, the embedded questions were systematically taken away and replaced with prompts to write a question and answer, (i.e. “Question:” followed by a blank line, “Answer:” followed by a blank line), and a red circle to serve as a visual prompt. For the self-questioning independent practice phase, the prompts to write the question and answer were inserted after each section. For the baseline and maintenance conditions, no prompts were added after each section. Finally, during the self-questioning fading phase, the prompts to write a question and answer were systematically faded until the red circle was the only prompt left.¹

**Comprehension Quizzes.** Each reading passage was followed by a 10-question comprehension quiz. At the end of each intervention session the researcher presented the comprehension quiz and the participants completed this independently. The participants read the test aloud and the researcher provided error correction on missed words if needed. There was no time limit for the participants. The questions for each quiz followed a similar pattern. Seven to eight out of the ten were multiple-choice and the other two to three were open-ended requiring short answers. Rouse et al. (2014) stated one of the limitations of their study was the way reading comprehension was assessed using only multiple-choice questions. The researchers

¹ Examples of reading passages are available upon request from the author
suggested for future research that more open-ended questions be used to provide more in-depth answers. Such questions mirror what is expected of the participants for grade level writing tasks and statewide assessment. Examples of the questions are as follows:

<table>
<thead>
<tr>
<th>Example of Comprehension Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Idea Questions</strong>&lt;br&gt;<em>(MC)</em></td>
</tr>
<tr>
<td><strong>Vocabulary Question</strong>&lt;br&gt;<em>(MC or OE)</em></td>
</tr>
<tr>
<td><strong>Detail Question</strong>&lt;br&gt;<em>(MC)</em></td>
</tr>
<tr>
<td><strong>Overall Concept Question</strong>&lt;br&gt;<em>(OE)</em></td>
</tr>
<tr>
<td><strong>Author’s Purpose Question</strong>&lt;br&gt;<em>(MC)</em></td>
</tr>
<tr>
<td><strong>Word Usage Question</strong>&lt;br&gt;<em>(MC)</em></td>
</tr>
<tr>
<td><strong>Point of View Question</strong>&lt;br&gt;<em>(OE)</em></td>
</tr>
</tbody>
</table>

*MC=Multiple-choice question; OE=Open-ended question*

The questions were published along with the reading passage and are formatted in a similar manner as questions on statewide assessments. Responses were counted correct if the written response matched the corresponding answers on the answer key. An example of a comprehension quiz is in Appendix F. The quiz designs varied slightly depending on the structure of the reading passages.

**Experimental Design**

A multiple baseline across participants design was used in the study. According to Cooper, Heron, and Heward (2007), a multiple baseline across participants design is appropriate when the researcher is investigating a target behavior for two or more participants in either the same or multiple settings. During a multiple baseline across subjects’ design, one target behavior is chosen for two or more subjects in the same setting. The subjects begin the baseline phase at
the same time and continue until a steady rate of responding has been achieved. Once that has
curred, the independent variable is applied to one of the subjects while the other subjects
remained in baseline. When the subject had reached either criterion-level or a steady rate of
responding is achieved, then the independent variable was applied to the next subject. Multiple
baseline designs are used as an alternative to reversal designs when (a) the target behavior is
likely to be irreversible and (b) when it is undesirable, impractical, or unethical to reverse the
design conditions.

This experimental design is the most widely used of the three forms of multiple baseline
designs due in part because teachers and other interventionists usually work with multiple
children at one time who need to learn the same skill (Cooper, Heron, & Heward, 2007). It is an
appropriate research design for students in a school setting because the staggered baseline allows
the researcher to determine if there is a functional relationship between the independent variable
and the dependent variable. A functional relationship is demonstrated when the dependent
variable varies only the presence/introduction of the independent variable demonstrating the
experimental control of the dependent variable. Experimental designs often rely on the
withdrawal of the independent variable and intra-subject replication of effect to demonstrate
experimental control. The multiple baseline design addresses this by staggering the introduction
of interventions across conditions (e.g. subjects, settings, or target behaviors). Due to the
staggered baselines, the researcher can conclude that the changes in behavior are a result of the
introduction of the independent variable and that each baseline and intervention phase is
independent. Replications occur across the individual subjects, settings, and/or behaviors
providing an option to the removal of the independent variable to demonstrate experimental
Experimental control is demonstrated if each behavior shows similar changes only when the treatment variable is introduced across subjects, settings, or behaviors.

There were seven phases in this study: baseline, embedded question training, embedded questions independent practice, self-questioning training, self-questioning independent practice, self-questioning fading, and maintenance. All the phases except for baseline had at least five data points per phase. According to Kratochwill et al. (2013), for a quantitative, single-case research design to be considered as Meeting Standards, there must be a minimum of six phases with at least five data points per phase. Generalization probes were administered at the end of each phase of the intervention, as opposed to Rouse et al.’s one-time probe at the end of the study. The intervention phases were staggered across the three subjects to control for threats to internal validity (e.g. maturation, testing, etc.) by demonstrating the independence of the baselines.

**Dependent Variable**

The dependent variable for this study was the total number of questions answered correctly on the comprehension quizzes within the reading passages which, is a total of 10 questions. The comprehension questions consisted of 7 to 8 multiple-choice and 2 to 3 open-ended questions.

**Independent Variable**

The independent variables for this study are- embedded questions training, self-questioning training, repeated practice and fading of self-questioning. The phases of the intervention included embedded questions training, embedded questions independent practice, self-questioning training, self-questioning independent practice, and self-questioning fading.
Procedures

Screening Phase. Parent consent letters were sent to the initial 13 students and consent was secured prior to initiating the screening procedures. Each of the students were also asked to assent to participate through a discussion with the researcher. The screening procedures were administered individually. The Maze CBM’s and ORF probes were administered in the same session. For the ORF probe, the researcher began by explaining to the students that she was going to give them a passage to read. The passage was the ORF probe to get a baseline of the student’s instructional reading level. The researcher gave a copy of the passage to the student and explained that they had one minute to read the passage to the best of his or her ability. The researcher started the timer and told the student when to start reading. The student started reading and continued until the researcher called time after 60 seconds and took the passage back. The researcher continued to administer the ORF probes to the students until they were unable to read with 92% or higher accuracy for third grade or 93% or higher accuracy for fourth grade. Fluency was determined by number of words read correctly over total number of words read. This was an important screening criterion because the participants needed to be able to read the passages independently.

The second probe that was administered was the Maze CBM probe. A copy of the passage was presented to the students and directions were given that the students would read the passage and stop at the parenthesis where they will choose a word to correctly complete the sentence. The student completed the example sentence from the DIBELS instructions. It was explained that the students will work for 3 minutes and that it was okay if the story was not completed. The researcher started the timer and the student worked until the researcher called time after 3 minutes, collected the passage, and scored it. The student completed the MAZE
until they were unable to correctly complete 7 or greater sentences for third grade or 12 or
greater sentences for fourth grade. Based on the initial screening results from the 13 students
there were not enough participants that met the criteria, so the researcher extended the screening
to other third and fourth grade classrooms. Once all initial screening data were collected and
compared to the inclusion criteria, the researcher found 5 students that met the criteria for the
study. Their results were compared and the 3 participants that had the lowest scores were chosen
to be the final participants in the study.

**Intervention Phases**

**Baseline Phase.** At the beginning of each baseline session, the researcher passed out a
reading passage to the participants. Instructional reading levels were obtained for each student
during the initial screening phase of the study using the DIBELS Oral Reading Fluency probe.
Those results are found in Chapter 4 under each student’s description. The researcher explained
to the participants that they would be reading the passage aloud then answering questions about
what they read. The researcher was available to read an unknown word from the passage if
asked. After the participants read the passage, the researcher passed out the 10-item
comprehension quiz. The participants were instructed to read the questions and answer choices
aloud and answer the questions as best they could. The researcher aided with decoding by
assisting with sounding out the words when needed but did not aid with question clarification.
Once the participants completed the quiz, the quiz was collected. No feedback on quiz accuracy
was provided during the baseline phase. The first participant to show stability of baseline by
achieving at least 4 out of 10 on the comprehension quiz for 3 consecutive sessions transitioned
to the embedded questions training phase.
The researcher discussed with the participants what reward system they would like to use as an incentive for participating in the research project. Student 1 chose a small edible treat for during and after each intervention session as an immediate reinforcer for completing the session. He also chose to have computer time as a reinforcer between sessions. Student 2 chose a small edible treat to have during the session and time spent with the researcher after the sessions were over. Student 3 chose a small edible treat but did not want anything else as an extended reinforcer. The researcher also presented a CBM graph that goes from 0 to 10 that the participants will graph at the end of each session. It was explained that when the participant showed a consistent criterion score across 3 consecutive sessions, they would get to move to the next intervention phase.

**Embedded Questions Training.** The participants were in the embedded questions training phase individually to keep the baselines staggered. The researcher used modeling, guided practice, and immediate feedback during each session. First, the researcher presented the participants with a reading passage and had them read the passage. This ensured that the participants had some exposure to the passage prior to reading again to answer the embedded questions and comprehension quiz questions. The teacher provided verbal feedback while the participants read. Verbal feedback was provided in the form of praise and error correction. The special education teacher stated that Student 1 and Student 2 have low self-confidence when reading aloud and verbal praise helps to encourage them to try even when the passage is difficult. Error correction was also used if the error the student made affected the sentence content. Next, the researcher started at the beginning of the passage and first modeled for the participants how to stop at each of the four embedded questions using a “think-aloud” modeling format. The steps were: (1) model how to stop at each question and read it aloud, (2) model how to refer to the
paragraph and underline/highlight the answer, (3) model how to reread the question and state the answer to ensure continuity, and (4) model how to write the answer in a complete sentence. The embedded questions were prefaced with the word, “Question:” and a red circle to indicate to the participants this was a stopping point in the passage. For the first attempt the researcher modeled the process for the first two questions. The researcher verbally walked through the think aloud process with the participants. The participants followed along to read each question, underlined the answer in the preceding paragraph, and then wrote the answer to the question on the line below the question labeled, “Answer:”. All the embedded questions were text explicit, which means the participants were able to find the answer in the text. The second step in the intervention was guided practice for the participants. The researcher answered the first two questions and the participants answered the remaining two to complete the passage. After the participants answered the embedded questions, the teacher passed out the comprehension quiz. The participants completed the quiz independently. Once the participants were done the researcher passed out a highlighter and provided immediate feedback for the answers. The participants marked their quizzes, accordingly, graphed their score on their chart, and then the researcher collected them at the end of each session. The participants transitioned to the next phase when they were able to score at least 5 out of 10 on the comprehension quiz questions for three consecutive trials.

At the end of each participant’s time in the phase, the researcher administered the generalization probe. These were administered individually, and the researcher presented a reading passage on the participant’s instructional reading level with the embedded questions included. The participants read the passage in its entirety allowing for error correction if needed then started over and answered the questions. No immediate feedback was given for accuracy.
**Embedded Questions Independent Practice.** Each session was begun by passing out the reading passage and having the participants read it aloud. The researcher aided in decoding when needed. Once the participant read the passage all the way through, they started over to begin answering the questions. The participants were expected to stop at each embedded question, read the question, underline/highlight the answer in the above paragraph, and then write the answer on the line following the question. If the participant incorrectly answered a question, they were instructed to reread the paragraph and try again twice more. If the participant was unable to answer the question correctly after three attempts, the researcher reviewed the think aloud steps with the question and answer then the participant continued with the next question. After this was completed, the researcher passed out the comprehension quiz and the participants completed it. Immediate feedback to the participants by checking it with them and discussing any errors. The participants received their immediate reinforcer and then graphed their progress. The participants progressed to the next phase when they were able to score at least 6 out of 10 on the comprehension quiz on 3 consecutive sessions.

Just like the embedded questions training phase, the researcher presented a generalization probe for the participant to complete before moving on to the next phase. The procedure for administering the generalization probe was the same throughout the data collection process.

**Self-Questioning Training.** In this phase the embedded questions were systematically faded. The questions were faded one at a time and were replaced with the red circle followed by the word “Question:” followed by a blank line to write the question as well as the blank line to write the answer. The questions were systematically faded using a combination of embedded questions and prompts (i.e. “Question:”) to self-questions in the following ratios: 3:1, 2:2, and 1:3, so by the end of the training phase the participants were responding only to the self-
questioning prompts. The researcher began the phase the same as the embedded questions training phase. She passed out the reading passage and had the participants read the passage aloud to ensure correct word decoding. Next, the researcher taught the self-questioning strategy using a “think aloud” modeling process on white chart paper. The proposed training steps were as follows: (1) model how to underline an important or interesting fact in the paragraph above the self-question, (2) model how to generate a question about the fact using a question word (i.e. who, what, when, where, how, why), (3) model how to write the question on the line labeled, “Question:”, and finally (4) model how to write the answer to the question on the line labeled, “Answer”. The researcher modeled how to form the answer as a complete sentence as that is a grade-level expectation. The participants were assured that no penalties would be taken for spelling errors. Initially, the researcher modeled the three questions and the participant completed the last question and answer. Next, she transitioned to guided practice where she completed the first two questions and the participant took a turn with the last two questions in the passage. The final step in the training phase was for the participants to independently practice completing three questions and the researcher completed one. The researcher provided corrective feedback and discussed with the students their strengths and areas of improvement. At the end of each session, the researcher administered the comprehension quiz and monitored as the participant completed it. Following completion, the researcher called out the answers and the participants checked their answers. The participants received their immediate reinforcer for participating and graphed their progress in the session. The participant transitioned to the self-questioning independent practice phase when they were able to correctly answer at least 7 out of 10 questions on the comprehension quiz for 3 consecutive sessions per ratio phase.
Prior to moving on the next phase, the researcher administered a generalization probe individually using the same format as the previous phases.

**Self-Questioning Independent Practice.** The researcher presented the passages divided into the four sections. The embedded questions were replaced with the prompt, “Question:” and a red circle. The participants were expected to generate their own questions and answers. The participants began each session by reading the passage aloud all the way through. The teacher aided with decoding as needed. The participants started at the beginning of the passage and read until they reached a prompt. They were expected to stop at the prompt, underline an interesting fact, generate a question, write the question, and then write the answer. The participants were told spelling would not be assessed. The researcher monitored the participants as they worked and if they made an error during question generation, the researcher prompted them to try again. The participants had two attempts before the researcher intervened and re-visited the self-questioning training phase. Following the independent practice, the researcher administered the comprehension quiz and monitored the participants. The participants received immediate feedback about their responses by the researcher explaining the answers. The participants received their immediate reinforcer then graphed their progress. The participants had to maintain a score of at least 8 out of 10 on 3 consecutive sessions before transitioning to the next phase.

Generalization probes were administered by providing the participants with an instructional level reading passage and prompts. The participants completed the self-question generation and answer section then took the comprehension quiz. No immediate feedback was given.
Self-Questioning Fading Phase. In this phase, the four self-questioning prompts “Question:” were gradually faded and in place only the red circle. The following ratios were used to fade the prompts: 3:1, 2:2, 1:3, and 0:4. The 0:4 ratio was added for this study; it was not part of Rouse’s et al. 2014 study. The purpose of adding the 0:4 ratio was to determine if the participants were able to be independently self-question for the whole reading passage as will be expected in the classroom. Red circles were used because they are easier to draw than stop signs and the participants were expected to draw their own prompts in the final generalization/maintenance phase. The red circles took the place of the lines to write the questions and the answers. The participants said the questions and answers at this point at the red circles instead of writing them down. The researcher presented the reading passage and the participants read it aloud all the way through. Next, the participants started reading again and worked through the prompts. The participants were provided with a highlighter to underline the interesting fact to aide with question generation and providing the answer. Participants can highlight reading passages on standardized tests, so this is a strategy they need to cultivate as much as possible. The researcher monitored the participants and recorded their questions and answers on her copy of the reading passage. The researcher provided corrective if needed using her copy of the passage. The participants were allowed two attempts if something was incorrect. Once, this was done the researcher administered the comprehension quiz and provided immediate feedback by checking the quiz with the student and having them graph their progress. The subjects remained in this phase until they were able to score at least 9 out of 10 correct on the comprehension quiz for 3 consecutive sessions.

A generalization probe was administered at the completion of this phase. The researcher provided the participant with a reading passage on their instructional grade level. The
participants completed the generalization probe individually and no immediate feedback was
given.

**Maintenance**

The maintenance probes were administered to the participants approximately 1 week
after each one completed the self-questioning fading phase. The researcher kept the format the
same as the baseline probes, (i.e., no prompts to self-question). The researcher passed out the
passage and the participants read through it completely. The participants started again and were
instructed to stop at the end of each section and draw a red circle to serve as a visual reminder to
self-question. The participants stated their question and answered aloud, highlighting in the
passage if needed. The researcher recorded the questions and answers on her copy of the
passage. Finally, the participants were given the comprehension quiz to complete. The
researcher provided feedback once they were done by sharing which answers were correct and
which ones were incorrect and explained why they were incorrect. The criteria for maintaining
the intervention will be to have scored at least 8 out of 10 on the comprehension quiz.

**Data Analysis**

The data for each participant were analyzed separately. A visual representation of the
data is represented in Chapter 4, Figure 2. Since the study utilized a multiple-baseline across
subjects’ design, the visual representation is a multiple-baseline graph that demonstrates the
staggered baseline and intervention phases for each participant. According to Maggin, Cook, and
Cook (2018), single-case research designs, such as multiple-baseline studies, primarily rely on
visual analysis of graphed data to determine whether the data that were collected demonstrates a
functional relation between the independent and dependent variables and also to determine the
strength and magnitude of the functional relation (Kratochwill et al, 2013). Visual analysis was
used to examine within-phase data patterns, compare data patterns between adjacent phases, and will consider the number of replications of the intervention effect (Maggin, Cook, & Cook, 2018).

Kratochwill et al. (2013) described the six outcome-measure features that are used to examine within- and between-phase data patterns through visual analysis: (a) level, (b) trend, (c) variability, (d) immediacy of the effect, (e) overlap, and (f) consistency of data patterns across similar phases. The current study will analyze the data by examining level or mean, trend when compared to the trend line for each phase of the study, percentage of non-overlapping data (PND) and range. The outcome measures will be described in greater detail in Chapter 4 of this study. These features will be assessed individually and collectively to determine whether the study results demonstrate a functional relation between the variables. A visual analysis of the mean and percentage of non-overlapping data for each participant will be represented in Chapter 4. These tables will be used to compare the mean scores and PND between each phase of the study for each participant and also for a within-phase analysis.

Institutional Review Board Approval

Permission for this study was requested from the Institutional Review Board (IRB) at Louisiana State University. Approval for the study from Louisiana State University is in Appendix A. School district consent was required to grant the researcher permission to conduct the study in a district school and is in Appendix B. School administrator consent was required for permission to screen the students and to administer the intervention phases and the comprehension quizzes in the school setting and located in Appendix C. Parent consent was required to allow the researcher to administer the intervention phases and the comprehension
quizzes to their child and is in Appendix D. Child Assent was needed to make sure the participant understood they had the right to not participate in the study and is in Appendix E.
CHAPTER 4
RESULTS

The purpose of this research study was to determine if using systematic prompt fading to program a self-questioning strategy will improve reading comprehension for students with disabilities. This chapter will detail the results of the study. The data will be presented in both narrative form and visual analysis form through a multiple-baseline graph and a table representing mean scores and PND. Range and trend scores will also be presented.

Initial Screening Data

Student 1 met the criteria for this study due to his score of 50 words correct on the ORF probe with an accuracy percentage of 93%. The student scored a 9 out of 15 on the MAZE probe which means he is able to comprehend text at a mid-third grade level according to the *DIBELS Next* manual.

Student 2 met the criteria for this study due to her score of 53 words correct on the ORF probe with an accuracy percentage of 93%. She scored a 7 out of 8 on the MAZE probe, which indicates she is able to comprehend text at a mid-third grade level according to the *DIBELS Next* manual.

Student 3 met the criteria for this study due to her score of 61 words correct on the ORF probe with an accuracy percentage of 94%. She scored a 9 out of 13 on the MAZE probe, which indicates she is able to comprehend text at a mid-third grade level according to the *DIBELS Next* manual.
Training of Data Collectors

Table 4.1.
Results of Data Collectors

<table>
<thead>
<tr>
<th>Data Collector</th>
<th>Guided Practice Phase</th>
<th>Independent Practice Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher #1</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td>Teacher #2</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Interobserver Agreement and Treatment Integrity

IOA was assessed through all phases of the study. There were three IOA raters: the researcher, the special education teacher in the classroom, and a second special education teacher on campus. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements, then multiplying by 100. In order to obtain valid interobserver agreement results there must have been 25% IOA at 85% or higher scoring accuracy on the comprehension quizzes (Cooper et al., 2007). If the scoring accuracy fell below 85% then the researcher would have to retrain and reestablish agreement until it reaches 85%. IOA for Student 1 was collected for 88% of the trials and was found to be at 94% scoring accuracy. IOA for Student 2 was collected for 91% of the trials and was found to be at 94% scoring accuracy. IOA for Student 3 was collected for 92% of the trials and was found to be at 97% scoring accuracy. No additional training was deemed necessary.

Treatment integrity data were collected during all phases of the study. The special education teacher and the paraprofessional in the classroom were the secondary observers. Treatment integrity was calculated by adding the number of steps the researcher completed correctly, then dividing by the total number of steps, and finally multiplying by 100. Treatment integrity for Student 1 was collected for 88% of his total trials and was found to be at 97%.
Treatment integrity for Student 2 was collected for 89% of her total trials and was found to be at 97%. Treatment integrity for Student 3 was collected for 90% of her total trials and was found to be at 97%.

**Descriptive Analysis of the Data**

**Participant Data**

The outcome measures that will be reported for the data are mean, trend, range, and percentage of nonoverlapping data (PND). Mean is defined as the average of a data set. The mean of each phase of the study will be reported under each participant’s graph and then the mean scores for all three participants’ baseline, practice phases, and fading phase will be calculated in one table to compare the scores within the phases. Trend is defined as the direction and magnitude of change in outcome data within each phase. The trend will be reported within the descriptive analysis for each participant. Range is defined as the difference between the smallest and largest values. The range will be reported within the descriptive analysis of each participant.

Scruggs et al. (1987) developed the first nonoverlap method to calculate effect sizes for data. PND is conceptualized as the percentage of intervention phase data points that exceed the highest datum point in the baseline phase. PND is calculated by counting the number of data points that do not overlap then dividing those data points by all the data points. Next, multiply that number by 100 in order to convert it to the percentage form. According to Scruggs, a PND score of 90% or higher indicates a very effective intervention; scores between 50% and 70% indicate interventions with questionable effects; and a score of 50% or lower indicates an ineffective intervention. Multiple-baseline studies such as this one usually calculates the PND for each baseline-intervention contrast and then each of those PND scores are averaged together.
for to determine the effect size for the full design. The PND scores for each participant will be reported in the table under each participants’ graph. The PND score for the full design will be reported with the overall mean scores of the participants.

**Student 1.** Figure 1 shows the number of reading comprehension questions answered correctly (out of 10) for each session across all phases of the study and Table 3 shows the mean comprehension quiz scores in each phase and the PND for each phase. During baseline, the number of comprehension questions answered correctly ranged between 1 and 7 with a mean of 4.5 correct responses. His generalization score was a 7. For the Embedded Questions Training phase, the number of comprehension questions answered correctly ranged between 5 and 7 with a mean of 5.8 correct responses. His generalization score was a 6. Next, during the Embedded Questions Independent Practice phase the number of comprehension questions answered correctly ranged between 5 and 9, which demonstrates an upward trend. He had a mean score of 7.2 with a generalization score of 3. During the Self-Questioning Training phase, the number of comprehension questions answered correctly ranged between 6 and 10 with a mean score of 7.8 and a generalization score of 9. There was a slight upward trend in the middle of the training phase when the prompts became 2:2. In the Self-Questioning Training Independent Practice phase, the number of comprehension questions answered correctly ranged from 7 to 8 with a mean score of 7.8. His generalization score was an 8. Finally, during the Self-Questioning Fading phase the number of comprehension questions answered correctly ranged from 8 to 10 with a mean score of 9.2 and a generalization score of 9. A maintenance probe was administered one week after the final intervention phase was concluded and the score was a 9. PND was calculated for each phase and is reported in Table 3; the PND between baseline and all the intervention phases were calculated and was found to be 59 percent.
Figure 1. Number of questions answered correctly by Student 1 on each comprehension quiz

Table 4.2. Student 1 MS and PND Scores on Comprehension Quizzes in Each Phase

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>EQT</th>
<th>EQIP</th>
<th>SQT</th>
<th>SQIP</th>
<th>SQF</th>
<th>Main.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.5</td>
<td>5.8</td>
<td>7.2</td>
<td>7.8</td>
<td>7.8</td>
<td>9.2</td>
<td>9</td>
</tr>
<tr>
<td>PND</td>
<td>0%</td>
<td>5.4%</td>
<td>13.5%</td>
<td>8.1%</td>
<td>32.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Student 2. Figure 2 shows the number of reading comprehension questions answered correctly (out of 10) for each session across all phases of the study and Table 4 shows the mean comprehension quiz scores in each phase and the PND for each phase. During baseline, the number of comprehension questions answered correctly ranged between 3 and 8 with a mean of 4.9 correct responses. Her generalization score was a 6. For the Embedded Questions Training phase, the number of comprehension questions answered correctly ranged between 4 and 9 with a mean of 7.0 correct responses. Her generalization score was a 7. Next, during the Embedded Questions Independent Practice phase the number of comprehension questions answered correctly ranged between 6 and 8. She had a mean score of 6.4 with a generalization score of 6. During the Self-Questioning Training phase, the number of comprehension questions answered correctly ranged between 6 and 10 with a mean score of 7.9 and a generalization score of 8. In the Self-Questioning Training Independent Practice phase, the number of comprehension
questions answered correctly ranged from 8 to 9 with a mean score of 8.2. Her generalization score was an 8. Finally, during the Self-Questioning Fading phase the number of comprehension questions answered correctly ranged from 8 to 10 with a mean score of 8.8 and a generalization score of 9. A maintenance probe was administered one week after the final intervention phase was concluded and the score was an 8. PND was calculated for each phase and is reported in Table 4; the PND between baseline and all the intervention phases were calculated and was found to be 33 percent.

Figure 2. Number of questions answered correctly by Student 2 on each comprehension quiz

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>EQ</th>
<th>EQIP</th>
<th>SQ</th>
<th>SQIP</th>
<th>SQF</th>
<th>Main.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.9</td>
<td>7.0</td>
<td>6.4</td>
<td>7.9</td>
<td>8.2</td>
<td>8.8</td>
<td>8</td>
</tr>
<tr>
<td>PND</td>
<td>2.5%</td>
<td>0%</td>
<td>7.5%</td>
<td>2.5%</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4.3.** Student 2 MS and PND Scores on Comprehension Quizzes in Each Phase

**Student 3.** Figure 3 shows the number of reading comprehension questions answered correctly (out of 10) for each session across all phases of the study and Table 5 shows the mean comprehension quiz scores in each phase and the PND for each phase. During baseline, the number of comprehension questions answered correctly ranged between 5 and 8 with a mean of
6.5 correct responses. Her generalization score was a 7. For the Embedded Questions Training phase, the number of comprehension questions answered correctly ranged between 5 and 8 with a mean of 6.0 correct responses. Her generalization score was an 8. Next, during the Embedded Questions Independent Practice phase the number of comprehension questions answered correctly ranged between 6 and 10. She demonstrated a downward trend from her highest score to the lowest during this phase. She had a mean score of 8.0 with a generalization score of 6. During the Self-Questioning Training phase, the number of comprehension questions answered correctly ranged between 7 and 9 with a mean score of 7.6 and a generalization score of 7. In the Self-Questioning Training Independent Practice phase, the number of comprehension questions answered correctly ranged from 7 to 10 with a mean score of 8.2. Her generalization score was an 8. Finally, during the Self-Questioning Fading phase the number of comprehension questions answered correctly ranged from 8 to 10 with a mean score of 8.8 and a generalization score of 9. A maintenance probe was administered one week after the final intervention phase was concluded and the score was a 10. PND was calculated for each phase and is reported in Table 5; the PND between baseline and all the intervention phases were calculated and was found to be 31 percent.
Figure 3. Number of questions answered correctly by Student 3 on each comprehension quiz.

### Table 4.4.
Student 3 MS and PND Scores on Comprehension Quizzes in Each Phase

<table>
<thead>
<tr>
<th>Measure</th>
<th>Baseline</th>
<th>EQT</th>
<th>EQIP</th>
<th>SQT</th>
<th>SQIP</th>
<th>SQF</th>
<th>Main.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>6.5</td>
<td>6.0</td>
<td>8.0</td>
<td>7.6</td>
<td>8.2</td>
<td>8.8</td>
<td>10.0</td>
</tr>
<tr>
<td>PND</td>
<td>0%</td>
<td>5.1%</td>
<td>2.6%</td>
<td>2.6%</td>
<td>21%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Data Across Participants**

This section will look at the data for the three participants together and will remove the training phases. Figure 4 shows the data together and Table 6 reports the mean scores for each participant, the mean scores for the generalization probes, and then the total mean across the intervention phases. The generalization passages were the same for the participants. Table 7 shows the PND across participants.

The mean baseline scores for the participants were 4.5, 4.9, and 6.5, which demonstrates that Student 3 performed above the criterion level of 4 throughout the baseline phase. The mean score for the baseline generalization probes was 6.7. Mean scores for the Embedded Question Independent Practice phase were 7.2, 6.4, and 8.0. The mean for the generalization probes were 7.2. Next, the mean score for the Self-Questioning Independent Practice phase was 7.8, 8.2, and 8.2. The mean for the generalization probes were 8.1. The mean scores for the Self-Questioning
Fading phase were 9.2, 8.8, and 8.8. The mean for the generalization probes were 8.9. The PND for participant 1 between baseline and just the intervention phases were calculated and found to be 77.2 percent. The PND for participant 2 between baseline and the intervention phases were calculated and found to be 41 percent. The PND for participant 3 between baseline and the intervention phases were calculated and found to be 48 percent.
Figure 4. Number of questions answered correctly by 3 participants on comprehension quizzes
Table 4.5.  Mean Scores on Comprehension Quizzes in Each Phase

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline</th>
<th>Gen.</th>
<th>EQIP</th>
<th>Gen.</th>
<th>SQIP</th>
<th>Gen.</th>
<th>SQF</th>
<th>Gen.</th>
<th>Main.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.5</td>
<td>7</td>
<td>7.2</td>
<td>3</td>
<td>7.8</td>
<td>8</td>
<td>9.2</td>
<td>9</td>
<td>9</td>
<td>7.54</td>
</tr>
<tr>
<td>2</td>
<td>4.9</td>
<td>6</td>
<td>6.4</td>
<td>6</td>
<td>8.2</td>
<td>8</td>
<td>8.8</td>
<td>9</td>
<td>8</td>
<td>7.26</td>
</tr>
<tr>
<td>3</td>
<td>6.5</td>
<td>7</td>
<td>8.0</td>
<td>6</td>
<td>8.2</td>
<td>8</td>
<td>8.8</td>
<td>10</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5.3</td>
<td>6.7</td>
<td>7.2</td>
<td>5.0</td>
<td>8.1</td>
<td>8.0</td>
<td>8.9</td>
<td>9.3</td>
<td>9.0</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Table 4.6. PND Scores in Independent Practice Phases

<table>
<thead>
<tr>
<th>Participant</th>
<th>EQIP</th>
<th>SQIP</th>
<th>SQF</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9.1%</td>
<td>13.6%</td>
<td>54.5%</td>
<td>77.2%</td>
</tr>
<tr>
<td>2</td>
<td>0%</td>
<td>4.5%</td>
<td>36.4%</td>
<td>41%</td>
</tr>
<tr>
<td>3</td>
<td>8.7%</td>
<td>4.3%</td>
<td>34.8%</td>
<td>48%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5.9%</td>
<td>7.5%</td>
<td>41.9%</td>
<td></td>
</tr>
</tbody>
</table>

The data illustrate an upward trend in Student 1’s means scores. For Student 2, there was a gradual upward trend as she moved through the phases. This would seem to indicate the acquisition of the questioning skills for these participants. Student 3 showed no change in trend as she moved through the phases; her scores remained between 8 and 9. However, the level of variability within conditions appears to have lessened slightly.

**Student 1 Summary.** His average for his baseline scores was a 4.5 out of 10, which is just at criterion level for moving to the next phase. However, he had 2 very low scores (2 for Session 5, 1 for Session 6). It is inferred that this was caused by the time in which the probe was administered, which was on a day that a lot of holiday activities were taking place and he was very distracted by that. He scored an average of 5.8 out of 10 for the Embedded Questioning Training phase, which again was right at criterion level. He demonstrated generalization of the skill with a score of 6 before moving to the next phase. He had an upward trend in the Embedded Questioning Independent Practice phase with an average score of 7.2, that is considered above criterion level. However, he did not demonstrate generalization at this phase.
with a score of 3. He was able to maintain the same average score for the next two phases, a 7.8, which is above criterion for the Self-Questioning Training phase and right at criterion level for the Self-Questioning Independent Practice phase. His generalization scores for the two phases demonstrate that he was able to carry the skill. For the Self-Questioning Fading phase where the prompts were systematically faded, he demonstrated an average score of 9.2. This is at criterion level for this phase and the maintenance probe administered one week after this was a 9.

**Student 2 Summary.** She began the same way as Student 1, with an average baseline score of 4.9 out 10 correct responses. She scored higher than he did on the Embedded Question Training phase with an average score of 7.0 to his 5.8. However, on the Embedded Question Independent Practice phase score she did not demonstrate an upward trend like Student 1 and averaged 6.4 correct responses. The remaining phases of the study report that her average scores leveled out around 8 and her generalization scores at each phase demonstrated that she was able to complete the tasks independently. She was somewhat consistent with her comprehension scores, especially during the Embedded Questions Independent Practice phase, the Self-Questioning Independent Practice phase, and the Self-Questioning Fading phase. There was a lot of jumping between scores in the Embedded Questions Training phase, which was conducted around the Christmas holidays, so her attention was not as it was for the later part of the study.

**Student 3 Summary.** Throughout the duration of the study, she had the highest performance scores. She performed above criterion level during baseline, Embedded Questions Training phase, and the Embedded Questions Independent Practice phase. During the Embedded Questions Independent Practice phase, there was a downward trend from 10 to 6 and then for the remainder of the data collection her scores fell mostly between 7 and 9. For the two independent practice phases and the Self-Questioning Fading phase, her correct answers averaged 8.0, 8.2,
and 8.8. When analyzed by themselves this does demonstrate a slight increase in performance. She completed the data collection above criterion with a final generalization score of 10 and a maintenance score of 10. However, due to her baseline scores being so high and most of her scores were either right at the highest baseline datum point or just below, her overall PND between baseline and all the intervention phases were calculated and was found to be 31%. Compared to the other participants is the lowest PND score. She had the lowest PND score because her highest baseline score was an 8, which is also the same score she made on 14 out of the 58 probes. There was some variability with her scores in Baseline, Embedded Questions Training, and even a downward trend in Embedded Questions Independent Practice. After that, the scores became more consistent and she scored between 8 to 10.

Results Summary

**Results Across Participants**

Overall, each participant demonstrated a gradual, but consistent increase in reading comprehension and question generation as they moved through the intervention phases. When analyzing just the baseline scores, the independent practice phases, the Self-Questioning Fading phase, and the generalization scores for those phases total mean scores recorded were 7.54, 7.26, and 8.3. These scores indicated that by the conclusion of the study the participants were able to perform the self-questioning strategy on a similar level. Analysis of within-phase total mean scores for the participants reported an increase from baseline, 5.3, to maintenance, 9.0, which indicates that the participants did improve their reading comprehension and self-questioning ability by the conclusion of the study. The within-phase PND scores reported that the Embedded Questions Independent Practice phase was not effective with an average PND of 5.9%. The same with the Self-Questioning Independent Practice phase with an average PND of 7.9%.
However, the Self-Questioning Fading phase did indicate a questionable effect with an average PND score of 41.9%. The participants answered an average of 8 to 10 questions correctly on the comprehension quizzes during the Self-Questioning Fading phase which indicates that they were able to acquire the skills from training, demonstrate some level of fluency, and were able to generalize and maintain the skill.
CHAPTER 5
DISCUSSION

The purpose of this study was to examine the effects of a self-questioning intervention with a prompt fading procedure on reading comprehension of third and fourth grade students with disabilities. Self-questioning strategy has garnered much research over the years (Wong, 1985; Rosenshine et al., 1996; Joseph et al., 2016). Ehren (2005) proposed it as a useful strategy for readers who can decode words but who do not understand or remember what they read. It may do this by encouraging them to become active in their learning and helping them make inferences the author assumed they would make. There is empirical evidence from the literature that supports the use of text comprehension strategies (e.g. self-questioning). The National Reading Panel (2000) concluded that “the strongest scientific evidence for the effectiveness of a text comprehension intervention was found for the instructional technique of question generation” (Ch. 4, p. 45). Humphries and Ness (2015) offer that when students utilize self-questioning strategies, they are taking ownership of the types of questions posed, as well as how to locate the answers to their questions.

Other researchers have also noted other benefits of self-questioning strategies. Another finding is that it aids students with memory, recall, and identification and integration of main ideas through summarization. Students who generate their own questions show improvement in reading comprehension scores (Therrien & Hughes, 2008; Taboada & Guthrie, 2006).

Systematic prompt fading is grounded in applied behavior analysis has demonstrated application for both social and academic behavior. Fading prompts from teacher-initiated to student-initiated has increased generalization across concepts and settings (Rouse et al., 2014). Getting the students to perform a behavior or skill both independently and strategically is the goal of any intervention. When prompts are provided and systematically faded, students may
increase their persistence in remaining on task, even if they perceive the task to be challenging (Lutz, Guthrie, & Davis, 2006). Students appear to benefit from direct strategy instruction in the form of modeling and procedural prompts in order to generate high-level questions (King, 1992). Separately, both procedures have been extensively studied in their own disciplines and have been demonstrated to be effective in increasing participant performance. However, prior to Rouse et al.’s 2014 study, there has not been any published research that combined student-generated questions with a systematic prompt fading intervention package. The current study sought to extend the body of self-questioning research by demonstrating that systematic prompt fading can be effective for helping students learn to generate their own questions and increase their reading comprehension. The current study is a conceptual replication and extension of the study conducted by Rouse et al. (2014). In the following sections, results will be discussed for each participant followed by a discussion of the study in total.

Results Summary

Overall, Student 1 did demonstrate a consistent increase in performance as he moved through the phases. However, when analyzing the PND for all the phases it was found to be at 59%. According to Scruggs (1987), this percent indicates that the intervention had questionable effect on the student’s ability to self-question. From a research standpoint this does not meet significant, but from a practitioner’s standpoint this is considered an improvement because he was able to increase and maintain his performance as he went through the phases and even maintain it after the initial data collection was completed. Out of the three participants he required the most immediate reinforcers of candy and time on the computer after each probe. When given a social validity survey at the conclusion of this study, he stated that he really enjoyed reading about the different topics, but his least favorite part was all the writing. His
teachers noted that he is using the self-questioning strategy more in their rooms as well. One teacher stated that both his reading fluency and comprehension level have improved, and she has observed that he pauses more often when he is reading to look for text details.

Working with Student 2 throughout this process, I discovered that she was initially very shy and did not have a lot of confidence during the beginning phases of the study. She may have become more comfortable with me (reduced reactivity) and performance feedback through the sharing of her progress may have increased her willingness to participate. This would seem to support research related to self-efficacy changes as a result of intervention. As with Student 1, she was able to improve her performance on the comprehension quizzes as she transitioned from embedded questions to student-generated questions, however her overall PND score was lower than Student 1. She did respond well to the edible reinforcers, but it wasn’t something she required for each probe like Student 1. She would ask for a treat when she wanted one. Her favorite part of the process was looking through the text and highlighting the sentences. She did not really like it when I had to help her read something. Her teachers reported that her reading scores are improving, and she is much more willing to participate and answer questions about a story.

For Student 3, throughout the duration of the study, she had the highest performance scores. However, when compared to the other participants she had the lowest PND score. She was the easiest out of the three participants to probe. She was attentive and demonstrated a willingness to participate. The student stated that she enjoyed participating in the study and enjoyed reading the stories. Her teachers reported that they noticed significant changes in her reading skills. Specific behaviors noted were locating text details and forming text-based questions. According to her teachers, her reading comprehension skills have improved and both
teachers noted a significant increase in her self-confidence. Reportedly, she volunteered to read more frequent and increased her willingness to answer questions during instruction.

The purpose of the study was to determine if a systematic prompt fading intervention package for teaching a self-questioning strategy was effective for improving reading comprehension for students with disabilities. The results support and extend the previous findings of Rouse et al. (2014). While there was no significant increase when analyzing the PND scores and the mean scores between phases, when the data are analyzed as a whole from baseline to maintenance there is a consistent increase in scores as all three participants moved through the phases. These data demonstrate improvement in acquiring and maintaining a skill through a series of practice opportunities and may be an intervention practice to demonstrate positive results in the classroom. Self-questioning may be an effective cognitive strategy for interacting with the text and applying new knowledge. However, it is also a strategy that should be broken down into sequential steps, taught explicitly, and assistance faded systematically through the addition of prompt fading. Students with disabilities can benefit from strategy instruction. Strategy instruction provides students with highly structured and explicit instruction they need to be able to use a strategy in various contexts.

**Relation to Previous Research**

This study was designed to be a conceptual replication of the Rouse et al. 2014 study. The purpose was to support and extend the study procedures to determine if combing self-questioning strategy instruction with a systematic intervention package is effective for improving reading comprehension and question generation. There have been a limited number of replication studies in the social sciences and education (Lemon et al., 2016; Makel & Plucker, 2014). Replication studies are important in the field of education because they help to
accumulate knowledge about the validity & generalizability of findings regarding intervention impacts. According to Chhin, Taylor, & Wei (2018), conceptual replication studies can help produce a greater understanding of the conditions under which an intervention may or may not be effective and for whom it may or may not be effective for. Conceptual replication research is vital in the field of special education because through replications we can build on existing research and identify more evidence-based practices that can be used across varied participants, settings, subjects, etc.

The National Reading Panel (2000) scientifically based research had determined the following specific comprehension strategies to be effective: monitoring comprehension, using graphic and semantic organizers, answering questions, generating questions, recognizing story structure, and summarizing. Four of the comprehension strategies were used in the present study: monitoring comprehension, answering questions, generating questions, and summarizing. In the same report, the NRP also recommended the following guidelines for teaching comprehension strategies: explicit or direct instruction that includes explanation, modeling, guided practice, and application. The goal being that students, especially students with disabilities, learn to use strategies flexibly and in other settings. Nelson and Manset-Williamson (2006) claimed that explicit strategy instruction may lead to enhanced self-regulation of reading strategy usage. Students who have an increase of self-regulation in reading may be able to employ the correct strategies that will enable them to be successful in comprehending the material as well as increasing their self-efficacy in other settings and with other type of texts. The data from this study support that the participants demonstrated an increase in reading comprehension using explicit strategy instruction. The researcher provided an explanation of each intervention phase before they began, the researcher modeled the strategy during the training and fading phases of
the study and provided opportunities for guiding practice during training and fading phases of the study.

To further ensure and verify skill acquisition, increasing the number of probes within the Self-Questioning Training phase and the Self-Questioning Fading phase extended the procedures in the Rouse et al. study. Each ratio of teacher-directed to student-directed was employed for a minimum of 3 data probes each. The researcher added the 0:4 ratio at the end of the Self-Questioning Fading phase to determine if the participants were able to demonstrate the self-questioning strategy independently. One of the evidence-based practices that applied behavior analysts utilize that has since been shown to be effective for teaching academic skills is systematic prompt fading. When prompts are provided and systematically faded, students increase their persistence in remaining on task, even if they perceive the task to be challenging (Lutz, Guthrie, & Davis, 2006). Students often require direct strategy instruction in the form of modeling and procedural prompts in order to generate high-level questions (King, 1992). In a classroom setting, the teacher should provide multiple opportunities for practice of a newly acquired skill in order build fluency and demonstrate generalization and maintenance when given multiple opportunities throughout the school day, which is why the training phases in the study were needed to determine if the participants were ready to move forward or needed more practice opportunities. Then the student should be able to perform the skill independently, hence the independent practice phases and the 0:4 phase within the Self-Questioning Fading phase. Any student in a classroom should be able to demonstrate independence of a skill before moving on because they need to build their body of knowledge in order to link it to more complex skills as they progress.
In the present study the results support that the participants increased their reading comprehension scores from an average of 4 to 6 questions answered correctly at baseline to an average of 8 to 10 questions answered correctly at the conclusion of the Self-Questioning Fading phase. An informal observation was that by the end of the study the participants were more confident in their question generation and may have demonstrated the ability to locate the answers to the questions in the text with increased automaticity. Future research should examine whether latency might provide a more sensitive measure of increased comprehension. Their teachers also noted that by the end of the study the participants were demonstrating greater confidence in answering questions and participating in reading comprehension activities during class. Considering the possibility of spill-over effect to other times and settings should be incorporated into future research efforts.

Teacher modeling and self-regulated use of any strategy is the core piece of effective instruction according to Pressley and Harris (1990). The research has demonstrated that students can be taught to self-generate questions. Self-instructional strategy development has been effective in improving both academic performances and self-efficacy among many students with learning disabilities. Good cognitive strategy instruction encourages students to construct powerful cognitive strategies. The goal of productive instruction is to get the students to the point where they can demonstrate the skill or strategy in other settings independently.

Limitations and Future Research

This study does support and extend previous research on self-questioning strategies and systematic prompt fading. However, one limitation of the study was the strength of experimental control using only three participants. In a multiple-baseline design, there must be at least three tiers to experimentally demonstrate a functional relationship between the variables. This study
utilized three participants, which was more than Rouse et al.’s (2014) two participants but replicating the study with more participants would provide the potential for a stronger demonstration of experimental control.

Purposely, the screening criteria for this study was very specific and narrow intended students that had acceptable reading fluency but struggled with comprehension. During the initial screening process a total of five students qualified to participate in the study. However, due to the time constraints only three were chosen. Additional students may have allowed for the demonstration of a more consistent effect although perhaps not a robust demonstration of effect. Future research should consider first, expanding the screening criteria to enter the study.

Regardless of reading fluency level, many students who are identified as having a reading deficit may have some form of reading comprehension difficulty. Therefore, future studies might include students who are identified as disabled or as a poor reader. In addition, consideration should be given to determining ways in which the power of the intervention might be enhanced. The special design of instructional and probe passages might increase the instructional time/trials required for students to acquire and begin to apply the questioning strategies.

Another limitation of the study was the researcher used Social Studies passages but taught the skill under a Reading umbrella. Future research studies should consider studying the effect of the self-questioning systematic-prompt fading package on a wider range of student populations. Referring to the first limitation of the screening criteria to be very narrow, expanding the criteria to any student with an identified reading deficit. Then the results could be analyzed to determine the effectiveness among the different students. Rouse et al. (2014) suggested future research could examine the effects of the intervention on lower grade levels with students who are in the initial stages of reading acquisition or even with higher grades that
read more complex texts with a greater amount of information. Other future research studies could use a group comparison design and compare the effects of the intervention package between classrooms to determine if the students’ comprehension increased as a result of the intervention package when compared to a control group who did not receive the intervention.

A third limitation of the study was similar to a limitation that Rouse et al. had in their 2014 study with regards to the way reading comprehension was assessed. The multiple-choice quizzes that accompanied the reading passages were used to assess comprehension in the present study and in Rouse et al.’s study. Rouse et al. (2014) used only 8 out of the 10 questions because they were multiple-choice and would provide an objective measure for the study. The authors noted that multiple-choice tests can be a limitation because they tend to measure a student’s ability to recall, not their ability to analyze and think deeper about the text. Trying to extend the research, the present study used all 10 questions that were on the comprehension quizzes. Typically, 7 to 8 questions were multiple-choice and the remaining 2 or 3 were open-ended. The questions followed a similar pattern as seen in Table 2, however when doing a question analysis some of the questions were not appropriate indicators of reading comprehension. Two specific examples were the open-ended vocabulary questions and the word usage questions. The open-ended vocabulary questions were the last questions asked on the test and it required the participants to use the vocabulary word in a complete sentence. This does not measure comprehension; it measures the participant’s ability to know the meaning of a word and how to correctly use it in a sentence. The second type of question that did not measure reading comprehension was the word usage questions. These questions took a sentence from the passage and left a blank for a preposition word and then gave the participants the four, word choices to fill in. Again, not a comprehension measure but a grammar usage measure. Also, the open-
ended questions that asked for author’s purpose, main idea, or point of view were not accurately measured. All ten questions on the comprehension test were worth one point each. The open-ended questions required either a complete sentence or a paragraph for the answer. Those types of answers should be assessed with a rubric of some kind. These were the questions that measured the participants’ comprehension the best because they had to go back into the text and provide evidence, however the manner in which they were measured did not match the effort. Future research could still use most of the questions provided on the comprehension quizzes, however, retype the quiz and use the questions that would represent a more accurate measure of reading comprehension. Attention could be given to taking out the vocabulary questions and the word usage questions to focus more directly on the meaning of the passages. Future efforts using open-ended questions could consider developing rubrics to facilitate a broader measure of comprehension. The use of a dichotomous scoring (e.g. correct/error) is limiting and may not reflect the possible interpretative nature of comprehension. Some of the open-ended questions only needed one sentence to answer it, however, the author’s purpose and main idea questions asked for a paragraph including supporting evidence from the text. The use of rubrics and varying levels of responses could improve the sensitivity of measurement while maintaining it’s validity.

Another limitation relating to assessment was that the participants’ writing ability was not taken into consideration as a screening measure for the study. There was no screening instrument used to assess their ability to generate and answer questions or their ability to compose a multi-sentence response to a question. The purpose of the study was to improve comprehension using self-generated questions as a tool to better interact with the text and extract information relative to the comprehension questions. The participants should have been screened
to determine if they had a basic ability to generate their own questions, even if the questions were at the recall level (i.e. where, when, who, etc.). That skill at least would have been a springboard to build upon to generate more quality questions about the text. Future research should include a pre-assessment to assess the ability of the participants to even generate a question for themselves in writing. In the initial stages of the intervention, Student 1 and Student 2 had difficulty generating even basic questions about the text. It took a great deal of modeling and prompting to get them to an independent level of question generation. Research has suggested that teachers who work with students with disabilities may tend to teach with teacher-provided questions and often have a difficult time transitioning their instruction to teaching students how to generate questions for themselves. It is important to transition that strategy over to the students so they will begin to have ownership over what they are reading and what they are taking away from the text. In future studies, assessing whether the participants can create a question from a statement could be a criterion for participating in the study. Students could be required to demonstrate the skill set retell / restate into a question before they would learn how to generate questions to demonstrate comprehension.

Assessing the participant’s ability to write composed sentences should also be considered. At least two of the questions on the comprehension quizzes were open-ended and required the participants to write a multi-sentence answer. All three participants were able to provide at least one sentence, however, Student 1 and Student 2’s responses were often incomplete. Gaining access to the participants’ standardized writing data would help to determine the level of instruction that will be needed for question generation and the quality of written response that will be expected. At least one question required a multi-sentence response and for the probes that did not score a 10 this was the question that was missed because they did
not fully answer the question with supporting evidence from the text, which is also an indicator of how well the participants comprehended the text.

Another possible limitation of the study was the potential variability among the reading passages. Due to the participants’ reading abilities the reading passages had to fall within the range of 550 to 800. Based on the Flesch Kinkaid scale, these reading levels were at beginning third grade to mid-fourth grade. The reading levels were based upon the DIBELS screenings to determine at what independent reading levels the participants could read at. The word count for these passages ranged from 200 to 700. Other parameters for the reading passages were that they had to be considered nonfiction, Social Studies texts. These criteria resulted in 348 passages, but not every passage were included. For example, when looking at the third and fourth grade curriculum some of the passages were Science concepts so they had to be excluded. Another variability with the passages was the structure of the text. Many passages were written like informative passages, but some were formatted as lists, diagrams, or how-to articles. One text structure that was used during the study was the point-of-view articles. This type of passage provided an opening paragraph explaining the overall topic and then had two sections of text to present both sides of an argument. When analyzing the data, the participants would struggle with these and found them hard to read. The researcher could not assist and explain what each section was trying to say in order to help them understand each side’s argument about the topic. Another reason not all passages could be used was that the comprehension quizzes did not have 10 questions. Some passages only had 5 questions and others asked questions about a certain word in the passage and how to use it in different ways. A final type of variability with the passages was the subject matter. The Social Studies passages covered topics from ancient civilizations to biographies to modern problems we have today, such as bullying and internet use.
participants scored higher on the passages that focused on American History, which is a topic that they study during fourth grade. They had the most difficulty comprehending passages about other countries and ancient times. They also had more difficulty with the passages that had longer word counts. There was more information, so it was harder to retain the information and comprehend the subject matter. Future research should do a thorough screening of the passages prior to the study. The website used for the passages and comprehension quizzes proved to be useful, additional time spent screening the passages may decrease variability in future research. However, for purposes of this study, the reading levels were of more importance and so the researcher determined to work within that range as a primary criterion.

A final limitation of the study was the manner for assessment of generalization. In the Rouse et al. (2014) study generalization was only assessed at the end of the study. In the present study assessed generalization for every phase of the study. For each phase of the study, the same generalization passage was used to analyze the comprehension levels of the participants. With the exception Student 1’s score of a 3 during the Embedded Questions Individual Practice phase, the participants scored within 2 points of each other in the rest of the study phases which indicates they were able to generalize the skill at about the same level. Generalization was only measured using the Social Studies passages in one setting. In order to assess if the participants generalized and maintained the self-questioning strategy, future research might implement the self-questioning intervention package with other types of text such as narratives, novels, or newspaper articles. The intervention package could also be implemented with other subject areas: Science, Math, English, and also in other settings such as the regular education setting.
Overall Significance and Conclusion

There is much research to support that the achievement gap between students with disabilities and students without disabilities has remained wide and there is no indication that the gap is decreasing. One reason this has occurred is because once students enter third grade, education no longer focuses on “learning to read” but “reading to learn”. If a student has difficulty acquiring and maintaining foundational skills such as reading fluency, basic recall questions, writing complete sentences then they are likely going to struggle for the remainder of their school career. Educational standards have once again shifted from skills-based learning to concept-based learning. Concept-based learning requires a basic use of higher order thinking skills such as summarizing, analyzing, and synthesizing information to explain an over-arching theme or problem. It is a very abstract thing to teach and students with disabilities typically perform best with strategy instruction that will enable them to break down these abstract concepts into explicit steps. Cognitive strategies, such self-questioning, are taught initially using explicit instruction to provide a clear description of the strategy, teacher modeling, and corrective feedback, guided and independent practice. The goal of this strategy is to teach students how to interact with the content so that learning becomes more deliberate, self-directed, and self-regulated (Jitendra & Gajria, 2011). Self-instructional strategy development has been offered as effective in improving both academic performances and self-efficacy among many students with learning disabilities.

Research has suggested that students with disabilities learn best with strategy instruction. Strategy instruction provides students with the highly structured and explicit instruction they need to be able to use a strategy in various contexts. Chan (1991) stated that when teachers use self-instructional techniques as the main construct of strategy instruction, students can achieve
internalization and self-regulation of strategy use. Some examples of using strategy instruction to program for reading comprehension are identifying the main idea, self-questioning, and summarization (Kim, Linan-Thompson, & Misquitta, 2012). Wong (1985) and Rosenhsine et al. (1996) have provided convincing evidence in their research that states teaching students self-questioning was an effective intervention for improving reading comprehension. Teaching students to self-question is a strategy they can use to monitor their own learning, which is essential in becoming an independent learner. Moving beyond strategy instruction, the ability for a student to regulate their own learning is equally important for reading comprehension. Self-regulation is achieved when a student can adapt a reading strategy to a specific reading situation by use of a pre-planned procedure.

Self-questioning requires the students to monitor their own comprehension by asking themselves a series of self-generated or teacher-provided questions before, during, and after reading a passage (Rouse et al., 2014). Research has shown that it is the most effective monitoring and regulating strategy of all the various metacognitive strategies in its effect on reading comprehension (King, 1992; Rosenshine, Meister, & Chapman, 1996). The research has shown that students will ask questions if they are taught how. Self-instructional strategy development has been effective in improving both academic performances and self-efficacy among many students with learning disabilities. Rosenshine, Meister, and Chapman (1996) reported that the instructional effects from student-generated questioning has been evident in their accuracy in answering test questions, better free recall of text, and identification of main ideas.

The goal of the present study was to program a self-questioning strategy instruction combined with a systematic prompt fading package and assess the extent of the effect on the
reading comprehension of students with disabilities. The present study did contribute to existing research by doing a conceptual replication of Rouse et al.’s 2014 study. By adding a third participant, adding more intervention probes, and keeping all of the questions on the comprehension quizzes the data did report a gradual upward trend for the duration of the study and showed that when given at least 5 opportunities to demonstrate the skill the participants did show a level of generalization and maintenance of the self-questioning strategy. This supports the findings from Rouse et al. (2014) that students with learning disabilities can benefit from learning strategies that increase self-questioning skills in order to improve their reading comprehension. This strategy was easy to implement and to teach, plus there is no cost to do it. It can be implemented in any subject area to meet the need of that content and can be adapted for use with all grade levels and all learners. Students would benefit from learning this strategy in the lower grades so by the time they got to the upper grades they would be fluent in it and those teachers can focus on teaching students how to develop more in-depth, quality questions that are appropriate to the type of text they are working with. It only has a few steps that effective teachers are already doing and when woven into the fabric of their daily teaching they would not have to make drastic changes to their lessons, and it would not affect the content instruction. It is simply another tool that can be taught to all students to better equip them to be successful and independent learners.
REFERENCES


APPENDIX A
IRB APPROVAL

ACTION ON EXEMPTION APPROVAL REQUEST

TO: Leah Turner
   Education

FROM: Dennis Landin
   Chair, Institutional Review Board

DATE: October 30, 2018

RE: IRB# E11318

TITLE: "Teacher I can read it, but I don't understand it!" Using Systematic Prompt Fading to
   Program a Self-Questioning Strategy with Students with Disabilities


Review Date: 10/30/2018

Approved X Disapproved

Approval Date: 10/30/2018

Exemption Category/Paragraph: 1

Signed Consent Waived?: No

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable): _______________________

By: Dennis Landin, Chair

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:
1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report,
   and LSU’s Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of
   subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request
   by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants,
   including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
8. SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc. Approvals will
   automatically be closed by the IRB on the expiration date unless the PI requests a continuation.

* All investigators and support staff have access to copies of the Belmont Report, LSU’s Assurance with DHHS,
   DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in
   this office or on our World Wide Web site at http://www.lsu.edu/irb
APPENDIX B
RESEARCH STUDY
SCHOOL DISTRICT CONSENT

Study Title: “Teacher I can read it, but I don’t understand it!” Using systematic prompt fading to program a self-questioning strategy with students with disabilities

Performance Site: One or more public elementary/primary schools in south Louisiana

Investigators: The following investigator is available for questions pertaining to this study: Leah Turner, Doctoral Student, College of Education, LSU, (225) 933-9620, (email: lturn28@lsu.edu)
Dr. R. Kenton Denny, 0223 Peabody Hall, College of Education, LSU (225) 578-6867, (email: rdenny@lsu.edu)

Purpose of the Study: To train the participants to use a self-questioning strategy while reading nonfiction text.

Subject Inclusion: Elementary/primary students with disabilities

No. of Participants: 3 or 4 students who are enrolled as third or fourth graders

Study Procedures: This study will take place over several months and require the investigator to collect data over 4 to 5 days a week. The study is designed to train the participants to self-question by starting with embedded questions in nonfiction text then progress to student-generated questions without prompts. The overall purpose is to teach them this strategy that will help them to self-regulate their reading, so they will be better prepared to answer reading comprehension questions.

Benefits: This study is designed to increase comprehension of nonfiction text as the participants learn how to generalize and maintain the self-questioning strategy across settings and subject areas. The ability to self-question and comprehend the text more effectively will aide them both in the classroom and on statewide assessment. The results of the study will be shared with the school district.

Risks: The only risk is the inadvertent release of the school and subject’s identity. Every effort will be to maintain the confidentiality of the school and participants. A pseudonym will be utilized in all written reports and neither the participants, the school district nor the school will be named. All data will be kept in secure files in which only the investigators have access. The school district will have full access to the transcripts, reports, etc.
Right to Refuse: Participation is voluntary, and the school district has the right to refuse participation in the study at any time without penalty.

Privacy: Participant and school identity will remain confidential unless disclosure is required by law or if participant gives verbal consent to have identity stated.

Signatures:

This study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects’ rights or other concerns, I can contact Dennis Landin, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. I agree to participate in the study described above and acknowledge the investigator’s obligation to provide me with a signed copy of this consent form.

_______________________________  __________________
School District Representative            Date
APPENDIX C
RESEARCH STUDY
ADMINISTRATOR CONSENT

Study Title: “Teacher I can read it, but I don’t understand it!” Using systematic prompt fading to program a self-questioning strategy with students with disabilities

Performance Site: One or more public elementary/primary schools in south Louisiana

Investigators: The following investigator is available for questions pertaining to this study: Leah Turner, Doctoral Student, College of Education, LSU, (225) 933-9620, (email: lturn28@lsu.edu)
Dr. R. Kenton Denny, 0223 Peabody Hall, College of Education, LSU (225) 578-6867, (email: rdenny@lsu.edu)

Purpose of the Study: To train the participants to use a self-questioning strategy while reading nonfiction text.

Subject Inclusion: Elementary/primary students with disabilities

No. of Participants: 3 or 4 students who are enrolled as third or fourth grade

Study Procedures: This study will take place over several months and require the investigator to collect data over 4 to 5 days a week. The study is designed to train the participants to self-question by starting with embedded questions in nonfiction text then progress to student-generated questions without prompts. The overall purpose is to teach them this strategy that will help them to self-regulate their reading, so they will be better prepared to answer reading comprehension questions.

Benefits: This study is designed to increase comprehension of nonfiction text as the participants learn how to generalize and maintain the self-questioning strategy across settings and subject areas. The ability to self-question and comprehend the text more effectively will aide them both in the classroom and on statewide assessment. The results of the study will be shared with the administrator.

Risks: The only risk is the inadvertent release of the school and subject’s identity. Every effort will be to maintain the confidentiality of the school and participants. A pseudonym will be utilized in all written reports and neither the participants, the school district nor the school will be named. All data will be kept in secure files in which only the investigators have access. The administrator will have full access to the transcripts, reports, etc.
**Right to Refuse:** Participation is voluntary, and the administrator has the right to refuse participation in the study at any time without penalty.

**Privacy:** Participant and school identity will remain confidential unless disclosure is required by law or if participant gives verbal consent to have identity stated.

**Signatures:**

This study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects’ rights or other concerns, I can contact Dennis Landin, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. I agree to participate in the study described above and acknowledge the investigator’s obligation to provide me with a signed copy of this consent form.

____________________________  ____________________
Administrator                Date
APPENDIX D
RESEARCH STUDY
PARENT CONSENT

To Parent or Guardian,

I am requesting your consent to allow your child to participate in a research study I am conducting. The purpose of the study is to increase reading comprehension while reading nonfiction text. Over a period of several months, 4 to 5 days per week, I will work with your child to learn a self-questioning strategy that they will use while reading nonfiction text. I will begin by modeling how to stop at certain points in a reading passage to answer teacher-generated questions and ending with the final phase of the study where your child should be able to read a passage and generate their own questions that will help them when answering more complex comprehension questions.

Your consent is needed and appreciated in order for your child to participate in the study. Attached is the Parent Consent Form for you to read through and sign. Please return to your child’s teacher in a timely manner. Thank you for assisting me in helping your child succeed with their reading.

Leah Turner
Doctoral Student, LSU
**Study Title:** “Teacher I can read it, but I don’t understand it!” Using systematic prompt fading to program a self-questioning strategy with students with disabilities

**Performance Site:** One or more public elementary/primary schools in south Louisiana

**Investigators:** The following investigator is available for questions pertaining to this study: Leah Turner, Doctoral Student, College of Education, LSU, (225) 933-9620, (email: lturn28@lsu.edu) Dr. R. Kenton Denny, 0223 Peabody Hall, College of Education, LSU (225) 578-6867, (email: rdenny@lsu.edu)

**Purpose of the Study:** To improve reading comprehension by teaching students a self-questioning strategy that they can utilize when reading nonfiction text.

**Inclusion Criteria:** Elementary students 8 to 10 years of age who have known support needs with reading comprehension as established by evaluation results and initial screening results

**Exclusion Criteria:** Elementary students who do not have known support needs with reading comprehension and who do not meet the initial screening criteria

**Study Procedures:** Over a period of several months, 4 to 5 days per week, the investigator, will work with your child to learn a self-questioning strategy that they will use while reading nonfiction text. The investigator will begin by modeling how to stop at certain points in a reading passage to answer teacher-generated questions and ending with the final phase of the study where your child should be able to read a passage and generate their own questions that will help them when answering more complex comprehension questions.

**Benefits:** This study is designed to increase comprehension of nonfiction text as your child learns how to generalize and maintain the self-questioning strategy across settings and subject areas. The ability to self-question and comprehend the text more effectively will aide them both in the classroom and on statewide assessment. The results of the study will be shared with you.

**Risks:** The only risk is the inadvertent release of the school and your child’s identity. Every effort will be to maintain the confidentiality of the school and your child. A pseudonym will be utilized in all written reports in place of your child’s name. All data will be kept in secure files in which
only the investigators have access. You, the parent, will have full access to the data, reports, etc.

**Right to Refuse:** Participation is voluntary, and a child will become part of the study only if both your child and you agree to the child’s participation. You as the parent or the child have the right to withdraw from the study at any time without penalty or loss of any benefit to which they might otherwise be entitled.

**Privacy:** The school record of participants in this study may be reviewed by investigators. Results of this study may be published, but no names or identifying information will be included for publication. Your child’s identity will remain confidential unless disclosure is required by law.

**Financial Information:** There is no cost for participation in the study, nor is there any compensation to the subjects for participation.

**Signatures:**

This study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about subjects’ rights or other concerns, I can contact Dennis Landin, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. I will allow my child to participate in the study described above and acknowledge the investigator’s obligation to provide me with a signed copy of this consent form.

__________________________________________  ________________________
Parent Signature                                      Date

The parent/guardian has indicated to me that he/she is unable to read. I certify that I have read this consent form to the parent/guardian and explained that by completing the signature line above he/she has given permission for the child to participate in the study.

__________________________________________  ________________________
Signature of Reader                                      Date
APPENDIX E
ASSENT FORM
FOR PARTICIPANT

I, ____________________________, agree to be in a study that will help children learn how to answer questions better when they read a story. I will be reading stories and then answering questions about them. I will be able to graph my progress to see how well I am doing. I will try my best and follow all the directions. I can decide to stop being in the study at any time without getting in trouble.

Child’s Signature: ____________________________  Age: _______  Date: ____________

Witness: ____________________________  Date: ____________________
APPENDIX F
EXAMPLE OF COMPREHENSION QUIZ

ReadWorks® Victoria Falls: The Smoke That Thunders - Comprehension Questions

Name: ___________________________ Date: ______________

1. What is Victoria Falls considered to be?
   A. It is considered to be the smallest waterfall in the world.
   B. It is considered to be the largest waterfall in the world.
   C. It is considered to be the loudest waterfall in the world.
   D. It is considered to be the oldest waterfall in the world.

2. What does the text describe?
   A. David Livingstone's trip to Victoria Falls
   B. how the ecosystem around Victoria Falls has changed
   C. Victoria Falls
   D. the Seven Natural Wonders of the World

3. Read these sentences from the text.

   “The mist caused by the falls also supports the surrounding environment. Around the waterfall is a rainforest-like ecosystem. Many species of trees, plants, and animals thrive there. If you travel there, you may catch a glimpse of the many different raptor species nearby, like falcons and black eagles. You may even spot elephants in the national parks on both sides of the river!”

   What can be concluded about the ecosystem around the waterfall based on this information?

   A. The ecosystem doesn't have as many plant and animal species as it used to many years ago.
   B. The ecosystem is healthier than what it used to be like many years ago.
   C. The ecosystem is in danger, and many plant and animal species are close to dying out.
   D. The ecosystem is very healthy and has a variety of plant and animal species.
4. Why might the local tribes who lived near Victoria Falls first call it "the smoke that thunders"?

   A. The spray and mist look like smoke. The falling water makes a loud sound like thunder.
   B. The falling water looks like smoke. The spray and mist sound like thunder.
   C. The waterfall can start loud fires that sound like thunder and create a lot of smoke.
   D. They wanted to scare visitors away from visiting the waterfall.

5. What is the main idea of this text?

   A. Hundreds of thousands of people make the trip to Victoria Falls each year to see the spectacular "smoke that thunders" in person.
   B. Local tribes first called Victoria Falls "the smoke that thunders."
   C. Victoria Falls is considered to be the largest waterfall in the world, and it supports its surrounding ecosystem.
   D. The spray and mist from Victoria Falls can be seen from many miles away.

6. Read these sentences from the text.

   "The mist caused by the falls also supports the surrounding environment. Around the waterfall is a rainforest-like ecosystem. Many species of trees, plants, and animals thrive there. If you travel there, you may catch a glimpse of the many different raptor species nearby, like falcons and black eagles. You may even spot elephants in the national parks on both sides of the river!"

As used in the text, what does the word "thrive" most nearly mean?

   A. to grow healthy and strong
   B. to become tired and weak
   C. to die off
   D. to move to another place
7. Choose the answer that best completes the sentence.

Many animals live in the rainforest-like ecosystem around Victoria Falls, _____ falcons and elephants.

A. also
B. first
C. such as
D. although

8. What does the mist from Victoria Falls support?

9. Explain at least two details about Victoria Falls.

Support your answer with evidence from the text.

10. Explain why hundreds of thousands of people go to see Victoria Falls each year in person.

Support your answer with evidence from the text.
## APPENDIX G
### EXAMPLE OF TREATMENT INTEGRITY CHECKLIST

**Phase:** Embedded Questions Independent Practice

<table>
<thead>
<tr>
<th>Name of Researcher: __________________________</th>
<th>Name of Observer: __________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: ________________________________</td>
<td>Start &amp; Stop Times: ____________________</td>
</tr>
<tr>
<td></td>
<td>Total Observation Time: ____________________</td>
</tr>
</tbody>
</table>

### Level of Implementation

4: Very Strong; 3: Strong; 2: Adequate; 1: Needs Improvement; 0: Not Observed

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Researcher started on time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Researcher passed out reading passage to the participants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Researcher explained that participants will read passage aloud</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Researcher provided error correction during reading passage if needed</td>
<td></td>
<td></td>
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<tr>
<td>5. Researcher explained that the participant will begin at the beginning and answer the embedded questions in the passage</td>
<td></td>
<td></td>
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<tr>
<td>6. Researcher provided corrective feedback if needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Researcher passed out 10-item comprehension quiz</td>
<td></td>
<td></td>
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<tr>
<td>8. Researcher instructed participants to complete quiz independently</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Researcher provided error correction when needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Researcher passed out highlighters and provide immediate feedback</td>
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</tr>
<tr>
<td>11. Researcher collected the quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Researcher assisted the participants in graphing their progress</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
VITA

Leah Michelle Turner is a native of Central, LA. After completing her schoolwork at Live Oak High School in 1996, Leah attended Southeastern Louisiana University and earned a Bachelor of Arts with a major in Elementary and Special Education in 2001. Immediately following, Leah continued at Southeastern Louisiana University and earned a Master of Arts with a major in Special Education in 2003. For the past 18 years, Leah has been serving as a special education teacher in Livingston Parish teaching Kindergarten through fourth grade resource/inclusion as well as students with significant disabilities/autism. Next in 2005, Leah began to pursue National Board Certification in the area of Exceptional Needs Specialist. She completed the process in November 2006 and was certified until November 2016. In August 2008, she was employed at Levi Milton Elementary School in Walker, LA and went back to school at the University of New Orleans to earn an add-on certification in Significant Disabilities/Autism to better meet the needs of the students she was teaching. That certification was completed in 2011. In August of 2012, Leah began pursuing her PhD in Curriculum and Instruction with a focus in Special Education at Louisiana State University. She is currently completing a graduate assistantship at Louisiana State University in the School of Education (while she is on professional sabbatical from Livingston Parish). In the fall, Leah will continue her relationship with Louisiana State University as an adjunct instructor for Instructional Practices for Students with Disabilities II (EDCI 3703).