THE EFFECTS OF A SELF-QUESTIONING STRATEGY ON THE COMPREHENSION OF EXPOSITORY PASSAGES BY ELEMENTARY STUDENTS WHO STRUGGLE WITH READING

DISSERTATION

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By

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Abstract

Students who are at-risk for reading require extra support with instruction and learning and have a greater chance of academic failure in the future. Thus, students who struggle with reading and the comprehension of text have limited background knowledge, lack the skills to connect with the text, and do not know how to read with a purpose. This study addressed these deficits through the use of a self-questioning strategy to increase comprehension performance. More specifically, the purpose of this study was to examine the effects of student-generated self-questions on expository reading comprehension of fourth grade at-risk learners. The generalization of comprehension skills was also assessed.

Key words: reading comprehension, self-questioning strategy, at-risk learners, student-generated questions
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Chapter 1: Introduction

It has been estimated that 60% of first grade students entering the classroom will need further support in addition to their general education curriculum and instruction (NICHD; Bursuck & Dahmer, 2011; Lyons, 1998). Any student who requires extra support for reading and learning is referred to as an at-risk learner (Bursuck & Damer, 2011). The National Reading Panel (NRP, 2000) and NELP (NELP, 2008) identified five key skills that are necessary for successful reading for students who are at-risk for learning (Bursuck & Damer, 2011). These key components include phonemic awareness, phonics, fluency, vocabulary, and comprehension. Students who are characterized as at-risk for reading initially have difficulty with reading fluency caused by the lack of skills with decoding, phonemic awareness, and phonological awareness. If students are unable to read fluently and accurately in the beginning stages of reading, they will have a greater chance of struggling with the more complex skills (i.e., vocabulary and reading comprehension) in the future.

Students who specifically struggle with comprehension of texts have limited vocabulary and background knowledge, they do not read with a purpose, and they struggle with actively engaging, connecting, and thinking about what they are reading (Bursuck & Damer, 2011, RAND Reading Study Group, 2002). Thus, when teaching students who are at-risk for reading how to comprehend, they require extra instructional support through direct teaching of methods, repeated practice with systematic feedback.
and error correction, and numerous opportunities to respond. Within the instruction, teachers must also integrate strategies to help promote the activation of background knowledge, generation of questions while reading, development of conclusions from information in the text, identification of relevant key features of the text (e.g., characters, setting, plot, conclusion), skills for monitoring and setting goals for comprehension, and the summarization of text (Bursuck & Damer, 2011; NRP, 2000; NELP; 2009).

Research has indicated that reading comprehension difficulties are often associated with deficits in comprehension strategy use and reading fluency (Therrien Wickstrom, & Jones, 2006). The self-questioning strategy is an effective method to promote the use of reading comprehension strategies. This strategy can include teacher-generated questions or student generated questions. The generation of questions while reading, help students to stimulate background knowledge, develop conclusions, identify of key features, and actively engage with the text. When teachers ask frequent and meaningful questions, students are more likely to retain information longer, understand the text more clearly, engage and connect with the text, and progress as critical thinkers (Bursuck & Damer, 2011).

**Self-Questioning Strategy**

By asking questions about what is being read, students become active with the text, have more opportunities to think about what they are reading, and gain the skills to effectively reflect on what they read. Not only can teachers ask questions while students read, but students can also be taught to ask their own questions while reading through self-questioning methods. Students who are taught to ask their own questions not only
gain the skills to be active and engaged readers, but they also become independent readers.

The skill of self-questioning is a type of self-management strategy that can be utilized to change behaviors, complete tasks, guide instruction, gain understanding, and much more (Heward, 2013). There are different types of self-questioning practices as it relates to reading comprehension. For example, self-questioning strategies have been used to identify main ideas and details (Chan, 1991; Hagaman, Casey, & Reid, 2010), summarize information (Manset-Williamson, Dunn, Hinshaw, & Nelson, 2008; Mason, 2004), identify grammar parts (Johnson, Graham & Harris, 1997), retell information (Mason, Snyder, Sukhram & Kedem, 2006), and content acquisition (Scott, 2008). Additionally, self-questioning strategies can be used to self-monitor goals for reading and check for understanding of text (Hagaman et al., 2010; Johnson, et al., 1997; Mason et al., 2006).

**Previous Research**

Previous research has demonstrated the effectiveness of self-questioning strategies for students who have weaknesses in reading comprehension. A review of self-questioning research conducted by Wong (1985) concluded that the effects of self-questioning training for students from the elementary level through the college level were successful in promoting effective reading comprehension. The study also concluded that self-questioning instruction should incorporate: (a) teaching to levels of criterion for mastery, (b) implement strategies with explicit instruction, and (c) allow enough time for students to properly read and process the information.
Another review of self-questioning interventions was conducted by Rosenshine, Meister, and Chapman (1996). The authors of this review evaluated studies in which students were instructed on how to generate their own questions to improve their reading comprehension. Teaching students to generate their own questions produced effective and substantial results. Overall, when students were trained to self-question, procedural prompts in the form of questions were given to guide the students through this process. The most effective question prompts for self-questioning included: (a) generic questions, (b) stem questions, (c) signal words, and (d) story grammar categories.

There are a variety of self-questioning strategies that guide and stimulate students to be more successful readers through interaction, connection, and reflection. One particular intervention that has proven to be successful with a variety of ages (third through sixth grades) and abilities (students who are low achieving, average achieving, and high achieving, as well as students with disabilities) is the Question Answer Relationship (QAR) strategy (Benito, Foley, Lewis, & Perry, 2005; Ezell, Hunsicker, Quinque, & Randolph, 1996; Ezell, Kohler, Jarzynka & Strain, 1992; Graham & Wong, 1993). The QAR strategy is a method used to help students who have difficulties answering inference questions (Bursuck & Damer, 2011). With this process of self-questioning, students are expected to identify four types of questions (i.e., right there, author and you, think and search, on my own) and then they must answer the actual questions before and after they read.

Another successful self-questioning strategy that has been proven effective for reading comprehension is the use of graphic organizers such as semantic maps, tables, timelines, KWL (Know, Want to know, what I Learned) chart, and story maps (Taylor,
Alber, Walker, 2002; Scott, 2008). Graphic organizers are easy to utilize because they can be implemented with a variety of texts (i.e., narrative, expository), with a range of ages, with a mixture of abilities (i.e., students with learning disabilities, novice readers with poor comprehension, students who are at-risk for reading), as well as at various times throughout reading (i.e., before, during, and after reading). For example, Taylor et al. (2002) utilized two interventions, one being a story map with story elements (main characters, setting, problem, major events, and story outcomes). The participants were expected to complete the map after reading a narrative passage. The authors found this intervention to be successful in promoting reading comprehension for students with learning disabilities.

In the self-questioning studies described above, students were either provided with a list of questions developed by the teacher or they were expected to generate their own questions. The ability to generate questions is an advanced reading comprehension skill. Struggling readers who initially need additional support and structure can eventually learn to generate their own questions through systematic instruction. Specifically, students can be provided with explicit instruction and self-questioning prompts that are gradually faded until the student uses the skill independently. Previous research has not examined the effects of systematic prompt fading on question generation, which is one purpose of the proposed study.

**Purpose**

The purpose of this study was to examine the effects of a self-questioning strategy on the expository reading comprehension of fourth grade students who struggle with reading. The self-questioning intervention consisted of a systematic prompt fading
procedure that gradually required the student to self-generate questions independently. Modeling, feedback, and guided practice was utilized to teach the self-questioning strategy. Additionally, this study examined the effects of the self-questioning strategy on the generalization of comprehension.

**Research Questions**

1. What are the effects of a self-questioning strategy on expository reading comprehension of fourth graders who struggle with reading?

2. What are the effects of a self-questioning strategy on the generalization of expository reading comprehension of fourth graders who struggle with reading?
Chapter 2: Literature Review

Introduction

Reading comprehension is an important skill for success not only in school, but it is a significant skill for success throughout a person’s lifetime. Reading comprehension is the essence of reading, essential not only to in-school academic learning, but also to lifelong learning (Duffy & Roehler, 1989; Durkin, 1993; Mason, 2004). Gaining a solid foundation for reading in the early years of development and the early years of school is critical to pave the way for success in reading for the future. In the primary years of elementary school, students learn how to read and gain strategies to become prosperous readers. As they progress through each grade level, students build upon their foundational skills and learn to acquire knowledge through reading. One must know how to comprehend text in order to successfully learn information. Reading comprehension, or gaining meaning from text, is considered to be the most crucial academic skill learned in school (Mason, 2004; Mastropieri & Scruggs, 1997).

Reading comprehension. The ability to read and comprehend grows more challenging as students progress from the elementary school years, through middle school, to high school and beyond. Reading content becomes more detail oriented, increasing the difficulty in which one must read and understand. Additionally, as years advance, students are required to read a wider variety of texts across a broader range of topics. For example, middle school students are expected to read a larger amount of
information throughout many subject areas compared to students in upper elementary
grades (Gajria, Jitendra, Sood, & Sacks, 2007; Solis, Vaughn, Pyle, Hassaram, & Leroux,
2012). As the demands of reading and comprehension increase for students,
unfortunately, the achievement gap continues to widen as students get older and progress
through school. The United States Department of Education (USDOE) defines the
achievement gap as the differences in academic performance between subgroups of
students (i.e., white, African American, Asian/Pacific Islander, low-income students,
English language learners, and students with disabilities) and their peers (U.S.
Department of Education, 2012). These performance gaps have been documented since
the 1970’s concentrating on the variances of academic performances between white and
non-white students, but since the 1990’s achievement gaps have existed in other areas as
well including low-income students and more affluent peers, English learners and native
English speakers, and students with disabilities and typically developing peers (U.S.
Department of Education, 2012). This gap has been correlated with disability, cultural
diversity, and income level (Alber-Morgan, 2010, p. 3; Casserly, 2006).

After the third grade, emphasis on instruction for learning to read often transitions
to instruction for reading to learn or reading to comprehend (Wanzek et al., 2013).
Therefore, if students do not read proficiently by the end of the third grade, they are at
great risk for serious consequences in their academic achievement (Wanzek et al., 2013).
In other words, if students cannot read and gain comprehension skills by the third grade,
they will continue to struggle and fall further behind their peers as they progress through
school contributing to the growing achievement gap.
Federal and state policies. These differences in academic performances between various subgroups have motivated the development of federal and state policies and laws to reform education, improve the quality of instruction and assessment, and to ensure that students have equal opportunities for quality education. These laws include, but are not limited to: No Child Left Behind, 2001 (NCLB), Title I, and Individuals with Disabilities Education Improvement Act, 2004 (IDEIA). With the continual advancement of these laws, and specifically stated through NCLB (2001), all third grade students throughout our nation are now required to read and comprehend at proficiency level by the year 2014.

The National Assessment of Educational Progress (NAEP) nationally represents measures of student progress over time in various content areas and subject matters. Specifically, the reading assessment measures reading comprehension across two types of text, literary text and informational text. The fourth grade results from 2011 indicated that 67% of students had at least the basic level in reading comprehension. Basic level of reading comprehension means partial mastery of prerequisite knowledge and skills that are fundamental for proficient work. Of the 67% of students performing at the basic level, only 34% of these students are proficient in reading comprehension. This means that considerably less than half of our fourth graders in the United States can competently comprehend what they read in both literary text and informational text. It is evident and clear from the NAEP assessment measures that over half (66%) of our nation’s students are at-risk for failing to read and comprehend sufficiently.

Other subject areas require a significant amount of reading and comprehending and consequently students who struggle with reading and comprehension will continue to
struggle in other content areas as well. NCLB (2002) and Individuals with Disabilities Education Improvement Act (IDEIA, 2004) now requires teachers to use evidence-based practices within their classrooms to work towards bridging the achievement gap (Alber-Morgan, 2010, p. 115). The use of practices that are empirically supported through research has been the push to increase student achievement and close the gap between low performing students and typically performing students. The use of evidence-based practices in the classroom has reinvigorated the researcher and practitioner communities’ need to locate and apply practices with a history of proven effectiveness (Solis et al., 2011). In order to bridge the research-to-practice gap, teacher education must provide teachers with an understanding of relevant evidence-based practices (Alber-Morgan, 2010, p. 115).

**Effective instruction for reading.** Strong evidence was found in the research conducted by the Institute of Education Sciences (IES) in 2008 that made recommendations for effective instruction for reading. Three instructional recommendations were made which included: (a) provide explicit vocabulary instruction, (b) use direct and explicit comprehension strategy instruction, and (c) provide struggling readers with intensive and individualized interventions delivered by trained specialists (Wanzek et al., 2013). All three of these instructional strategies have been supported by a wide variety of evidence including students with and without disabilities.

Furthermore, The National Reading Panel (NRP) has identified five critical components of reading that must be taught in order for students to be successful readers. These five components of reading are: (a) phonemic awareness, (b) phonological awareness, (c) fluency, (d) vocabulary, and (d) comprehension. Each of these
components of reading impact a student’s ability to read, but the first four components are essential to support the fifth component, successful comprehension of reading. In order to teach these five critical pieces, teachers must implement evidence-based practices and scientifically supported strategies to ensure students become successful readers.

Reading to comprehend is to extract meaning from text, the ultimate goal of reading (Berkeley, Scruggs, & Mastropieri, 2010). In order to comprehend effectively, all students must have the ability to perform successfully with processing information well, using background knowledge to support what is being read, being aware of their own learning, gaining vocabulary knowledge, having sufficient reading fluency, and being active readers. If students do not acquire and attain these skills, their reading comprehension can be compromised (Berkeley et al., 2010). Students with learning disabilities face even greater challenges when learning to read and comprehending text. Ninety percent of students with learning disabilities exhibit significant difficulties learning to read (Lyon, 1995; Sencibaugh (2007); Vaughn, Levy, Coleman, & Bos, 2002). They not only struggle with basic reading at a young age, but they are weak with analyzing the context of words, which leads to the inability to decipher or understand the meaning of text (Sencibaugh, 2007).

**Evidence-based practices for reading comprehension.** When implementing instruction to support reading comprehension for students with disabilities, again, it is critical for teachers to be aware and knowledgeable of successful evidence-based practices. In 2010, Berkeley and colleagues conducted a meta-analysis synthesizing reading instruction to promote reading comprehension for students with learning
disabilities in elementary, middle, and high school. This meta-analysis included forty studies conducted between 1995 and 2006, which evaluated fundamental reading instruction, text enhancements, questioning/strategy instruction, peer-mediated instruction, and self-regulation. After evaluating various reading instruction strategies, the authors found that the 2 reading interventions with the largest numbered effect sizes were question/strategy instruction (e.g., direct questioning while reading, comprehension strategies, and self-questioning while reading) and text enhancements (e.g., in-text question placement, graphic organizers, and technology). These successful strategies had two particular pieces in common, they all taught students to attend more carefully or think more systematically about the text they are reading and they all were thoroughly organized and implemented through instruction.

It is important to note that the study conducted by Berkeley and colleagues (2010) demonstrated the continued effectiveness of reading comprehension interventions conducted prior to 1996, especially question/strategy instruction. The results indicated that with the addition of the Berkeley et al., (2010) study to prior studies, there are approximately 100 studies that contributed to the findings with a variety of effective interventions to improve reading comprehension of students with LD. Most of these studies had a common effort to teach students to attend more carefully or to think more systematically about what they are reading. Self-questioning strategies give students the strategies to do just that; approach reading in a systematic and organized way to enhance student engagement with the text.

Another study evaluating reading comprehension for middle school students with learning disabilities was conducted by Solis et al., (2011). In this study, the authors
synthesized thirty years worth of research ranging from 1979 to 2009. Fourteen studies were included in this review specifically including strategy instruction related to main idea and summarization of text. The authors found that effective summarization and main idea interventions had several common features of instruction across the studies. These common features include strategies of sequential processing, self-questioning, mnemonics, the use of graphic organizers, and self-monitoring tools (e.g., checklists and prompt cards), as well as mapping (e.g., mapping story elements of a narrative text). The use of explicit instruction to implement reading strategies was found to better support the understanding of text for students who struggle with reading and have learning disabilities.

The goal of the study conducted by Solis et al., (2011) was to understand the effectiveness of interventions aimed at improving the comprehension of students with LD in middle school (grades 6, 7, and 8; ages 12-14) and to identify those practices with high impact to influence educational practices. The authors suggested that teachers should use practices that identify the most important elements of the text (i.e., who or what the text is about) in order to summarize and connect the information. This specific review of the literature indicated several strategies to accomplish summarization including sequential processing, self-questioning, mnemonics, and graphic organizers. Again, Solis et al., (2011) proved self-questioning strategies were highly effective approaches for increasing the reading comprehension of students with learning disabilities.

In order for students to be actively engaged readers and learners, teachers must implement evidence-based practices that have continually been proven successful. Both evaluations of research conducted by Berkeley et al., (2010) and Solis et al., (2011)
spanned over 54 studies, conducted over thirty years, and included students with learning disabilities from elementary school through high school. These meta-analyses stated that various types of self-questioning strategies are successful interventions with some of the largest treatment effect sizes for increasing reading comprehension. Self-questioning strategies supply the learner with skills to become engaged with the text they are reading and systematically organize information to comprehend productively and successfully.

**Self-questioning strategy.** Self-questioning is a skill that is classified as a self-management strategy and is often times utilized to change behaviors, complete tasks, guide instruction, gain understanding, and much more. Self-management is the ability to generate responses to increase or decrease the future frequency of a target behavior one wishes to change (Heward, 2013). Self-monitoring and self-evaluation are the most commonly used methods as well as being the most researched of all of the self-questioning skills (Heward, 2013). Self-monitoring is a procedure in which a person observes his or her own behavior and records the occurrences or nonoccurrences of a specific desired or undesired behavior. Self-evaluation is when a person compares his or her own performance against a predetermined goal or standard. Thus, self-questioning can incorporate both self-monitoring procedures and self-evaluation procedures to actively generate questions about a particular topic to increase understanding of the content being read, monitor progress to ensure accuracy of generating questions, and evaluate how well the questions were generated against a pre-set goal. Self-questioning strategies have been continually proven successful strategies for the acquisition of comprehension skills through empirical scientific evidence (see Berkeley et al., 2010; Solis et al., 2011).
The study conducted by Wong (1985) evaluated and reviewed self-questioning instructional research within 27 studies from 1965 through 1982. These studies used self-questioning strategies, either in an oral format or a written format, to increase student processing of text when reading, for students from elementary school through college. The authors found three critical instructional variables for teaching self-questioning: (a) level of criterion training, (b) explicit instruction about question generation, and (c) student processing time. Therefore, the studies in which students were trained to desired criterion, received clear instructions on question generation, and were given sufficient processing time (amount given to read) gained the most successful results overall. In contrast, studies that did not focus on these three components of instruction failed to achieve positive student outcomes.

In addition, Wong (1985) stated that the effectiveness of self-questioning instruction is best determined by the maintenance and transfer of skills learned through this instruction. Delayed tests with new materials give a more reliable indication of the durability or strength of the training. Maintenance tests are a more rigorous measure and transfer tests are the most rigorous of all. Therefore, when teaching self-questioning skills for increasing success for reading comprehension, it is necessary to include strategies for maintaining these skills. Teachers must also program strategies into learning to ensure long-term use for ultimate attainment of skills. Overall, self-questioning strategies implemented for reading have been proven to be successful when implemented effectively (i.e., sufficient training, explicit instruction, proper time to process) to promote reading comprehension skills.
Another review of interventions for self-questioning was conducted in 1996 by Rosenshine, Meister, and Chapman. Twenty-six studies were included in this evaluation and provided instruction to students on how to generate questions to improve reading comprehension. Of the 26 studies, 17 of the studies taught the single strategy of question generation directly and nine of the studies incorporated reciprocal teaching to instruct question generation. The direct teaching of self-question generation consisted of traditional instruction and students were taught the single strategy of question generation. In the studies that implemented reciprocal teaching instructions, students were taught more than one question generation strategy (i.e., summarization, prediction, and clarification). In essence, reciprocal teaching is when the teacher first models the skill of generating questions after reading a paragraph and then provides time for students to practice this skill with unlimited support (e.g., teacher guidance, corrective feedback, many opportunities to respond). As students become proficient and more successful with generating their own questions, the teacher fades the support, for students to generate their own questions independently.

Rosenshine et al. (1996) found that the practice of teaching students to generate questions while they read yielded large and substantial results. Generally, the most successful procedural prompts when implementing self-questioning strategies to increase reading comprehension were signal words, generic questions, question stems, and story grammar categories. Regular instruction and reciprocal teaching yielded similar results. Therefore, across the 26 studies, for both instructional approaches (traditional instruction and reciprocal teaching) experimenter-developed comprehension tests and summarization tests were favored over standardized tests. When the performance on standardized tests
was used as the dependent variable, the most effective prompts for self-questioning were
generic questions (e.g., what is the main idea of this passage or chapter? how does the
author put the ideas in order? what are the key vocabulary words?) and stem questions
(e.g., how are… and… alike? what is the main idea of…? what are the strengths and
weaknesses of…? what conclusions can you draw about…?). When experimenter-
developed comprehension tests were used as the dependent variable, signal words (e.g.,
who, what, where, when, how) and the use of story grammar categories (e.g., setting,
main character, character’s goal, character’s obstacle) were the most effective prompts
for self-questioning.

The two reviews of self-questioning strategies, Wong (1985) and Rosenshine et
al. (1996), provided important implications when utilizing self-questioning strategies to
improve reading comprehension. When implementing self-questioning strategies teachers
must teach skills to a sufficient criterion for mastery, teachers must explicitly and directly
teach skills, and teachers must give students enough time to read and process the text
(Wong, 1995). The most effective self-questioning procedural prompts to increase
reading comprehension are the use of generic questions, question stems, signal words,
and grammar categories (Rosenshine et al., 1996). By implementing general prompts for
self-questioning, students gain a consistent understanding of how to apply these strategies
to numerous texts providing a better understanding of what they read. Question
generation is a systematic method of delivering active processing, central focusing, and
other comprehension-fostering and comprehension-monitoring activities (Rosenshine et
al., 1996).
Purpose

The purpose of this literature review is to extend previous research through the identification and reporting of evidence-based practices to teach self-questioning methods for students with disabilities and students who are at-risk for reading failure at the elementary school level. Specifically, the studies that have been evaluated in this review included both students who have learning disabilities in reading and students who are at-risk for reading failure. All studies focused on students from kindergarten through fifth grade. Some of the studies included students in sixth because they were combined with fifth graders within those particular studies. This review of research also includes single subject research designs whereas previous self-questioning literature reviews only include control group comparison studies.

Method

A comprehensive search of the literature was conducted through a computer data-based site, EBSCOhost, which included Academic Search Complete, Education Research Complete, ERIC, Psychology and Behavioral Sciences Collection, and PsychINFO. Education abstracts, Google Scholar, and ancestral searches were also utilized. The following search terms were employed: self-questioning, question generation, question-answer generation, self-generated questions, reading comprehension questions, main idea summarization, reading comprehension reading strategies, SRSD, QAR, KWL, RAP strategy, PQ4R, previewing and reading comprehension, SQ3R, question answer relation, elementary, disabilities, and at-risk.

All studies selected were based on specific inclusion criteria, these requirements include: (a) published in peer-reviewed journal articles from 1990 to 2012, (b) included
self-questioning independent variables (i.e., instruction or intervention) in an area of literacy, they could be included as an intervention/component package of programs, lessons, or other strategies, (c) included reading comprehension as one of the outcome measures (dependent variables), (d) employed either single-subject, experimental, or quasi-experimental design of study, and (e) included participants in kindergarten through fifth grade, and (f) included participants with disabilities and/or children who were at-risk for reading failure. Overall, the review included 16 experimental research studies published between 1990 and 2012.

Results

A total of 16 experimental research studies meeting the inclusion criteria were represented in this literature review. See Appendix F for a summary table of each study’s features ordered by the authors and a table of student performance outcomes ordered by the types of self-questioning strategies implemented for reading comprehension. Specifically, all studies included students spanning kindergarten through fifth grade with disabilities and/or students who were at-risk for reading failure. A review of the 16 experimental studies revealed 14 separate intervention strategies for self-questioning to improve the reading comprehension of learners. Several types of analyses were accomplished in this literature review including the evaluation of the types of self-questioning interventions utilized to improve reading comprehension, the effectiveness of these interventions, as well as the important defining features of these interventions and outcomes.
Participants. The total number of participants included in all 16 studies was 583 students. Out of the 583 students, 321 (55%) students were male, 233 (40%) students were female, and 29 (5%) students’ gender was not specified. Of the 16 studies, only one study did not specify gender (Benito et. al., 2005). Out of 583 students, 180 (31%) were Caucasian, 150 (26%) were African American, 16 (3%) were Hispanic, seven (1%) were Asian/Pacific Islander, and 111 (19%) were other. The ethnicity was not stated for 122 (20%) participants.

Due to the criteria of the study, all of the 16 studies were conducted with elementary aged students. Seven of the 16 studies included a range of students with both elementary students and middle school students (Chan, 1991; Graham & Wong, 1993; Johnson, Graham, & Harris, 1997; Manset-Williamson, Dunn, Hinshaw, & Nelson, 2008; Taylor, Alber, & Walker, 2002; Therrien, Wickstrom, & Jones, 2006; Therrien & Hughes, 2008). There were two studies that used a combination of elementary grade levels (Benito, Foley, Lewis, & Prescott, 1993; Gaultney, 1995). For example, Gaultney (1995) included 45 fourth and fifth grade males who were poor readers, but experts with baseball information. Of the 583 students, there were no studies that included students in kindergarten or first grade. There were 31 (5%) second graders, 50 (9%) third graders, 88 (15%) fourth graders, 182 (31%) fifth graders, 39 (7%) sixth graders, six (1%) seventh graders, and one (less than 1%) eighth grader included throughout the 16 studies. There were 186 (32%) students whose grade levels were not specifically stated.

When evaluating the abilities of the students, the inclusion criteria required the 16 studies to have comprised of students who were at-risk for reading or students with disabilities. There were three studies that included a combination of special education
students and general education students (Chan, 1991; Mason, 2004; Mason, Snyder, Sukhram, & Kedem, 2006). For example, Mason et al., (2006) included nine fourth grade low achieving students, four of whom were identified with varying disabilities and five students without disabilities. Of the 583 participants throughout the 16 studies, 204 (35%) students were described as average readers, 195 (33%) students were described as low achieving, at-risk for reading, poor readers, and/or students with poor comprehension, and 167 (29%) students’ reading abilities were not explicitly stated, but were described as having various reading abilities (i.e., high, average, and low ability readers), such as in the studies conducted by Ezell, Hunsicker, Quinque, and Randolph (1996) and Ezell, Kohler, Jarzynka, and Strain (1992).

There were 121 (21%) students who were identified with a disability and receiving special education services. Of the 121 students with disabilities, there were 90 (74%) students with learning disabilities, 26 (21%) students identified as having reading disabilities, two (2%) students with Attention Deficit Hyperactivity Disorder (ADHD), three (2%) students with Speech Language Impairment (SLI), and one (less than 1%) student with Emotional Behavioral Disorder (EBD). Some studies included students with more than one disability such as in the study conducted by Mason et al., (2006) in which one participant was identified as having LD and SLI.

**Settings.** Of the 16 studies evaluated, three (19%) of the studies took place outside of the United States including Guam (Benito et. al., 2005), Australia (Chan, 1991), and British Columbia (Graham & Wong, 1993). Eleven (69%) of the studies reported to have taken place in either an urban, suburban, or rural setting and five (31%) studies did not state the type of setting the study took place (Benito et al., 2005; Chan,
Of the 11 studies, 7 (64%) studies took place in an urban school district, three (27%) studies took place in suburban school districts (Graham & Wong, 1993; Johnson et al., 1997; Taylor et al., 2002), and one (6%) study took place in a rural school district (Therrien et al., 2006). Fifteen (94%) of the studies took place in public elementary schools during the school year and one (6%) study took place in a private elementary school for six weeks during the summer (Mansett-Williamson et al., 2008). For example, in the Mansett-Williamson et al., (2008) study, students were recruited from both private and public schools through principals and teachers for a summer reading clinic at a private school for students with reading disabilities.

Within the various school settings, interventions were implemented in a variety of classroom types including the general education setting, resource room/pullout setting, or a combination of classroom settings (i.e., both the general education classroom and the special education resource room). Four (25%) studies stated interventions and trainings took place in the general education classroom, five (31%) studies stated instruction took place in the resource room or pullout setting, and six (38%) studies did not clarify the classroom setting.

Fifteen (94%) out of the 16 studies included in the literature review reported the implementer(s) of the self-questioning strategy. Five (33%) studies indicated that the experimenter of the study implemented the self-questioning intervention and strategies. Four (27%) studies used the general education classroom teacher as the implementer, two (13%) studies used the resource room/special education teacher as the implementer (Chan, 1991; Taylor et al., 2002), one (7%) study used trained tutors (Therrien &
Hughes, 2008), one (7%) study used advanced university graduate students (Johnson et al., 1997), and one (7%) study used undergraduate students who were majoring in special education (Therrien et al., 2006). Finally, one (7%) study used a combination of instructors including the experimenter and two advanced university students to implement instruction and the self-questioning strategy (Mason, 2004).

Research designs. All 16 studies reported the type of research design utilized to evaluate the effectiveness of the various self-questioning strategies. A total of 11 (69%) studies used a comparison group design, four (25%) studies used a single-subject research design, and one study (6%) used both comparison group design and single-subject research design within the study (Manset-Williamson et al., 2008). The study conducted by Manset-Williamson et al. (2008) used a multiple-baseline single-subject design to measure mean scores of comprehension questions and used a repeated-measures ANOVA to measure the statistical significance of the means.

Of the 12 studies that used a comparison group design, including the study that utilized both types of research designs (Manset-Williamson et al., 2008) as indicated above, eight (67%) used randomized experimental designs and four (33%) used quasi-experimental designs. Included in the comparison group designs, four (33%) studies stated the testing condition was a within-subject factor and 6 (50%) studies stated repeated measures were utilized to examine different treatments and their statistical significances. Of the five studies that used a single-subject research design, again including the study that utilized both types of research designs (Manset-Williamson et al., 2008), 2 (40%) studies used a multiple baseline design (Ezell et al., 1992; Manset-Williamson et al., 2008), 1 (20%) study used an alternating treatments design (Taylor et
al., 2002), one (20%) study used a multiple probe design (Mason et al., 2006), and one (20%) study used a multiple baseline design with multiple probes given during baseline (Hagaman, Casey, & Reid, 2010).

**Dependent variables.** Many dependent variables associated to reading comprehension were assessed throughout the 16 studies evaluating self-questioning interventions. Twelve (75%) of the 16 studies included more than one outcome measure meaning more than one dependent variable was utilized to evaluate reading comprehension of self-questioning interventions. For example, both studies conducted by Therrien et al., (2006) and Therrien and Hughes, (2008) measured the effects of a combined self-questioning intervention with repeated readings on both the reading comprehension and the reading rate for reading achievement (count words per minute). Four (25%) studies evaluated only one outcome measure of comprehension. For example, Hagaman et al., (2010) measured one dependent variable of reading comprehension through oral retell and short answer questions and Walker (1995) measured reading comprehension through tests using short answer and essay questions.

Again, all 16 studies evaluated the effects of self-questioning strategies on the comprehension or response to reading. As stated above, 12 of the studies included more than one outcome measure. Additional dependent variables included identifying the main idea and details (6%), rating the importance of sentences in reading passages (6%), question generation (13%), metacognitive knowledge about reading (6%), the correct usage of the self-questioning reading strategy (13%), content acquisition (i.e., science or social studies), story map response accuracy (6%), correct responses to self-questions (6%), and reading fluency (13%).
Three (19%) of the 16 studies assessed reading outcomes of comprehension through various oral formats, five (31%) studies used a variety of written formats, and seven (44%) studies utilized a variety of both oral and written formats. Additionally, one (6%) study included both an oral format and a computer-assisted format to evaluate comprehension as the reading outcome (Manset-Williamson et al., 2008). In the study conducted by Manset-Williamson and colleagues (2008), after reading the passage on the computer, students were expected to answer seven inferential computer read multiple choice questions and then summarize the passage in an oral retell with a recording device on the computer.

Half of the studies (eight studies or 50%) included in the literature review used more than one type of format to measure the various outcomes of self-questioning strategies. For example, Stahl Scott (2008) used a variety of measures to assess reading growth, reading comprehension, and knowledge of the strategic process of reading through Maze assessments, vocabulary recognition tasks, oral free retell, written cued retell (specific questions asked), and a post-intervention interview. Overall, six (38%) studies utilized multiple-choice question formats, seven (44%) used types of oral retell formats, two (13%) used written retell formats, eight (50%) used short answer formats, and one (6%) used a fill-in-the-blank format. One (6%) study also employed both a short answer format to assess comprehension performance and a Likert-scale assessment format to evaluate the students’ knowledge about reading and the self-questioning strategy utilized within the study (Graham & Wong, 1993).

**Reading materials.** Out of the 16 studies, nine (56%) studies used expository text only, four (25%) studies used narrative text only, and two (13%) studies used both
narrative text and expository text (Ezell et al., 1992). Additionally, one (6%) study did not explicitly state the type of reading passages employed in the study (Graham et al., 1993). In the particular study conducted by Graham and Wong, (1993), the description of the reading materials stated that the reading comprehension passages were developed from fifth and sixth grade curriculum materials and stimuli used in previous studies by Raphael (1982) and Wong and Jones (1982). Therefore it was not clear if the reading passages were narrative texts or expository texts. Of the nine studies that used expository text, two (13%) studies used instructional text. For example, Chan (1991) utilized written materials that instructed and informed readers about identifying explicit main ideas, identifying implicit main ideas, deleting redundant information, and deleting trivial information.

Expository texts were generally taken from social studies textbooks, science textbooks, developed by the experimenter, adapted from other commercial programs, basal readers, and DIBELS passages. Narrative texts were generally taken from basal readers, developed by the experimenter, adapted from other commercial programs, and DIBELS passages.

**Independent variables: Self-questioning strategy.** Throughout the 16 studies, the majority of the studies implemented more than one self-questioning strategy. Four of the 16 studies implemented only one self-questioning strategy and 12 studies implemented more than one self-questioning strategy, either to compare the differences in effects of these differing strategies or implemented the various strategies in a package intervention. For example, a study that compared the various effects of different self-questioning strategies was Stahl Scott, (2008). In this study, experimenters compared the
effects of three different self-questioning strategies by implementing them across three
groups along with one additional group who did not receive an intervention for control.
These self-questioning strategies included picture walk, KWL (Know, Want to learn,
Learned), and Direct-Reading and Thinking Activity (DRTA). Another example of
implementing more than one self-questioning strategy to compare their effects was seen
in the study done by Taylor and colleagues (2002). The authors used an alternating
treatments design to compare the effects of self-questioning throughout texts and story
mapping of the story elements for narrative texts.

Of the 12 studies that implemented more than one strategy, some of the studies
utilized a main self-questioning strategy, but also incorporated strategies to support and
supplement the strategy to create a packaged intervention. In the study conducted by
Hagaman and colleagues (2010), the researchers implemented the RAP strategy (read a
paragraph, ask what is the main idea and details, and put into own words) and
supplemented this strategy with the Self-Regulated Strategy Development (SRSD)
model, which provided procedures for teaching students reading strategies along with
self-monitoring and goal setting.

**Question answer relationship strategy.** One of the most commonly used self-
questioning strategies implemented throughout the 16 studies was the use of the Question
Answer Relationship (QAR) strategy or a variation close to the QAR strategy (Benito et
al., 1993; Ezell et al., 1992; Ezell et al., 1996; Graham & Wong, 1993). Four of the 16
studies utilized the QAR strategy. The study conducted by Benito and colleagues (1993)
implemented the QAR strategy while students read selections from the adopted fourth
grade social studies textbook. Students were taught the QAR relationship with
metacognitive instruction through a gradual release model. Students had to answer three out of the four types of questions included in the QAR strategy: “right there,” “think and search,” and “author and you” while reading the various selections from the social studies textbook. Students also had a wall chart and desk cards for references when using the QAR strategy.

Two studies conducted by Ezell and colleagues (1992, 1996) utilized the QAR strategy along with peer assisted sessions in which students had the opportunity to practice with a cooperative group after teacher instruction and before the independent comprehension checks. The cooperative group exercises allowed for students to practice asking and answering questions about various types of stories (the 1992 study used character focused stories and the 1996 study used narrative and expository texts). Unlike the study conducted by Benito and colleagues (2005), students in both of these studies were required to answer all of the four question types included in the QAR strategy: “right there,” “putting it together,” “author and you,” and “on your own.”

The study conducted by Graham and Wong (1993) used a modified QAR strategy called the 3H strategy (here, hidden, and in my head). The purpose of the 3H strategy was to make students aware of question/answer relationships that are text explicit, text implicit, or script implicit. This allowed students to use appropriate text and/or background knowledge in answering comprehension questions. The authors compared two modes of teaching the 3H strategy for enhancing reading comprehension. The two teaching methods included a didactic teaching method and a self-instructional training. Students in the self-instruction group learned three additional self-questions (how will I
answer the question, where is the answer to this question, and is my answer correct) to guide their use of the 3H strategy.

**Generic self-questioning strategies.** Another commonly used self-questioning strategy present throughout many of the studies in this review was the use of generic questioning. Five of the 16 studies used a varied version of generic self-questioning (Chan, 1991; Mason, 2004; Taylor et al., 2002; Therrien et al., 2006; Therrien & Hughes, 2008). The self-questions included pre-made generic questions pertaining to narrative texts and expository texts, and dealing with story structure, specific story elements (character, setting, plot, ending of story), or information based on the general text.

Taylor and colleagues (2002) conducted a study that used generic questions for the self-questioning strategy while reading narrative texts. The generic questions included 10 pre-printed questions on laminated cards and students were required to stop at two predetermined stopping points throughout the reading to answer these questions about the text. The authors of this study also compared this self-questioning intervention with the use of story mapping that dealt with the story elements (i.e., characters, setting, plot) of the text.

The study led by Therrien et al. (2006) also implemented a generic questioning strategy adapted from the Reread-Adapt and Answer-Comprehend (RAAC) intervention, a supplemental program (consisting of 8 instructional steps), designed to include instructional components from both repeated readings and question generation literatures. Students were give the same questions targeting main character, setting, and ending of the story after each narrative passage supplemented with repeated readings. Basically, students continually read the same passage until a specific criterion was met for Count
Words per Minute (CQPM) and then the students were asked the generic questions. Additionally, a follow up study that utilized the generic self-questioning strategy and repeated readings strategy was conducted by Therrien and Hughes, (2008) to evaluate the effects of the same strategies, but this time they compared the interventions with one another rather than as a combined package. Students again read narrative passages, but students previewed and read aloud the questions before reading and then answered the questions out loud after reading.

The study conducted by Chan (1991) implemented a structured self-questioning strategy in which students were given specific, but generic pre-planned self-questions for each topic they were reading about (i.e., deleting redundant information, deleting trivial information, locating topic sentences, and identifying implicit main ideas) for the instructional text. Specifically, students were taught how to ask themselves the pre-developed self-questions while reading the passage and how to look for the answers to the questions. Students were then allowed to practice the strategy on their own.

Finally, Mason (2004) utilized the Reciprocal Questioning (RQ) strategy to compare the effects against the TWA strategy (Think before reading, think While reading, and think After reading). The Reciprocal Questioning procedure (RQ) included the training of students to ask and answer good questions with peers, and students took turns asking and answering the questions to ensure accuracy for both questions and answers. The RQ strategy was taught with Cooperative ReQuest procedure and students initially worked in groups of four and then were reduced to working in pairs. The TWA strategy was taught with the explicit self-regulatory strategy development instructional procedure, SRSD, discussed next.
Self-regulated strategy development. Three studies used a self-regulatory method (i.e., SRSD) for implementing self-questioning strategies to improve reading comprehension (Hagaman et al., 2010; Mason, 2004; Mason et al., 2006) and one study compared the actual components of SRSD to evaluate the varying pieces of the effectiveness on reading comprehension (Johnson et al., 1997). Self-Regulated Strategy Development (SRSD) is a systematic procedure that allows students to be active learners and collaborators that emphasizes an interactive relationship between the teacher and student. The essential components of SRSD include: (a) task-specific strategies, (b) procedures for regulating the strategy, (c) procedures for regulating task behavior such as self-instruction, self-monitoring, and goal setting.

The studies conducted by Hagaman et al. (2010), Mason (2004), and Mason et al. (2006) used SRSD as a framework to implement the main self-questioning strategy of these studies. Specifically, Hagaman and colleagues (2010) used the SRSD method to implement the RAP (read a paragraph, ask what is the main idea and two details, and put into own words) self-questioning strategy. Mason (2004) used SRSD as a method to implement the TWA strategy portion of the reading comprehension intervention in their comparative research of TWA and RQ. Mason and colleagues (2006) also evaluated the effects of using the SRSD method to implement the TWA self-questioning strategy along with a goal strategy called PLANS (Pick goals, List way to meet goals, And, make Notes, and Sequence notes), for reading and writing of expository text. Students read passages using TWA self-questioning strategy and PLANS goal setting strategy to retell what they learned in both oral and written formats.
Unlike the previous studies that utilized SRSD to implement the main self-questioning strategies, the study conducted by Johnson and colleagues (1997) implemented SRSD as the main self-questioning strategy. SRSD was evaluated in four different conditions (SRSD alone, SRSD plus goal setting, SRSD plus self-instruction, and SRSD plus goal setting and self-instruction) to evaluate the various components of SRSD and their effects on reading comprehension.

**Student generated self-questioning strategies.** Overall, there were three studies in which students were required to generate their own self-questions using varying self-questioning strategies (Gaultney, 1995; Manset-Williamson et al., 2008; Walker, 1995). These self-question strategies included generating why question and answers, the FIST strategy of developing questions about the first sentence of each paragraph, and SRQ2R (survey, read, question, recite, review) strategy.

The first study requiring students to develop their own questions, completed by Gaultney (1995), asked students to generate and then answer their own why questions. First, the authors identified students who were “baseball experts” and then trained these students how to ask why questions about the text and answer these questions while reading stories about baseball. The instructor modeled how to ask why questions and how to answer the why questions while reading until students exhibited independent production of the strategy. Students were then given expository text about baseball and then were required to generate their own why questions and answers while reading. A comparison group was utilized in which these students did not use baseball stories to compare the effects of students being familiar with the information they were reading versus students being unfamiliar with the information they were reading.
A second study that required students to develop their own self-questions was the study conducted by Manset-Williamson et al., (2008). The authors adopted the FIST (FI-make a question with the first sentence, ST-survey the paragraph for answers and tie answers into question by writing one sentence) self-questioning strategy in which students with reading disabilities read the first sentence of the paragraph, created a question from the sentence that might be answered by the paragraph, and then after reading, the students determined whether the author of the text answered the questions or not. This research piece also utilized text-reader software called Kurzweil 3000® to read the text of the passages and the comprehension questions aloud to the students.

The third study that trained student to ask their own self-questions while reading was the study conducted by Walker (1995). The author used the SRQ2R self-questioning strategy, which is a variation or re-ordering of the SQ3R strategy. There were seven different experimental groups (SRQ2R alone, SRQ2R with main idea training, SRQ2R with text structure training, main idea training only, text structure training only, and a control group) involved in this study to evaluate and compare the effects of the SRQ2R strategy with various pre-trainings of main ideas and text structures. Students using the SRQ2R strategy were expected to use charts containing the steps to the strategy, watch models of the strategy, and practice the strategy in small groups. Students were reminded every day to review the SRQ2R strategy and repeat the steps with a buddy before using the strategy.

Comparing self-questioning strategies. Lastly, Stahl Scott (2008) compared the effects of three main self-questioning strategies. These strategies included Picture Walk (PW), KWL (Know, Want to learn, and Learned), and Directed Reading-Thinking
Activity (DRTA). The PW strategy is a pre-reading activity in which the teacher and student preview each page or few pages of a new book and use the pictures to generate discussion about what the book is most likely to be about. The KWL strategy is used to enable teachers to activate prior knowledge and help students to become purposeful readers of expository text. Before reading, students are to list facts they know and what they want to learn about the topic of the passage they will be reading. After reading, students listed new information they learned from reading the passage. Finally, the DRTA strategy is an instructional framework in which the text is divided into significant sections, and the teacher facilitates discussion for each section of the text. Through this process, students learn to become purposeful readers, generate predictions, and support their predictions based on the information of the text. All three strategies incorporate reader involvement and social mediation, activation of prior knowledge, and making predictions.

**Length of the intervention.** The length of instruction in sessions for the intervention strategies of self-questioning could be calculated for 14 (88%) of the 16 studies. Therefore, for the 14 studies, the mean length of instruction for the intervention of self-questioning strategies was 26 sessions with a median of 10.5 sessions (range 2-165 sessions). The total length in days of the studies conducted could be calculated for the same 14 (88%) of the 16 studies. The mean length of the 14 studies was 48 school days (range 5-260 school days) with a median of 24 school days. Due to unclear information within the other two studies (Benito et al., 2005; Mason, 2004), the lengths in sessions of the interventions or the total length of the studies could not be calculated.
Both of these studies did not report the length of instruction (sessions) within the study or the full length (school days) of the actual study.

**Maintenance and generalization measures.** Maintenance and generalization measures were present throughout the 16 self-questioning strategies evaluated in this review. Of the 16 studies, half or eight (50%) of the studies conducted maintenance measures. Five (63%) of the eight studies that conducted maintenance measures found the maintenance results to be successful (Chan, 1991; Ezell et al., 1996; Graham & Wong, 1993; Johnson et al., 1997; Mason et al., 2006). For example, in the study conducted by Mason et al. (2006), the researcher administered short-term maintenance measures (four to six weeks following intervention) and long-term maintenance measures (12 weeks following final short-term maintenance probes). Student performance on comprehension was measured through oral and written retell. Overall, student performance improved and was maintained following instruction. Six students who participated in the long-term maintenance testing and were found to have maintained skills above their original baseline measures.

Three (37%) of the eight studies that conducted maintenance probes gained variable results (Hagaman et al., 2010; Mason, 2004; Walker, 1995). For example, in the study conducted by Mason (2004), maintenance probes for summarization, retell, and comprehension were administered three weeks after the self-questioning intervention was terminated. The performance on the number of main ideas retold had not maintained over time.

Of the 16 studies, only five (31%) of the studies conducted generalization measures. Four (80%) of the five studies found the generalization probes to be successful
(Chan, 1991; Ezell et al., 1996; Johnson et al., 1997; Therrien et al., 2006). For example, in the Johnson et al. (1997) study, the researchers used a pre-test and post-test generalization measure to assess generalizability across people and settings. The instruction and intervention was implemented by the general education teacher in the general education classroom and then the generalization probe was administered by the special education teacher in the special education classroom. Results from this measure indicated that instruction for the self-questioning reading strategy produced meaningful and generalizable effects on students’ story comprehension skills.

One (20%) of the studies did not have successful generalization results (Mason, 2004). In the study conducted by Mason (2004), the generalization probe was evaluated on the transmission of oral retell to written retell of story elements and main ideas. The researchers hypothesized that if the students improved on comprehension performance of oral retell, then these skills would generalize to written retell. Unfortunately, there was no statistically significant findings on the written retell measures, indicating a lack of transfer of skills from oral retell to written retell.

**Social validity measures.** Social validity measures were evident in eight (50%) of the 16 studies evaluating self-questioning strategies. All eight of the 16 studies that conducted social validity measures gained positive results (Ezell et al., 1992; Ezell et al., 1996; Graham & Wong, 1993; Johnson et al., 1997; Mason, 2004; Mason et al., 2006; Stahl Scott, 2008; Taylor et al., 2002). Specifically, in the study conducted by Taylor and colleagues (2002), students were asked a week after the last day of data collection through teacher interviews to state their opinions on both reading strategies of story
mapping versus self-questioning. Four out of five of the students reported that they preferred the self-questioning strategy over the story mapping strategy. In the study conducted by Mason et al. (2006), students reported that they liked the TWA plus PLANS reading strategies as well as the instruction. Six questions were asked during post-instruction interviews pertaining to instruction and strategies. In addition, these strategies were seen to improve both the students’ reading and writing skills. Additionally, in one (13%) of the eight studies that gained positive results on social validity measures, the Stahl Scott (2008) study geared their social validity measures more towards strategy knowledge and procedural knowledge, rather than the traditional evaluations of whether or not students liked or preferred specific reading strategies.

Overall, of the eight studies that conducted social validity measures, six (75%) of the studies focused their social validity measures towards the students only (Graham & Wong, 1993; Johnson et al., 1997; Mason, 2004; Mason et al., 2006; Stahl Scott, 2008; Taylor et al., 2002) and two (25%) of the studies evaluated both teacher and students’ thoughts and opinions (Ezell et al., 1992; Ezell et al., 1996). For example, the study conducted by Ezell and colleagues (1992), assessed the classroom teacher, the students, and nine random teachers outside of the study. The classroom teacher completed four satisfaction questionnaires at various times throughout the study evaluating students’ overall reading comprehension skills and their opinions about students’ abilities to ask and answer different types of questions. The students were also surveyed before and after intervention. Additionally, other teachers and outside specialists were asked to view videotape sessions and give feedback. These social validation measures indicated that the
teacher, students, and outside teachers and specialists responded positively to the intervention and effects on reading comprehension and strategy use.

In summary, there were four (25%) studies that did not conduct any measures for maintenance, generalization, or social validity (Benito et al., 1993; Gaultney, 1995; Mansett-Williams et al., 2008; Therrien et al., 2008). On the other hand, there were four (25%) studies that completed all three measures of maintenance, generalization, and social validity within their studies (Ezell et al., 1996; Johnson et al., 1997; Mason, 2004; Mason et al., 2006).

**Student outcomes.** Again, Table 2 presents student performance outcomes ordered by the types of self-questioning strategies implemented for reading comprehension. All of the 16 studies included in this review found that self-questioning strategies had positive effects on reading comprehension skills. All students throughout the studies, including students who were at-risk for reading failure, struggling readers, and students with disabilities, benefited from the use of self-questioning strategies to increase skills in reading comprehension. The majority of the studies found that self-questioning strategies substantially improved student outcomes when answering explicit questions across narrative and expository texts, but had minimal improved student outcomes when answering inferential questions, requiring more background knowledge and higher-level thinking. Furthermore, the majority of the research suggested that when self-questioning strategies were taught through explicit instructional methods, greater growth for reading comprehension skills were evident.
Discussion

Overall, the use of self-questioning strategies had positive effects on reading comprehension for elementary school students who were at-risk for reading failure, struggling readers, and students with disabilities. There were a variety of self-questioning strategies under review within the 16 research articles, including strategies that are used before reading (i.e., KWL chart, picture walk, repeated readings), during reading (i.e., DRTA, RAP strategy, story mapping) and/or after reading (i.e., reciprocal questioning, 3H strategy) as well as throughout all steps of the reading process (TWA, FIST strategy). Some self-questioning strategies were compared on their effectiveness and quality of intervention success for reading comprehension within the same study (i.e., self-instruction training versus didactic teaching, KWL versus picture walk versus DRTA, self-questioning versus story mapping), while other self-questioning strategies were combined with other strategies as a packaged intervention (RAP strategy and SRSD, repeated readings and question generation).

In conclusion, the findings throughout the 16 research pieces supported the use of self-questioning methods to promote active student engagement with reading to improve student success for reading comprehension. Generally, typically developing students routinely acquire the necessary skills (i.e., decoding, phonemic awareness, vocabulary acquisition, self-correcting reading procedures, active engagement with the text) to become successful readers and comprehenders. Students with learning disabilities have difficulty associating meaning with words, recognizing important information, recalling specific information and details, drawing conclusions, and making predictions (Sencibaugh, 2007). It is important to note, students with disabilities and students who
struggle with reading require explicit and direct instruction on how to use self-questioning strategies while reading various types of text and answering a variety of questions about the text they read. Research has suggested that explicit and systematic instruction in reading comprehension strategies can be an effective way to help students overcome difficulties comprehending what they read (Hagaman et al., 2010).

In addition, it is also beneficial for students needing extra support for reading to receive guided practice and independent practice of self-questioning skills to foster maintenance and generalization. For example, in the study conducted by Hagaman and colleagues (2010) the authors found that the SRSD method for teaching the RAP paraphrasing self-questioning strategy was a critical feature of instruction because it provided clear and specific guidelines for effective use of the strategy. Finally, by teaching self-questioning skills for reading, students become active learners, engage with the text, and grow into independent readers and learners.

**Limitations and implications for future research.** The majority of the studies included in this review comprised of students in the upper elementary grades, specifically fourth and fifth grades. There were no kindergarten and first grade students in any of the studies and significantly few second grade students (5%) were included. Third grade students (9%) and fourth grade students (15%) were under represented as well throughout the self-questioning studies. This finding may be due to the fact that reading comprehension skills become most critical during the third grade year when students are transitioning from learning how to read, to reading for learning purposes. Therefore, researchers may not find it crucial to evaluate the reading comprehension skills of younger elementary aged students because they are still learning how to read. Though, it
has been argued that school should take a more active role in early identification of reading comprehension problems and develop preventative approaches, rather than waiting to repair the comprehension problems to arise in the later years (Hagaman et al., 2010; Underwood & Pearson, 2004).

It is necessary and important to teach skills for reading comprehension in kindergarten through second grade. These skills can easily be adapted and simplified for earlier learning and acquisition. Future research should evaluate effective self-questioning practices for reading comprehension in early elementary grades. It is important to know what methods and types of instruction are meaningful to foster comprehension skills in the earlier years. For example, self-questioning strategies can be evaluated through guided reading procedures and storybook read-alouds in which the teacher asks questions before, during, and after reading. Picture walks and other types of self-questioning strategies should be further assessed in the earlier elementary grade years.

Some ethnicities were represented more than other ethnicities throughout the 16 studies evaluating self-questioning strategies. Caucasian and African-American ethnicities were mostly represented in the studies respectively. Hispanic populations and Asian/Pacific Islanders were significantly underrepresented. Future studies should focus on a more diverse representation of ethnicities when conducting research on the effects of self-questioning on reading comprehension. Not only should more diverse populations be included in self-questioning studies, but individual studies themselves should include diversity among their participants. In addition, it would be beneficial for educational
research to include more students who are learning to speak English as their second language.

Due to the criteria of this literature review, studies that included students who were at-risk for reading failure, struggling learners, or students with disabilities were the focus. Among these specified participants, the most common students were poor readers or students who were at-risk for reading failure. Only three out of the 16 studies included both general education students and special education students. A significant increase in schools are attempting to instruct almost all students with disabilities in the general education classroom for the entire school day (Wolford, Heward, & Alber, 2001). With the push and advocacy for more instruction in inclusion settings, future research should conduct more studies with a combination of general education students and students with varying abilities. Most of the students who were receiving special education services were identified as having learning disabilities. Students with speech language impairments, Attention Deficit Hyperactivity Disorder (ADHD), Emotional Behavior Disorder (EBD), and others not included in the 16 self-questioning studies (e.g., autism, cerebral palsy, Down syndrome) were considerably underrepresented throughout. Future research should focus on including more of a variety of disabilities within studies to evaluate the effects of self-questioning strategies on reading comprehension.

The majority of the self-questioning research was conducted in urban settings. Research is limited to other settings including suburban and rural areas. Future research should consider conducting research in other environments where students of all ages and abilities struggle with reading comprehension and are in need of more successful interventions and strategies. Additionally, 15 out of the 16 studies were conducted in
traditional school settings. Future research should expand into other types of school settings including magnet schools (e.g., math and science, technology, music and performing arts) specialized schools (e.g., schools for students with dyslexia, schools for students with autism, schools for students who are deaf and hard of hearing, schools for students who are visually impaired), charter schools, and home-based and schools that hold classrooms and learning on-line.

Not only did over half of the studies take place in urban settings, but the majority of the studies were implemented by the experimenter(s) including undergraduate and graduate students. It would be most beneficial for future research to conduct studies in which classroom teachers are specifically trained on how to teach self-questioning strategies to implement into their own classrooms. It would be more of an advantage for teachers to learn successful methods based on empirical evidence. This would then help to ensure that more teachers in a greater amount of classrooms utilize added effective teaching methods. For example, the experimenters in the study of Therrien et al., (2008) trained school district paraprofessionals two intervention strategies (i.e., repeated readings and self-questioning strategy) to increase the comprehension of students with disabilities and students who were at-risk for reading failure. More studies should take teacher training into consideration as a part of their intervention package for self-questioning.

An overwhelmingly amount of studies were conducted in public elementary schools during typical school hours. Instruction generally took place in either a general education classroom or in a resource room (e.g., pullout setting, special education classroom, separate small vacant room) and during language arts and/or reading
instruction time. Some studies implemented self-questioning strategies using science and social studies materials for the purpose of using expository texts, though during language arts and/or reading instruction time. Future research should implement self-questioning strategies in more of a variety of subject areas and classes including science, social studies, math, art, and music. By implementing self-questioning strategies to promote reading comprehension in a variety of subject matter, students are more likely to maintain skills over time, generalize skills to other environments, and generalize skills to previously learned and newly learned skills. Generalization and maintenance of skills will be discussed in more depth later.

Comparison group design was used more often when evaluating the effects of self-questioning strategies on comprehension in comparison to single subject design. Interestingly, there was one study that utilized both a group comparison design along with a single subject design (Mansett-Williamson et al., 2008). Future research should consider using more single subject designs especially when implementing strategies for students with disabilities. The use of single subject designs focus more on the individual learner and research that includes participants with disabilities should emphasize their attention on the specific needs of each learner. It is more practical and sufficient to apply a single subject design rather than a group design when focusing on the progress and needs of individual students.

The use of assessments to guide instruction and monitor the implementation of self-questioning strategies is imperative. All of the self-questioning strategies implemented some type of comprehension measure with both explicit and implicit questions. Most of the studies implemented both oral formats and written formats to
assess comprehension. There were also more studies that implemented written assessments in the form of short answer questions for reading comprehension compared to oral assessments. In addition to the standard reading comprehension measures (i.e., explicit, implicit), there was a wide range of other measures incorporated throughout the 16 studies. These other measures include content acquisition (i.e., science topics), question generation accuracy, identifying main ideas and details, reading fluency, and rating sentences of importance.

In the future, studies implementing self-questioning strategies to evaluate the effects on comprehension should monitor how well students use the self-questioning strategies that are implemented through a checklist or procedural integrity type measure. For example, if students are using the RAP paraphrasing strategy to self-question as they read, measures can be taken on the accuracy of stating the main ideas, writing two supporting details, and writing information in their own words. The RAP strategy is a six-step instructional model and students can be monitored on how well they follow each step of the strategy. The importance of strategy use is essential because if students are not using the strategy as intended, there may be negative outcomes for reading comprehension improvement. By measuring strategy use, students can be closely evaluated as well as directly and immediately corrected. More studies should also measure content acquisition when reading expository texts. By evaluating information being learned through self-questioning strategies and reading, experimenters gain another valuable piece to determine the effectiveness of the self-questioning strategy. Are the students really learning content while they read? Experimenters could assess not only the success of comprehension, but also content (e.g., science and social studies) acquisition.
A significant amount of the studies evaluated in this review concluded that self-questioning strategies were successful in promoting reading comprehension for explicit information. When students were assessed on more implicit or inferential information, they were not as successful. For example, when evaluating the QAR strategy, students can be assessed on all four types of questions comprising of the strategy: right there, putting it together, author and you, and on your own. The first two questions (right there and putting it together) are explicit questions in which the information is directly stated in the text. The second two questions (author and you and on your own) are implicit questions in which students must have background knowledge and pull information from the text to draw conclusions and answer the questions. In the studies under review, students generally had greater gains and better maintenance measures for the explicit questions in comparison to the implicit questions. It would be beneficial for future research to evaluate more closely self-questioning strategies that will support both question types, compare the effectiveness of the question types, and improve the use of these interventions. Future research could also implement self-questioning reading packages that include a mini-lesson prior to reading to support and facilitate background knowledge and vocabulary acquisition to increase reading comprehension for implicit and inferential information.

All of the 16 studies included in this review either evaluated self-questioning strategies for expository text or self-questioning strategies for narrative text. It would be interesting and advantageous for futures researchers to implement and compare the reading of both types of text for self-questioning strategies. Studies should be developed to compare the effects of different types of self-questioning strategies on varying types of
text (i.e., expository, narrative). For example, a study could implement a specific self-questioning checklist for expository texts and evaluate the effects on comprehension, and then implement a comparable self-questioning checklist for narrative texts and evaluate the effects on comprehension. Here, experimenters can assess the similarities and differences first hand between the various self-questioning strategies for different types of texts. In addition, future studies should evaluate the effects of self-questioning strategies on comprehension when using persuasive texts or biographical texts. A wider variety of reading topics, different genres, and text formats need to be implemented in future research to broaden the use and support of self-questioning strategies.

Only half of the studies included measures for maintenance and social validity and less than half of the studies included generalization measures overall. A skill is not truly learned unless it can be maintained over time and generalized to other settings and skills. For behavior change to be meaningful, it must persevere and be useful to the individual in other settings (Bicard et al., 2010; Stokes & Baer, 1977). The maintenance and generalization of skills is such a critical component and unfortunately is commonly overlooked. Future studies should implement measures for maintenance through weekly and/or monthly maintenance probes once interventions have been removed. This will allow for improved evaluations of more effective practices to determine if specific skills maintain over time. If skills do not maintain over time, the intervention becomes less effective and less useful.

Future research should also incorporate measures for the generalization of self-questioning skills by monitoring other subject areas or other skills where the intervention was not specifically implemented. Researchers should also include procedures within
their interventions to program for the generalization of self-questioning skills. In other words, researchers should specifically train participants to generalize the skills being implemented to improve reading comprehension outcomes through self-questioning strategies that support the use of skills in other areas (e.g., loose teaching, self-monitoring strategies, mediating stimulus).

**Implications for practice.** After reviewing 16 studies that implemented various types of self-questioning strategies to increase comprehension skills, it can be concluded that self-questioning strategies support positive outcomes for successful understanding of reading. Self-questioning strategies have also been successful for promoting the comprehension of both narrative texts and expository texts. Self-questioning strategies were proven to be successful for countless elementary aged students with varying abilities. Many of the studies included in this review proved the implementation of self-questioning strategies were enhanced with the use of explicit and direct teaching methods. Programming for maintenance and generalization should be given more attention when implementing self-questioning strategies for life-long learning and success for our students.

The majority of the studies included in this review evaluated the effects of self-questioning strategies on reading comprehension for students in the upper elementary grades (i.e., fourth grade and fifth grade). Typically, skills for reading comprehension are heavily focused more in third grade and above, but it is crucial to build the foundational skills for reading comprehension in the younger elementary grade levels as well. Reading strategies that focus on questioning to promote comprehension for younger students under third grade can be implemented throughout lessons, teaching methods, and student
activities. For example, as teachers are conducting a read aloud session, they can begin implementing and modeling self-questioning strategies through a guided reading method. Teachers can implement general before, during, and after reading questions such as (a) what do you think this story will be about? (b) who is the story about? (c) where are the characters located in the story? (d) what do you think will happen next? (e) what happened at the end of the story? (f) what do you think about the story?

These questions can easily be applied to a variety of texts including expository and narrative texts. For expository texts, teachers can focus on vocabulary, ask questions specifically about the explicit facts, and connect what is being read to the lives of the students. For narrative texts, teachers can focus on the story elements including characters, setting, problem, and solution. Teachers can also engage readers/listeners by asking general questions such as: (a) what happened in the beginning of the story? (b) what happened in the middle of the story? (c) what happened in the end of the story? Active student engagement is promoted through the continuous questions given by the teacher through this guided self-questioning method. As the teacher models for the students, they learn to become more interactive with the text and have a greater chance of increasing understand of what they are reading.

First and second grade readers are more independent and can utilize simple self-questioning checklists or graphic organizers as they read. For example, the KWL chart is a comprehensive graphic organizer that generates prior knowledge (what I Know), gets the students thinking about the topic they will be reading (what I Want to know), and requires the students to reflect on what they read (what I Learned). Giving students as many opportunities to interact with the text, again will allow for a greater understanding
of what is being read. A self-questioning checklist could be another effective way to promote students’ active engagement and interaction with the text. The self-questioning checklist could be a general guide applied to a variety of genres including both expository and narrative texts. For example items on the checklist could prompt students to conduct the same evaluation of what they are reading every time no matter what type of text they are reading. These items could easily be applied to both narrative and expository texts:

1. Look at the pictures,
2. What do you think the story/passage will be about?
3. Read the first paragraph,
4. What is the main idea of the story/passage?
5. After you read, retell/summarize what you read.

Many of the studies under review implemented not only a self-questioning strategy, but also utilized an explicit and direct teaching method to teach the self-questioning strategy. Research shows that many students who struggle with reading and have been identified as students with disabilities require direct and explicit instruction for learning, especially for learning how to comprehend what they read (Wanzek et al., 2013; Wong, 1985). When implementing a self-questioning strategy to promote reading comprehension, teachers should use direct teaching methods. SRSD has been proven effective and well supported by research for teacher to provide explicit procedures for teaching students with a variety of abilities (Hagaman et al., 2010).

It is important to keep in mind, different types of text (i.e., expository, narrative, biographical, persuasive) serve different purposes such as to tell a story, to give information, or to persuade. Therefore, the questions incorporated into a self-questioning strategy will be different depending on the type of text being read by the student. It would be valuable for teachers to develop standard questions based on the types of texts. For
example, standard questions that would go along with an expository text could include: (a) what is the topic about? (b) what do you already know about the topic? (c) what do you want to know more about? (d) what is one interesting fact you learned about the topic? (e) what is the main idea of the passage? (f) what are two supporting details to support the main idea? The standard types of questions that could be implemented for a persuasive passage could include: (a) what is the author persuading the readers to do/think? (b) what is the pro side of the argument? (c) what is the con side of the argument? (d) do you feel persuaded? (e) did the author change your mind about the topic/issue?

A large amount of the literature under evaluation in this review focused on reading and comprehension instruction within language arts and reading classes. Teachers should consider using these same self-questioning strategies when reading in other content classes as well. For example, when reading science and social studies information, students can use self-questioning strategies as they read to better comprehend the material. One self-questioning strategy in particular that would be advantageous for the purpose of reading and comprehending science and social studies topics is the (QAR) strategy. Before the students read, they can preview the comprehension questions that will be asked after reading the text. Then as students are reading, they can underline any information that will help them to answer the comprehension questions at the end. Finally, students can use the QAR strategy to identify the different types of questions being asked (right there questions, think and search questions, author and you questions, and on my own questions) to help them better
answer the questions by thinking about the text they are reading and also using higher-level thinking skills.

The QAR strategy can also be useful in the content area of math. Students can apply this strategy by identifying the relationships between word problems and what is required to solve these problems. For example, students can read a story problem and then identify whether or not all of the information is included in the word problem in order to solve the problem (right there question). If some of the information needed to solve the problem is not included in the story problem, students would need to use information they already know (i.e., a dozen equals twelve, there are 60 minutes in an hour, four quarts equals one gallon) and must apply it to solve the problems (author and you question). By giving students strategies for identifying the types of story problems, they can better think about what is being asked in the problem and solve it more efficiently and successfully by being more engaged and aware.

Only half of the research articles under review assessed for maintenance of skills. A skill being taught should continue even after the instruction of that skill has been discontinued. Skills are only valuable if they can be used over a long period of time and the student can use the skill in other settings (Bicard et al., 2010; Stokes & Baer, 1977). It is important for teachers to keep in mind that when they are teaching students to use self-questioning strategies while reading, they need to think about how they will instruct students to ensure the maintenance of these strategies. In order to encourage maintenance of self-questioning strategies, teachers can include mastered skills within the teachings of new skills. For example, if students have mastered self-questioning strategies when reading narrative texts, these same skills can be used while implementing self-
questioning strategies of expository texts. The same methods of explicit instruction that was used to teach self-questioning skills for narrative text, can be implemented when teaching self-questioning skills for expository text (e.g., what happened in the beginning? what did you learn in the beginning? what happened in the middle? what did you learn in the middle? what happened in the end? what did you learn about the topic in the end?).

Less than half of the studies under review programmed for the generalization of self-questioning strategies and skills. Teachers need to take into great consideration that when they are teaching students self-questioning strategies while reading, they need to program for the generalization of these skills as well. If students are not generalizing self-questioning strategies and skills, then the students have not successfully acquired these skills and can be considered not mastered. In order to program for generalization of self-questioning strategies, teachers can implement generalization tactics. Some suggested generalization tactics that would work best with teaching self-questioning strategies include: (a) teaching enough examples, (b) teaching self-management techniques, and (c) training students to recruit teacher attention.

In order to teach enough examples to promote the generalization of self-questioning strategies, teachers must give students as many opportunities to use the strategies as possible. These opportunities could include using the strategies with various types of texts or stories, with a variety of topics, in various types of classroom settings (i.e., whole group, small group, peer tutor, one-on-one with the teacher). Teachers can also teach a variety of self-questioning strategies to allow students to find the strategy that works best for their learning. All of these possibilities will help to promote the
generalization of skills by allowing students to apply self-questioning strategies by providing a wider variety of uses and offering a multitude of chances.

Teachers can also implement self-management techniques while teaching self-questioning strategies to promote the generalization of these skills. For example, teachers can provide individual cards for students to reference and self-manage the self-questioning strategy as they read. Students then can access these cards when needed to promote more independent learning as well. Students can also self-monitor themselves by setting reading and comprehension goals and monitoring their own progress as they read over time and throughout the school year. Students can even self-monitor themselves on how well they utilize self-questioning strategies when they read.

The most powerful motivational and behavior management tool available to classroom teachers is the systematic application of contingent praise and attention (Craft, Alber, & Heward, 1998). When students are given teacher attention and feedback, students tend to work harder and gain the desire to continue to learn. Classrooms are a very busy place and often times it is difficult to obtain the attention from the teacher. Therefore, teachers can train students to recruit teacher attention while teaching self-questioning strategies. As students are learning to use self-question strategies, teachers can program stopping points throughout the strategy for students to stop, raise their hand to gain the teacher’s attention, and once the students have gotten the attention from the teacher appropriately, the student can ask the teacher how they are doing or if their work is correct. By training students to recruit teacher attention, they are learning how to gain the attention from the teacher in an appropriate manner and at an appropriate time as well as becoming an active participant and learner within the classroom.
The review of self-questioning strategies on reading comprehension has proven to be successful for elementary aged students with a variety of abilities. Self-questioning strategies not only help to improve reading comprehension, but they allow for the learners to become more independent thinkers and learners. Students learn skills and strategies to become active readers and interact with the text to make them more successful when understanding information. By programming for generalization and maintenance when implementing self-questioning strategies, students will gain the ability to apply these skills over a variety of content areas, with a variety of reading genre, as well as maintain these skills over a long period of time. Ultimately, with the use of self-questioning strategies while reading, students will become successful life-long readers and learners.
Chapter 3: Method

Participants and Setting

Participants. The participants of the study were six fourth-grade students identified as at-risk readers by their reading/language arts teacher. The teacher based the decision of participants for the study on last year’s state standardized reading test for third grade and beginning of the year screening tests and pre-assessments for reading. Students were identified for the study using the following criteria (1) students had good attendance, (2) students were not expected to be repeating the fourth grade, (3) students reading abilities were no more than two grade levels below the fourth grade reading level, (4) students were not English Language Learners (ELL) or receiving ELL services, (5) students scored below a 599 reading level on the Lexile reading measure (which is considered below grade level expectations by Scholastic Reading Inventory, on grade level is between a 600 and 699 Lexile level), (6) students were able to write a complete sentence, and (7) students scored between 390 and 420 on the reading portion of the Ohio Achievement Assessment (OAA) third grade standardized assessment from spring 2013. Students must score 400 or above on the reading OAA to be considered a “proficient” reader and for the 2012-2013 school year, students were required to score 390 or above to advance to the fourth grade. All students attended a suburban elementary school located east of the city of Columbus. These students spent all of their day between three general education classrooms one for math, one for science and social studies, and the other for
language arts and reading. See Table 1 for demographics and reading scores for each participant.

Table 1. Demographics and Reading Scores of Participants.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>3rd Grade OAA Test Scores</th>
<th>Winter Lexile Level</th>
<th>Spring Lexile Level</th>
<th>Winter Fluency Rate</th>
<th>Spring Fluency Rate</th>
<th>Winter Comp</th>
<th>Spring Comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ansley</td>
<td>F</td>
<td>M</td>
<td>415</td>
<td>535</td>
<td>600</td>
<td>107</td>
<td>120</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Edith</td>
<td>F</td>
<td>W</td>
<td>400</td>
<td>550</td>
<td>650</td>
<td>101</td>
<td>130</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Liz</td>
<td>F</td>
<td>W</td>
<td>410</td>
<td>490</td>
<td>495</td>
<td>94</td>
<td>99</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Maxine</td>
<td>F</td>
<td>B</td>
<td>415</td>
<td>375</td>
<td>425</td>
<td>62</td>
<td>85</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Nellie</td>
<td>F</td>
<td>H</td>
<td>397</td>
<td>565</td>
<td>640</td>
<td>113</td>
<td>128</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Zander</td>
<td>M</td>
<td>W</td>
<td>402</td>
<td>515</td>
<td>550</td>
<td>82</td>
<td>110</td>
<td>15</td>
<td>9</td>
</tr>
</tbody>
</table>

Ansley. Ansley was a multi-racial female in the fourth grade. She participated in 40 minutes per day of Leveled Literature Intervention school program (LLI) in a small group outside the general education classroom. In the winter, she was reading at a fourth grade reading level (Fountas and Pinnell), reading at a 535 Lexile level (below grade level), and reading 107 words correct per minute (wcpm) fluency rate (AIMS) with 10 words correct on comprehension (AIMS MAZE). In the spring she was reading at a fourth grade reading level, reading at a 600 Lexile level (at grade level), and reading 120 wcpm fluency rate with 7 words correct on comprehension.

Edith. Edith was a white female in the fourth grade. She was identified with a Specific Learning Disability (SLD) and received special education services. She also participated in 40 minutes per day of LLI in a small group outside of the general education classroom. She was fully included in the general education setting for the rest
of the school day. She did not receive any other accommodations or modifications. In the winter, she was reading at a third grade reading level (Fountas and Pinnell), reading at a 550 Lexile level (below grade level), and reading 101 wcpm fluency rate (AIMS) with 14 words correct on comprehension (AIMS MAZE). In the spring she was reading at a fourth grade reading level, reading at a 650 Lexile level (at grade level), and reading 130 wcpm fluency rate with 18 words correct on comprehension.

*Liz.* Liz was a white female in the fourth grade. She participated in 40 minutes per day of LLI in a small group outside the general education classroom. In the winter, she was reading at a fourth grade reading level (Fountas and Pinnell), reading at a 490 Lexile level (below grade level), and reading 94 wcpm fluency rate (AIMS) with 15 words correct on comprehension (AIMS MAZE). In the spring she was reading at a fourth grade reading level, reading at a 495 Lexile level (below grade level), and reading 99 wcpm fluency rate with 10 words correct on comprehension.

*Maxine.* Maxine was a black female in the fourth grade. She participated in 40 minutes per day of LLI in a small group outside the general education classroom. In the winter, she was reading at a fourth grade reading level (Fountas and Pinnell), reading at a 375 Lexile level (below grade level), and reading 62 wcpm fluency rate (AIMS) with 8 words correct on comprehension (AIMS MAZE). In the spring she was reading at a fourth grade reading level, reading at a 425 Lexile level (below grade level), and reading 85 wcpm fluency rate with 9 words correct on comprehension.

*Nellie.* Nellie was a Hispanic female in the fourth grade. She had exited the LLI program prior to the study. In the winter, she was reading at a fourth grade reading level (Fountas and Pinnell), reading at a 565 Lexile level (below grade level), and reading 113
wcpm fluency rate (AIMS) with 16 words correct on comprehension (AIMS MAZE). In the spring she was reading at a fourth grade reading level, reading at a 640 Lexile level (at grade level), and reading 128 wcpm fluency rate with 14 words correct on comprehension.

**Zander.** Zander was a white male in the fourth grade. He participated in 40 minutes per day of LLI in a small group outside the general education classroom. In the winter, he was reading at a fourth grade reading level (Fountas and Pinnell), reading at a 515 Lexile level (below grade level), and reading 82 wcpm fluency rate (AIMS) with 15 words correct on comprehension (AIMS MAZE). In the spring she was reading at a fourth grade reading level, reading at a 550 Lexile level (below grade level), and reading 110 wcpm fluency rate with 9 words correct on comprehension.

**Setting.** Data was collected in the general education classroom during the 2-hour language arts and reading block, 4 to 5 days a week. The experimenter implemented the interventions with all of the students (self-questioning training) at a table in a corner of the language arts classroom. During experimental sessions, the language arts teacher was leading instruction, monitoring independent work, or working with small reading groups. There were about 25 students in the classroom, the classroom teacher, the experimenter, and periodically a data collector.

**Experimenter and Data Collectors**

The primary experimenter was a third year doctoral student with 10 years of teaching experience in both general education and special education classrooms. She implemented all interventions including the self-questioning procedures and the fading of the self-questions as well as administering all dependent measures. In addition, the
primary experimenter observed and recorded the target students’ behaviors. The primary data collector was an undergraduate student pursuing licensure for mild to moderate special education intervention and occupational therapy. She collected treatment integrity data and interobserver agreement data. A secondary data collector also collected treatment integrity data and interobserver agreement data. She was an undergraduate student pursuing licensure for early childhood special education intervention.

Materials

**Comprehension quizzes.** The comprehension quizzes consisted of eight experimenter developed multiple-choice questions pertaining to the passage read in that particular session. All quizzes were formatted exactly the same and they were comprised of the same types of questions (see Appendix A). There were two questions pertaining to basic facts from the story (i.e., what, where, how, which), one question about a key vocabulary word, one question about order of events (i.e., what happens next?), one question about the overall concept of the passage (i.e., why, how), one question about the author’s purpose (i.e., the author probably wrote this passage because…), one question about cause and effect (i.e., what would most likely happen if?), and one question about drawing conclusions (i.e., you can conclude from this passage…). The classroom teacher examined the quizzes to help determine if they were approximately equal in difficulty. Quizzes or topics that are too difficult or too easy will be removed.

**Expository reading passages.** Reading passages selected for all phases of the study were expository texts consisting of science topics or social studies topics (see Table 2 for reading passages and corresponding levels). They were adapted from Readworks.org and were selected based on the Lexile level (770-980). All participants
read between a Lexile level of 375 and 565 (all below grade level) in the winter at the beginning of the study, therefore passages were selected at higher Lexile levels to promote on-grade level performance. Students who are college and career ready are expected to read between a 770 and 980 Lexile level during their fourth grade academic year (Scholastic Inc., 2007; National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). All reading passages for baseline were kept in the same format as found from Readworks.org. All reading passages in the training and self-questioning intervention were sectioned evenly into four smaller paragraphs. After each of these four paragraphs, a stopping point or prompt were presented with either two lines or a stop sign symbol.

As the students progressed through the phases of the self-questioning training, the two-lined prompt was systematically faded to the stop sign symbol. For the prompt with the two lines, one line was for the student to write a self-generated question about the paragraph above it. The second line was for the student to write the answer to the self-generated question. For the prompt with the stop sign symbol, students were expected to self-generate an oral question about the paragraph above it and orally answer that question. The classroom teacher examined the reading passages to help determine if they were approximately equal in difficulty. Reading passages that were too difficult or too easy were removed. In addition, reading passages that deal with topics that students have had prior exposure or are familiar to the student were also removed.
Table 2. *Reading Passages and Corresponding Reading Levels*

<table>
<thead>
<tr>
<th>Passage</th>
<th>Source</th>
<th>Lexile Level</th>
<th>Flesh-Kinkaid</th>
<th>Grade</th>
<th># of Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A Distant Relative</td>
<td>readworks.org</td>
<td>850L</td>
<td>7.1</td>
<td>5</td>
<td>302</td>
</tr>
<tr>
<td>2 A Plant Puzzle</td>
<td>readworks.org</td>
<td>970L</td>
<td>5.7</td>
<td>4</td>
<td>391</td>
</tr>
<tr>
<td>3 A Funny Old Ballpark</td>
<td>readworks.org</td>
<td>870L</td>
<td>6</td>
<td>4</td>
<td>503</td>
</tr>
<tr>
<td>4 A Million Dollar Nickel</td>
<td>readworks.org</td>
<td>760L</td>
<td>8.5</td>
<td>4</td>
<td>211</td>
</tr>
<tr>
<td>5 Ohio's Location</td>
<td>SS Textbook</td>
<td>GEN</td>
<td>7.6</td>
<td>4</td>
<td>355</td>
</tr>
<tr>
<td>6 A Courtroom</td>
<td>readworks.org</td>
<td>870L</td>
<td>5.9</td>
<td>3</td>
<td>374</td>
</tr>
<tr>
<td>7 A Chance for Freedom</td>
<td>readworks.org</td>
<td>840L</td>
<td>5.8</td>
<td>5</td>
<td>311</td>
</tr>
<tr>
<td>8 A Liger's Tale</td>
<td>readworks.org</td>
<td>830L</td>
<td>5.7</td>
<td>6</td>
<td>283</td>
</tr>
<tr>
<td>9 Tricky Move</td>
<td>readworks.org</td>
<td>960L</td>
<td>9.5</td>
<td>6</td>
<td>172</td>
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<tr>
<td>10 Asteroid Attack</td>
<td>readworks.org</td>
<td>840L</td>
<td>6.2</td>
<td>5</td>
<td>323</td>
</tr>
<tr>
<td>Characteristics of Living Things</td>
<td>Science Textbook</td>
<td>GEN</td>
<td>6.7</td>
<td>4</td>
<td>284</td>
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<td>830L</td>
<td>7.1</td>
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<td>890L</td>
<td>7.3</td>
<td>5</td>
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<tr>
<td>13 After the Floods</td>
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<td>760L</td>
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<tr>
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<td>14 Aztecs, Incas, and Mayans</td>
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<tr>
<td>15 Ohio's Earliest Peoples</td>
<td>SS Textbook</td>
<td>GEN</td>
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<td>4</td>
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<td>readworks.org</td>
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<td>6</td>
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<tr>
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<td>970L</td>
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<td>400</td>
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<tr>
<td>20 Earth's Changing Surface</td>
<td>readworks.org</td>
<td>890L</td>
<td>7.4</td>
<td>5</td>
<td>476</td>
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</tbody>
</table>

Dependent Variable

**Number of questions answered correctly.** The dependent variable was the total number of multiple-choice questions answered correctly (out of 8) for each comprehension quiz administered at the end of each instructional session. The first five questions of the quizzes pertained to recalling the main idea and details, vocabulary comprehension, and sequencing events. The last three questions consisted of the author’s
purpose, cause and effect relationships, and drawing conclusions. Students were allowed up to 15 minutes to complete the quiz. Once students were finished with their comprehension post-quizzes during the intervention conditions, the primary data collector reviewed the correct answers with the students. Feedback was not delivered during baseline.

**Independent Variable**

**Self-questioning intervention.** The independent variable was the self-questioning intervention. The self-questioning intervention included a training phase including two sessions to teach students how to utilize the strategy. The systematic prompt fading procedure was then used to teach students to move from writing their own self-questions to orally developing their self-questions about the reading passage. The independent variable of the self-questioning strategy is thoroughly described under the procedures section.

**Experimental Design**

A multiple baseline across participants was utilized to evaluate the effects of the self-questioning training and intervention on the number of comprehension questions answered correctly. There were two multiple baseline graphs with three students in each making it a total of six participants.

**Procedures**

**Baseline.** During the baseline condition, the experimenter worked with all six participants at the same time in a small group (see Appendix B for the script). The experimenter explained to the students that they would be reading expository passages. Students read the passage silently and independently with no other instructions. Students
were given up to 15 min to complete the reading passage. Once students finished reading their passages, the experimenter collected each passage and then administered the 8-item comprehension quiz. The students completed the quizzes independently within 15 minutes.

**Intervention.** During intervention, all students underwent a self-questioning training for two days. Then, through the intervention, prompts for students to write self-questions were systematically faded to stop signs in which students were expected to ask answer the self-questions out-loud. Generalization measures were conducted three times throughout all phases of the study.

**Self-questioning training.** During the self-questioning training, the experimenter provided direct instruction to each student independently on how to generate questions about paragraphs in a reading passage. The direct instruction method included modeling, guided practice, and corrective feedback (see Appendix B for the script). Students were expected to read the passage out loud to assist in immediate corrective feedback for decoding difficult words if necessary. Each passage was divided into four sections. After each section, there were two lines that served as prompts, the first line was a prompt to write a question and the second line was a prompt to write the answer. When students finished reading and developing questions and answers, they completed the post-quiz. The training for each of the six students lasted two sessions.

**Self-questioning intervention.** To begin the intervention, students continued with the same format as in the training and fading phases. Students were expected to read the passages silently and independently (see Appendix B for the script). Again, each passage was divided into four sections and students wrote questions and answers pertaining to
each paragraph they read. The student read each section silently, stopped at the self-
question prompts, developed and wrote a question, answered by writing the question, got
feedback from the experimenter, and then continued on to the next paragraph. The
experimenter recorded whether or not the student asked and answered the question
correctly.

The experimenter evaluated the quality of the question and the answer using these
following criteria: (1) the student formulated a question, (2) the question was on topic
pertaining to the paragraph, (3) the student answered the question correctly, and (4) the
student used information from the paragraph to answer the question. If the student did not
ask an accurate question and say a correct answer, the experimenter implemented a
systematic error correction using least-to-most prompting strategy as follows: (1)
experimenter prompted the student to underline a key word in the paragraph to help
formulate a question, if student did not formulate an accurate question/answer, then (2)
the experimenter prompted the student to underline a sentence in the paragraph to help
formulate the question. If students still struggled with formulating a question and answer,
the experimenter then (3) modeled a correct question and answer and then had the student
say the question and answer independently.

After students completed the passage and developed and answered self-questions,
they completed the post-quiz. Once the student was finished with then quiz, the
experimenter provided feedback on each quiz answer. If students had developed self-
questions similar to questions on the post-quiz, the experimenter praised the student (e.g.,
“Great job with developing a question just like the quiz, good thinking”). If students got
the quiz question correct, the experimenter praised the student (e.g., “Nice job,” “Good
thinking,” “Awesome”). If students got the quiz question incorrect, the experimenter directed the student to the correct answer (e.g., “What would be a better answer for this question?”). All students were required to reach a criterion of six out of eight questions correct over two consecutive sessions to move to the fading procedure of the self-questioning strategy.

**Fading of the Self-questioning strategy (Fading of Self-Questions from Written to Oral).** A prompt fading procedure was used to assist students with moving from writing self-questions to generating self-questions orally. The experimenter worked with each student individually and students read the passages silently and independently (see Appendix B for the script). As students met criterion (six out of eight correct over two consecutive sessions), the experimenter faded the lines one section at a time and replaced them with a small stop sign to serve as a prompt to stop, then ask and answer a question aloud. Therefore, the format of the questions was systematically faded from written questions to oral questions. As students met criteria (six out of eight correct responses over two consecutive sessions), they responded to a combination of written self-questions and answers to oral self-questions in the following ratios: 3:1, 2:2, and 1:3 until the written questions (two lines) were completely faded and the students were responding only to the oral self-questioning prompts (stop signs).

Students were trained to generate and answer explicit questions that could be answered directly through the text they were reading. See Appendix C for an example of the prompt fading procedure on the reading materials. All procedures in the fading of self-questions remained the same as the procedures in the self-questioning intervention (i.e., experimenter feedback, quality of question evaluation, systematic error correction).
After students completed the passage and developed and answered self-questions, they completed the post-quiz. Once students were finished with then quiz, the experimenter provided feedback on each quiz answer. The feedback method followed the same procedure as in the self-questioning intervention phase.

**Generalization.** Generalization measures were assessed using passages from the students’ current fourth grade curriculum textbooks for both science and social studies. Three to four generalization probes were conducted (two for social studies and one to two for science) across all phases of the study. Generalization probes were administered during different sessions from the other sessions of the study and followed the same procedures as the baseline procedures. Generalization probes were administered to the small group of students and students were expected to read the passage and complete the post-comprehension quiz. Students did not receive feedback after they completed the quiz.

The textbook passages ranged from Flesh-Kinkaid level of 6.7 to 9.1 and were between 284 words and 355 words. There were not Lexile level measures for these passages. Passages from the student’s fourth grade textbook were selected as the generalization measure because the students were expected to read these materials for class and their reading material for fourth grade were based from these areas of science and social studies. The experimenter was interested in assessing the extent to which the self-questioning strategy would generalized to materials used within the classroom and content areas within the fourth grade curriculum.

**Interobserver Agreement**

Interobserver agreement (IOA) was assessed on 57% of the students’ post
comprehension quizzes across all phases of the study. The primary and secondary observer independently and separately from the experimenter scored copies of the quizzes. Keys with all correct answers to the questions were provided for all quizzes. Agreements and disagreements were examined on a question-by-question basis. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplied by 100.

**Treatment Integrity**

Treatment integrity data was collected on 80% of baseline sessions, 51% of training and intervention sessions, and 75% (Ansley) to 100% (all other students) of generalization sessions across all participants. Each session was scored in-vivo by the primary or secondary data collector. Various treatment integrity checklists for all phases and conditions were used to determine the extent to which the various sessions were implemented as intended (see Appendix D for checklists). The primary experimenter utilized the checklists during the sessions to ensure the integrity of the various procedures for all conditions and phases of each intervention. The observers used the checklists and recorded whether or not the experimenter implemented each step correctly. Treatment integrity was calculated by adding the number of steps completed correctly, dividing by the total number of steps, and multiplying by 100.
Chapter 4: Results

Figure 1 shows the number of reading comprehension questions answered correctly (out of eight) for Nellie, Edith, and Ansley for each session across all phases of the study. Figure 2 shows the number of reading comprehension questions answered correctly (out of eight) for Liz, Zander, and Maxine for each session across all phases of the study. Overall, baseline comprehension quiz scores ranged from one to seven with a mean of 4 (50%) correct responses with a total of 33 baseline sessions for all participants combined. During training, the overall comprehension quiz scores ranged from three to eight with a mean of 6.08 (76%) correct responses with a total of 12 training sessions for all participants combined. During the fading phase, the overall comprehension quiz scores ranged from three to eight with a mean of 6.18 (77%) in a total of 38 fading sessions for five out of the six students (Maxine did not make it to the fading intervention phase due to the end of the year). Table 3 summarizes the overall mean and percentage scores for the participants combined across all phases of the study. Table 4 summarizes the mean and percentage scores for each individual participant across all phases of the study.
Figure 1. Total Questions Completed Correctly on Post-Comprehension Quizzes per Session for Nellie, Edith, and Ansley.
Figure 2. Total Questions Completed Correctly on Post-Comprehension Quizzes per Session for Liz, Zander, and Maxine.
Results by Student

**Nellie.** Prior to the implementation of the intervention, Nellie had stable baseline. During baseline, the number of comprehension questions answered correctly ranged between one and three with a mean of 2.25 (28%) correct responses. During the training phase of the self-questioning strategy, the number of comprehension questions answered correctly ranged between three and six with a mean of 4.5 (56%) correct responses. In the fading of self-questions to stop sign prompts phase, the number of comprehension questions answered correctly ranged from five to eight with one outlier of three with a mean of 6.45 (81%) correct responses. Nellie did not reach the stop sign phase of the study due to the end of the school year. The percent of non-overlapping data points (PND) between the baseline phase and the training and intervention phases were calculated for Nellie with a total of 92%.

**Edith.** Prior to the implementation of the intervention, Edith had stable baseline. During baseline, the number of comprehension questions answered correctly ranged between three and four with a mean of 3.6 (45%) correct responses. During the training phase of the self-questioning strategy, the number of comprehension questions answered correctly ranged between six and seven with a mean of 6.5 (81%) correct responses. In the fading of self-questions to stop sign prompts phase, the number of comprehension questions answered correctly ranged from five to eight with a mean of 6.2 (77%) correct responses. Edith did not reach the stop sign phase of the study due to the end of the school year. There were no overlapping data points between the baseline phase and the training and intervention phases for Edith. Therefore PND was 100%.
**Ansley.** Prior to the implementation of the intervention, Ansley had a more variable baseline measure. During baseline, the number of comprehension questions answered correctly ranged between two and seven with a mean of 4.8 (60%) correct responses. During the training phase of the self-questioning strategy, the number of comprehension questions answered correctly increased to seven with a mean of 7 (88%) correct responses. In the fading of self-questions to stop sign prompts phase, the number of comprehension questions answered correctly ranged from five to seven with a mean of 6 (75%) correct responses. Ansley did not reach the stop sign phase of the study due to the end of the school year. The percent of non-overlapping data points (PND) between the baseline phase and the training and intervention phases were calculated for Nellie with a total of 0%.

**Liz.** Liz’s baseline measure was more variable as well, ranging from one to five number of comprehension questions answered correctly with a mean of 3.75 (47%) correct responses. During the training phase of the self-questioning strategy, the number of comprehension questions answered correctly ranged from three to eight with a mean of 5.5 (67%) correct responses. In the fading of self-questions to stop sign prompts phase, the number of comprehension questions answered correctly ranged from five to seven with a mean of 5.9 (74%) correct responses. Liz did not reach the stop sign phase of the study due to the end of the school year. The percent of non-overlapping data points (PND) between the baseline phase and the training and intervention phases were calculated for Liz with a total of 73%.

**Zander.** Prior to the implementation of the intervention, Zander had a somewhat variable baseline measure. During baseline, the number of comprehension questions
answered correctly ranged between three and six with a mean of 4.8 (60%) correct responses. During the training phase of the self-questioning strategy, the number of comprehension questions answered correctly increased to six and eight with a mean of 7 (88%) correct responses. In the fading of self-questions to stop sign prompts phase, the number of comprehension questions answered correctly ranged from five to seven with a mean of 6.3 (79%) correct responses. Zander did not reach the stop sign phase of the study due to the end of the school year. The percent of non-overlapping data points (PND) between the baseline phase and the training and intervention phases were calculated for Zander with a total of 43%.

**Maxine.** Prior to the implementation of the intervention, Maxine had a very variable baseline measure which created delay with intervention. During baseline, the number of comprehension questions answered correctly ranged between two and seven with a mean of 4.2 (53%) correct responses. During the training phase of the self-questioning strategy, the number of comprehension questions answered correctly ranged from five and seven with a mean of 6 (75%) correct responses. Maxine did not reach the fading intervention or the stop sign phase of the study due to the end of the school year. The percent of non-overlapping data points (PND) between the baseline phase and the training and intervention phases could not be calculated due to Maxine not entering the intervention phase of the study with the end of the school year.

**Generalization**

Generalization probes were administered four times throughout the study for Ansley and three times throughout the study for the other five participants. The generalization probes were reading passages taken from the fourth grade science and
social studies textbooks used by the school’s district. For the generalization reading passages, Nellie scores ranged between two and five with a mean of 3.3 (42%). She increased from 38% in baseline to 44% in intervention indicating there was 6% increase with generalization. For the generalization reading passages, Edith’s scores ranged between three and eight with a mean of 5 (63%). She increased from 44% in baseline to 100% in intervention indicating there was a 56% with generalization showing the greatest gains within this study. For the generalization reading passages (four reading passages instead of three), Ansley’s scores ranged between three and seven with a mean of 5 (63%). She increased from 50% in baseline to 75% in intervention showing a 25% increase. For Liz’s generalization passages, her scores ranged between zero and four with a mean of 2 (25%). She increased from 0% in baseline to 38% in intervention indicating the second greatest effects for generalization within this study. For the generalization reading passages, Zander’s scores ranged between five and six with a mean of 5.7 (71%). He increased from 63% to 69% in baseline to intervention showing a 6% increase.

Table 3. Summary of Overall Mean and Percentage Scores on Comprehension Quizzes.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Total Sessions</th>
<th>Overall Mean</th>
<th>Overall Percentage</th>
</tr>
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<tbody>
<tr>
<td>Baseline</td>
<td>33</td>
<td>4</td>
<td>50%</td>
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<tr>
<td>Training</td>
<td>12</td>
<td>6.08</td>
<td>76%</td>
</tr>
<tr>
<td>Fading</td>
<td>38</td>
<td>6.18</td>
<td>77%</td>
</tr>
</tbody>
</table>
Table 4. Summary of Mean and Percentage Scores for Each Student on Comprehension Quizzes.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline Mean</th>
<th>Baseline Percent</th>
<th>Train Mean</th>
<th>Train Percent</th>
<th>Fading Mean</th>
<th>Fading Percent</th>
<th>Overall Percent Increase</th>
<th>PND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nellie</td>
<td>2.25</td>
<td>28%</td>
<td>4.5</td>
<td>56%</td>
<td>6.45</td>
<td>81%</td>
<td>55%</td>
<td>92%</td>
</tr>
<tr>
<td>Edith</td>
<td>3.6</td>
<td>45%</td>
<td>6.5</td>
<td>81%</td>
<td>6.2</td>
<td>77%</td>
<td>36%</td>
<td>100%</td>
</tr>
<tr>
<td>Ansley</td>
<td>4.8</td>
<td>60%</td>
<td>7</td>
<td>88%</td>
<td>6</td>
<td>75%</td>
<td>15%</td>
<td>0%</td>
</tr>
<tr>
<td>Liz</td>
<td>3.75</td>
<td>47%</td>
<td>5.5</td>
<td>67%</td>
<td>5.9</td>
<td>74%</td>
<td>27%</td>
<td>73%</td>
</tr>
<tr>
<td>Zander</td>
<td>4.8</td>
<td>60%</td>
<td>7</td>
<td>88%</td>
<td>6.3</td>
<td>79%</td>
<td>28%</td>
<td>43%</td>
</tr>
<tr>
<td>Maxine</td>
<td>4.2</td>
<td>53%</td>
<td>6</td>
<td>75%</td>
<td></td>
<td></td>
<td>22%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Interobserver Agreement

Interobserver agreement (IOA) was assessed on 57% of the students’ post comprehension quizzes across all phases of the study. Agreements and disagreements were examined on a question-by-question basis. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplied by 100. The total IOA for the students’ post comprehension quizzes across all phases of the study was 99.8%.

Treatment Integrity

Treatment integrity data was collected on 80% of baseline sessions, 51% of training and intervention sessions, and 75% (Ansley) to 100% (all other students) of generalization sessions across all participants. Treatment integrity was calculated by adding the number of steps completed correctly, dividing by the total number of steps, and multiplying by 100. The total treatment integrity for baseline was 100%, for training and intervention was 99.9%, and for generalization was 100%.
Chapter 5: Discussion

The purpose of this study was to examine the effects of a self-questioning strategy on the expository reading comprehension of six fourth-grade students identified as at-risk learners and to further evaluate a systematic prompt fading procedure that gradually required the students to self-generate questions independently from written questions to oral questions. This study demonstrated that a self-questioning strategy with a fading procedure was effective for improving the reading comprehension for the six students. These results support previous findings that self-questioning strategies improve reading comprehension for elementary students who are at-risk readers (Benito et al., 2005; Chan, 1991; Ezell et al., 1992; Ezell et al., 1996). The results of this study also extend the self-questioning research by demonstrating that self-questioning strategies are effective for helping fourth grade students who are at-risk to generate their own questions to promote successful reading comprehension.

Baseline comprehension test scores were low and stable for two of the participants (Nellie and Edith), fairly low and a little more variable for two of the participants (Liz and Zander), and higher scores with variability for the last two participants (Maxine and Ansley). Nellie and Edith showed the greatest gains between baseline and intervention (Nellie from 28% to 83% with a 55% increase and Edith from 45% to 77% with a 36% increase). Liz and Zander had medium gains from baseline to intervention (Liz from 47% to 74% with a 27% increase and Zander from 60% to 88%
with a 28% increase). Ansley showed a lower increase of 15% from baseline to intervention (from 60% to 75%) and Maxine did not enter the fading phase of intervention but had a 22% increase from baseline to training (53% to 75%). Overall, once intervention was trained and implemented, all participants showed mostly substantial gains from baseline. By the end of the study all students were scoring six or more out of eight consistently on the post-comprehension quizzes.

The PND scores indicated mixed results across all participants. Edith had the highest PND score of 100%, which shows a strong effect for the self-questioning strategy on the reading comprehension. Nellie had the second highest PND score of 92%, considerably strong results as well. Liz’s PND score was 73%, also a good indicator for the strength of the intervention on reading comprehension. Zander’s PND score was 43%, indicating minimal effect of the intervention and Ansley’s PND score was 0% showing the least effects of the intervention. Maxine’s PND score could not be calculated because she did not enter the intervention phase. In conclusion, the PND scores for each participant showed mixed results from Edith with very strong effects (100%) to Ansley with no effects (0%). Most likely, Nellie’s PND score (92%) and the percentage increase from baseline scores to intervention scores (55%) would have been higher, but there was one outlier on the post-comprehension quiz in session 18 with a score of three out of eight. Nellie reported that the questions on the quiz were really hard for her to understand and answer.

Visual analysis of the graphs for Zander (43%) and Ansley (0%) indicated that these particular PND scores may not best represent the students’ outcomes due to slightly higher baseline scores and not enough time to complete the intervention of fading the
self-questions from written format to oral format. During the intervention phase, Ansley completed the first part of intervention where she was developing all four questions/answers in written format. Zander completed intervention in which he was developing two written questions/answers and two oral questions/answers.

Nellie and Edith showed the greatest gains from the intervention of self-questioning. Nellie increased 55% of her average scores from baseline to intervention and Edith increased 36% of her average scores from baseline to intervention. Their PND scores were also strong and showed solid significance (Nellie with 83% and Edith with 100%). Nellie was able to complete the intervention and fading procedure up to writing one question/answer and orally asking three questions/answers. Edith had finished with writing three questions/answers and orally asking one question/answer.

Liz showed minimal results from the intervention of self-questioning on her reading comprehension. She increased 27% of her average scores from baseline to intervention. She was able to complete the intervention and fading procedure up to writing one question/answer and orally asking three questions/answers. Nellie and Liz completed the most sessions throughout the study and reached the furthest with the intervention of self-questioning and fading procedure with writing one question/answer and orally asking three questions/answers. Again, Maxine did not reach intervention, but completed the training phase of self-questioning (2 sessions). Maxine increased 22% of her average scores from baseline to the training phase.

During the generalization phase, all students demonstrated at least some generalization compared to their baseline performance. Edith demonstrated the strongest generalization with an increase of 56% from baseline to intervention. She also scored the
highest generalization score with a mean score of 8 (100%). Liz demonstrated medium
generalization with an increase of 38% from baseline to intervention. She scored zero out
of eight (0%) in baseline and then scored an average of 3 out of eight (38%) during
intervention of self-questioning. Ansley demonstrated minimal generalization with an
increase of 25% from baseline to intervention. In addition, she completed four
generalization passages compared to the other participants. Nellie and Zander
demonstrated the weakest generalization both with an increase of 6% from baseline
scores to intervention scores on the comprehensions quizzes for the generalization
passages. Maxine’s generalization scores were not calculated because she did not enter
intervention and all of her generalization passages were completed during the baseline
phase.

The positive results of this intervention for all participants may be credited to
learning a strategy that directly focuses on a self-monitoring procedure. With the self-
monitoring intervention, students are required to think about the text they are reading,
develop questions and answers based on the information, and then apply this information
to comprehension questions at the end. Training students to develop their own questions
and answers can guide and promote them to identify important information as well as
connect and build this information with their prior knowledge. The purpose of
systematically fading the questions from a written format to an oral format was to help
facilitate more automaticity when forming questions and answers connecting to the text.
In turn, this may help to support students in becoming more independent learners and
readers.
Limitations and Future Research

Although this study supports previous systematic prompt fading and self-questioning research, the extent to which the reading comprehension was assessed for the participants was a limitation. The use of multiple-choice format for post-comprehension quizzes was chosen by the experimenter to ensure consistency across the quizzes for each passage that contained different topics. Multiple-choice format for quizzes can be considered a limitation because students are recognizing information rather than recalling information like they would in an extended response format. Future research should attempt to include comprehension assessments that include skills with recall such as open-ended questions, retelling a passage, or writing a summary.

Additionally, related to assessment, the experimenter attempted to track and assess the students’ self-questions and answers (i.e., formulated question, question was on topic, answer given, answer contained information from the passage) as they were being trained and during the intervention phase, but there was no formal measure for the types of questions, the quality of the questions, or the quality of the answers. Future research should attempt to assess the students’ quality and type of self-generated questions and answers, as this may be an influence on reading comprehension. The quality and type of questions and answers may be assessed using a rubric that analyzes how well the questions and answers captures important points in the text and whether the questions are literal, inferential, or critical.

In respect to the post-comprehension quizzes, these quizzes were experimenter developed which posed inconsistency with the difficulty of questions when comparing the quizzes. Even though the experimenter followed a specific format for the types of
questions included for every quiz, there was no control over the level of difficulty for these types of questions. Even though every quiz had the same types of questions, it was possible that some quizzes could have asked harder questions pertaining to the content compared to other quizzes. Future research should consider using commercial programs and materials that have more control over the difficulty of questions on a quiz-by-quiz basis with more consistency with difficulty.

Due to the end of the year, time was limited, and the experimenter was unable to implement maintenance measures to evaluate whether students maintained the skills of self-questioning and answering once the intervention was complete. Future research should plan for longer time in the classroom and be aware of school calendars and events (e.g., spring break, state testing). Generalization measures were also limited due to the time frame of the study. Three to four generalization measures were implemented and it would have been beneficial to have more of these types of measures. Future research could extend their generalization measures into other classrooms, such as science and social studies classrooms, to see how the self-questioning intervention affects student performance in these particular subject areas. Since expository passages (science and social studies) were used to implement the self-questioning strategy, it would be beneficial to evaluate student performance in these subjects. In addition, generalization measures could be extended to other types of reading materials such as narrative texts or biographies.

An added limitation pertaining to the end of the year and time limitations was that the students did not finish the intervention. They were unable to move through all the phases of the study. Nellie and Liz made it up to the final stop sign phase (oral format for
all questions/answers), but did not have time to make it through the whole phase. Zander made it up to three oral questions/answers and one written question/answer, Edith made it up to two oral questions/answers and two written questions/answers, Ansley made it up to one oral question/answer and three written questions/answers and finally Maxine made it through training, but did not have any sessions in the intervention phase. Future research should try to plan for longer training and intervention phases or reduce the number of participants in the study. With this type of self-questioning intervention along with the systematic fading procedure, more time is required for the students to move through the phases. Fewer participants may help with the time required to train students.

Another limitation to this study was the lack of social validity measures for both the students and teachers. Social validity measures were not conducted due to the end of the school year and the beginning of summer break. Anecdotal data was recorded for social validity, but there were no formal questionnaires given to the students or teachers. An example of social validity was when one of the students, Ansley, used the example of the Liberty Bell (which was one of the reading passages from the study she had read the week before) when in a class discussion about symbolism in reading and books. Another example of social validity is when Ellie asked to write two questions and answers instead of one question and answer when she was working on the self-questioning intervention. She liked the intervention so much that she wanted to ask more questions. Even though formal social validity measures were not implemented for this study, these two pieces of anecdotal information is promising for the use of the self-questioning strategy for instruction and support for successful reading comprehension.
There were two limitations with the student data and responses on the comprehension quizzes. First, Ansley’s variability of responding, which showed a PND of 0%. All of her data overlapped with her baseline measures because she scored a seven out of eight on one of the baseline measures. She had two sessions of training and three sessions of intervention, therefore if she had more time with the intervention, she may have shown less variability with a better PND score.

Second, Maxine’s baseline data was variable with a two high scores on the post-comprehension quizzes (seven out of eight) towards the middle of the study, which delayed the implementation of intervention. Maxine also did not make it to intervention, but showed an increase of 22% from baseline to training. There was no indication as to why Maxine may have scored higher on two of the quizzes in baseline and the Lexile levels of the passages were consistent with other passages she scored lower on.

Overall, the experimenter did not have control over what topics students have been exposed to outside of the study or their background knowledge of various topics. It could be possible that background knowledge or exposure to other topics played a role in the variability of the data for these participants. Future research should plan to control for background knowledge or exposure to other topics by consulting with teachers and/or examining curriculum materials. Experimenters could also pre-assess the participants before or during the study to better plan and develop reading passages that students have had little exposure to their topics. Administering pre-and post-assessments over science and social studies content would also be a good idea to formally assess prior knowledge. It would also be beneficial to administer these assessments to measure the information on
science and social studies topics gained and maintained by the participants throughout the study.

Additionally, all students rarely scored perfect scores (eight out of eight) on the post-comprehension quizzes once they entered intervention after training. This poses a limitation because with an intervention, students should be scoring with full achievement. Students may have not gotten enough training with the self-questioning intervention (two training sessions for each student) therefore future research should look at extending the training to more than two sessions or set a higher criteria (criteria for this study was six out of eight correct responses over two consecutive sessions) in order for students to move onto the intervention phase.

**Implications for Practice**

The self-questioning intervention with a prompt fading procedure was effective for increasing reading comprehension for six fourth grade students who were identified as at-risk learners. The self-questioning intervention is very versatile in which teachers can use a variety of self-questioning strategies and apply these strategies to learners of different age and abilities. For example, if students have greater needs, teachers can develop questions for the students and then the students can answer the questions rather than generating their own questions. Students with higher abilities could benefit from learning how to ask both explicit and inferential questions rather than just explicit questions. Self-questioning strategies can also be applied to other types of reading passages including narrative, persuasive and biographies. For example, questions for biography type passages would ask: (1) When and where was the person born? (2) What impact did this person have on our world? (3) Why is this person important? (4) What
was this person’s family like? Another example, questions for persuasive essays would ask: (1) What is the author trying to persuade? (2) What is a pro to their argument? (3) What is a con to their argument?

The self-questioning strategy is easy to implement, time efficient, and cost effective. This strategy could simply be incorporated into any type of reading passage, with any ability level, and with any age. In addition, the self-questioning strategy could be implemented into a Response to Intervention (RtI) model quickly and effortlessly. Because the self-questioning intervention can be easily adapted, these strategies can be implemented into each tier of an RtI model (i.e., whole group instruction, small group instruction, individual instruction). Teachers can add structure or take away structure with the self-questioning intervention to meet the needs of various learners within the different tiers of the RtI model. For example, teachers can work one-on-one with students giving them more structure with the intervention. Teachers can also implement the self-questioning strategy with a peer model set up in which students work with partners and asking each other questions about what they are reading together.

Lastly, self-questioning strategies could also be used as a self-monitoring tool. Students who tend to get distracted easily or who are off-task often may benefit from self-questioning while reading. For example, students could be prompted to answer questions more often throughout the passage. Rather having four stopping points, students could have six or eight stopping points. Questions for self-monitoring could include questions about understanding the passage rather than identifying or recalling facts from the passage. For example, students could be asked after a paragraph: (1) Do you understand what you read?, (2) What are words you don’t know?, (3) What sentences
or facts do you not understand?, and (4) What is the most interesting fact to you? This would allow for the student to monitor what they are learning and allow for the teacher to assess the needs of the student and guide future instruction.

**Conclusion**

In conclusion, the self-questioning strategy with a fading prompt procedure has been proven effective to increase the reading comprehension of at-risk fourth grade learners. All students in this study were able to show improvement from their baseline measures to intervention measures. Generalization measures were also promising for five out of the six participants. Even though formal social validity measures were not implemented, the teachers and students liked the intervention and found it helped the students to better understand what they were reading. Overall, the self-questioning strategy shows promise with improving the reading comprehension of students with varying abilities, of different ages, and can easily be implemented with a variety of genre.
References


RAND Reading Study Group. (2002). *Reading for the understanding: Toward an R&D program in reading comprehension*.


APPENDIX A: COMPREHENSION QUIZ EXAMPLE
Comprehension Questions

1. According to the passage, how many bald eagles live in the United States?
   a. Half a million
   b. 20,000
   c. 210
   d. 200,000

2. As used in the passage, what does habitat mean?
   a. Where eagles live
   b. Where people live
   c. Where bears live
   d. Roads and homes

3. How are the bald eagles making a comeback?
   a. Bald eagles are lying a lot more eggs and having more babies
   b. Bald eagles were made the national bird of the United States
   c. There are laws in place now to help protect bald eagles
   d. Bald eagles are not eat fish, they are finding other sources of food

4. Choose the answer that best completes the sentence below:
   ___________ Benjamin Franklin thought the turkey would be a better choice, the eagle is the national bird of the United States.
   a. However
   b. Because
   c. Although
   d. After
5. Why did eagles get sick from eating fish?
   a. The fish were diseased from polluted water
   b. Eagles are not supposed to eat fish
   c. The eagles were eating the wrong kind of fish
   d. The eagles did not get sick from eating fish

6. Based on the passage, why are eagles the “best conservation story” in the United States?
   a. Eagles symbolize freedom and strength
   b. Eagles are majestic creatures
   c. Chemicals poisoned the eagles and their eggs
   d. Conservation efforts saved eagles from extinction

7. What is this passage mostly about?
   a. How majestic eagles are when they fly in the air
   b. The impact other types of birds have on the eagle population
   c. The effects of human actions on the eagle population
   d. What eagle habitats and nests look like

8. Why did the eagle population drop when people started building homes and roads?
   a. The population most likely dropped because the eagles became the national bird of the United States
   b. The population most likely dropped because the eagles did not have places to live and find food
   c. The population most likely dropped because the eagles were not drinking enough water
   d. The population most likely dropped because the eagles were not building the right kinds of nests for their babies
APPENDIX B: SCRPITS
Baseline & Generalization Passages

Students read silently and independently

1. *(First session only): Introductions, facilitators introduce themselves and have students introduce themselves back.

2. *(First session only): Script for Obtaining Student Verbal Assent, make sure all students agree to participate.

3. Today, you will be reading an expository passage. When you are done reading you will be given some comprehension questions about the story. Answer these questions as best as you can.

4. Give the students the story, tell them to begin reading.

5. When each student is finished reading, collect the story and administer the quiz.

6. When the students are finished with the quizzes, collect the quizzes, and thank the students for participating.

7. **Do not** provide feedback on quiz accuracy.
Self-Questioning Training – Day 1

Four written questions/answers

Read out loud with facilitator

1. Today you will be learning a reading strategy, called self-questioning. This reading strategy will help you comprehend or understand what you are reading. You will use this strategy when you read expository passages.

2. Do you know what an expository reading passage is?

3. Student answers: An expository reading passage is a true story and has facts.

4. Good! An expository passage is a reading passage that is a true story and has facts. We are going to learn how to form questions about what we read and this is called a self-questioning strategy.

5. We are going to learn and practice the self-questioning strategy. Again, this strategy will help you to understand what you read.

6. Facilitator shows student the passage with the self-question prompts.

7. With this self-questioning strategy, you will see these stopping points with lines to write your questions and answers to go along with what you read. You will ask and answer questions as you read for each of the four paragraphs. You will put your question on the first line and the answer on the second line. When you see these prompts you will stop reading, make a question, and then write the correct answer to the question.

8. What will you do when you see the prompt?

9. Student answers: Stop reading and make a question and an answer

10. Yes, stop reading and create a question and an answer.
11. Where will you write your question?
12. Student answers: On the first line

13. Great! Where will you write your answer?
14. Student answers: On the second line

15. Then, you will continue reading until you reach the second prompt. At the second prompt you will again, stop reading, then ask and answer the question.

16. What will you do when you see the second prompt?
17. Student answers: Stop reading and create and answer the question

18. Yes, stop reading and create and answer the question.

19. Where will you write your question and answer?
20. Student answers: The question on the first line and the answer on the second line

21. Yes, good job!

22. Do you have any other questions so far?

23. The facilitator will explain that this will happen for the rest of the prompts throughout the passage.

24. Then, once you are done reading, you will answer 8 comprehension questions about the story you just read.

25. Do you have any questions?

26. Let’s practice together:

27. The facilitator and student will have their individual passages with the self-questioning prompts so student can write their own answers and the facilitator can model the method.
28. Please point to the first stopping point. Please point to the remaining stopping points.

29. Do you have any questions before we begin reading out loud together?

30. The facilitator and student will begin reading the passage out loud together.

31. When they reach the first prompt, the facilitator and student will stop reading. The facilitator will model for the student how to look back in the text and develop a question based on the information in the first paragraph. Then the facilitator will model writing the question. The student will also write the first question on their own paper. Then the facilitator will answer the question using the information in the text. The student will follow the teacher’s lead and write the answer on their own paper. (I do).

32. The facilitator and student will continue to read the passage together.

33. The same format of developing and answering the questions for each prompt will be as follows:

   - Second prompt (written): Student and teacher complete together (we do).
   - Third prompt (written): Student and teacher complete together (we do).
   - Fourth prompt (written): Student completes independently with minimal teacher guidance (you do).

34. When the facilitator and student have completed the first training, the student will complete the comprehension post-quiz independently.

35. The facilitator will review all questions and answers with the student following the completion of the comprehension post-quiz.
Self-Questioning Training – Day 2

Four written questions/answers

Read out loud with facilitator

1. Today you will be continuing with the self-questioning strategy as we read an expository passage. What is an expository passage?

2. Student answers: An expository reading passage is a true story and has facts.

3. Good! An expository passage is a reading passage that is a true story and has facts. Today, we are going to do the same thing as last session. While we are reading, we will stop and ask and answer questions about what we are reading.

4. Do you remember what we do when we get to a prompt?

5. Student answers: We stop reading, make a question, and then answer the question.

6. Yes, perfect, we stop reading, ask a question about the paragraph and then answer the question using the information in the paragraph.

7. Where will you write your question?

8. Student answers: On the first line

9. Great! Where will you write your answer?

10. Student answers: On the second line

11. Do you have any other questions so far?

12. Let’s look at the last prompt. Do you notice anything different?

13. Student answers: Yes, there is a stop sign instead of the two lines to write on.
14. Very good observation! So instead of writing a question and answer, you will just say the question and the answer out loud. Does this make sense?

15. So what will you do when you see the two lines?

16. Student answers: I will write a question and then I will write an answer about the information in the paragraph.

17. Yes, very smart! Now, what will you do when you see a stop sign?

18. Student answers: I will say the question and then the answer out loud instead of writing the question and the answer.

19. Yes, very good job remembering. Do you have any questions about this?

20. The facilitator and student will begin reading the passage out loud together.

21. The same format of developing and answering the questions for each prompt will be as follows:

   - First prompt (written): Teacher completes to model (I do).
   - Second prompt (written): Student and teacher complete together (we do).
   - Third prompt (written): Student completes independently with minimal teacher guidance (you do).
   - Fourth prompt (vocal): Student completes independently with minimal teacher guidance (you do).

22. When the facilitator and student have completed the second training, the student will complete the comprehension post-quiz independently.

23. The facilitator will review all questions and answers with the student following the completion of the comprehension post-quiz.
Fading of Written Self-Questions to Oral Self Questions

Questions/Answers faded depending on criteria and student scores

Student reads silently independently

1. Today you will be continuing with the self-questioning strategy as we read an expository passage. What is an expository passage?

2. Student answers: An expository reading passage is a true story and has facts.

3. Good! An expository passage is a reading passage that is a true story and has facts.

4. Do you remember what we do when we get to a prompt?

5. Student answers: We stop reading, make a question, and then answer the question.

6. Yes, perfect, we stop reading, ask a question about the paragraph and then answer the question using the information in the paragraph.

7. Now, this time and from now on, there will only be stop signs. This means you will be asking and answering questions all out loud. You will not be writing any questions and answers from now on. Do you have any questions about this? Also, you will be reading the passage independently to yourself.

8. The student will read the passage independently and silently. When the student gets to a stop sign, they will stop reading and formulate their questions and answers.

9. The same format of developing and answering the questions for each prompt will be as follows:
-First prompt (vocal): Student completes independently with minimal teacher guidance (you do).
-Second prompt (vocal): Student completes independently with minimal teacher guidance (you do).
-Third prompt (vocal): Student completes independently with minimal teacher guidance (you do).
-Fourth prompt (vocal): Student completes independently with minimal teacher guidance (you do).

10. When the facilitator and student have completed the fifth training, the student will complete the comprehension post-quiz independently.

11. The facilitator will review all questions and answers with the student following the completion of the comprehension post-quiz.
**Self-Questioning Intervention**

*Four written questions/answers*

*Student reads silently independently*

1. Today you will be continuing with the self-questioning strategy with the stop sign prompts only. Do you remember what to do when you see a stop sign?

2. Student answers: Yes, I stop reading, say a question out loud, and then answer the question out loud.

3. Yes, perfect answer! Remember, you will be reading the passage independently and silently to yourself. Do you have any questions before you begin reading?

4. The student will read the passage silently. When the student reaches a stop sign prompt, they will stop reading, ask a question out loud and then say the answer out loud.

5. As the student is formulating the questions and answers for each of the four prompts, the teacher will check for accuracy of the question and answer.

6. The student will complete all questions and answers independently with no facilitator assistance, unless the student develops an inaccurate question and/or answer.

7. If the student does not ask an accurate question or does not say an accurate answer, the facilitator will follow a systematic least-to-most error correction:

   - The facilitator will guide the student to underline a key term in the paragraph to formulate a more accurate question
- The facilitator will guide the student to underline a sentence with a complete fact in the paragraph to formulate a more accurate question.
- The facilitator will model a question and an answer for the student.

8. After the student has completed the reading along with the four questions and answers, the student will complete the comprehension post-quiz independently.

9. The facilitator will review all questions and answers with the student following the completion of the comprehension post-quiz.
APPENDIX C: READING PASSAGES EXAMPLES
Earth's Neighbor

By: Erin Horner

Who is your next door neighbor? Do you and your neighbor have a lot in common? Our planet has a neighbor. Earth's neighbor is the planet Mars. These neighbors have a lot in common. Their landforms are very similar. Both Mars and Earth have canyons and valleys. They both have mountains, too. Mars's mountains are a lot taller, though! Both of these planets also have volcanoes.

While they are a lot alike, Mars and Earth are also very different. Mars is smaller and much colder than our planet. The average temperature on Mars is 80 degrees below zero! That is a lot colder than the North Pole! Mars also has two moons. Earth only has one. Our moon is round. Mars's moons look like lumpy potatoes. They are shaped like ovals and full of craters. These moons are also very small. No person has ever set foot on Mars. But who knows? Someday, scientists might make it possible to explore this space neighbor in person. Then we could really learn about all that these "next door neighbor" planets have in common.
Earth's Neighbor

By: Erin Horner

Who is your next door neighbor? Do you and your neighbor have a lot in common? Our planet has a neighbor. Earth's neighbor is the planet Mars. These neighbors have a lot in common.

Question: __________________________________________________________

Answer: __________________________________________________________

Their landforms are very similar. Both Mars and Earth have canyons and valleys. They both have mountains, too. Mars's mountains are a lot taller, though! Both of these planets also have volcanoes.

Question: __________________________________________________________

Answer: __________________________________________________________

While they are a lot alike, Mars and Earth are also very different. Mars is smaller and much colder than our planet. The average temperature on Mars is 80 degrees below zero! That is a lot colder than the North Pole! Mars also has two moons. Earth only has one. Our moon is round. Mars's moons look like lumpy potatoes. They are shaped like ovals and full of craters. These moons are also very small.

Question: __________________________________________________________

Answer: __________________________________________________________

No person has ever set foot on Mars. But who knows? Someday, scientists might make it possible to explore this space neighbor in person. Then we could really learn about all that these "next door neighbor" planets have in common.

Question: __________________________________________________________

Answer: __________________________________________________________
Earth's Neighbor

By: Erin Horner

Who is your next door neighbor? Do you and your neighbor have a lot in common? Our planet has a neighbor. Earth's neighbor is the planet Mars. These neighbors have a lot in common.

Question: ____________________________________________________

Answer: _________________________________________________________

Their landforms are very similar. Both Mars and Earth have canyons and valleys. They both have mountains, too. Mars's mountains are a lot taller, though! Both of these planets also have volcanoes.

Question: ____________________________________________________

Answer: _________________________________________________________

While they are a lot alike, Mars and Earth are also very different. Mars is smaller and much colder than our planet. The average temperature on Mars is 80 degrees below zero! That is a lot colder than the North Pole! Mars also has two moons. Earth only has one. Our moon is round. Mars's moons look like lumpy potatoes. They are shaped like ovals and full of craters. These moons are also very small.

Question: ____________________________________________________

Answer: _________________________________________________________

No person has ever set foot on Mars. But who knows? Someday, scientists might make it possible to explore this space neighbor in person. Then we could really learn about all that these "next door neighbor" planets have in common.
Earth's Neighbor

By: Erin Horner

Who is your next door neighbor? Do you and your neighbor have a lot in common? Our planet has a neighbor. Earth's neighbor is the planet Mars. These neighbors have a lot in common.

Question: ____________________________________________________________

Answer: ______________________________________________________________

Their landforms are very similar. Both Mars and Earth have canyons and valleys. They both have mountains, too. Mars's mountains are a lot taller, though! Both of these planets also have volcanoes.

Question: ____________________________________________________________

Answer: ______________________________________________________________

While they are a lot alike, Mars and Earth are also very different. Mars is smaller and much colder than our planet. The average temperature on Mars is 80 degrees below zero! That is a lot colder than the North Pole! Mars also has two moons. Earth only has one. Our moon is round. Mars's moons look like lumpy potatoes. They are shaped like ovals and full of craters. These moons are also very small.

No person has ever set foot on Mars. But who knows? Someday, scientists might make it possible to explore this space neighbor in person. Then we could really learn about all that these "next door neighbor" planets have in common.
Earth’s Neighbor
By: Erin Horner

Who is your next door neighbor? Do you and your neighbor have a lot in common? Our planet has a neighbor. Earth's neighbor is the planet Mars. These neighbors have a lot in common.

Question: __________________________________________________________

Answer: __________________________________________________________

Their landforms are very similar. Both Mars and Earth have canyons and valleys. They both have mountains, too. Mars's mountains are a lot taller, though! Both of these planets also have volcanoes.

While they are a lot alike, Mars and Earth are also very different. Mars is smaller and much colder than our planet. The average temperature on Mars is 80 degrees below zero! That is a lot colder than the North Pole! Mars also has two moons. Earth only has one. Our moon is round. Mars's moons look like lumpy potatoes. They are shaped like ovals and full of craters. These moons are also very small.

No person has ever set foot on Mars. But who knows? Someday, scientists might make it possible to explore this space neighbor in person. Then we could really learn about all that these "next door neighbor" planets have in common.

STOP

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Earth’s Neighbor

By: Erin Horner

Who is your next door neighbor? Do you and your neighbor have a lot in common? Our planet has a neighbor. Earth's neighbor is the planet Mars. These neighbors have a lot in common.

Their landforms are very similar. Both Mars and Earth have canyons and valleys. They both have mountains, too. Mars's mountains are a lot taller, though! Both of these planets also have volcanoes.

While they are a lot alike, Mars and Earth are also very different. Mars is smaller and much colder than our planet. The average temperature on Mars is 80 degrees below zero! That is a lot colder than the North Pole! Mars also has two moons. Earth only has one. Our moon is round. Mars's moons look like lumpy potatoes. They are shaped like ovals and full of craters. These moons are also very small.

No person has ever set foot on Mars. But who knows? Someday, scientists might make it possible to explore this space neighbor in person. Then we could really learn about all that these "next door neighbor" planets have in common.
APPENDIX D: PROCEDURAL CHECKLISTS
## Treatment Integrity Checklist

**Baseline:**

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1. Tells students they will be reading an expository (nonfiction) passage

2. Tells students they will answer questions about the story as best as they can

3. Gives students a copy of the story

4. If students ask for help with reading the passage, the experimenter says, “Just do your best”

5. Tells students to begin reading

6. When each student finishes story, administer quiz

7. If the student asks for help with a quiz question, the experimenter says “Just do your best”

8. When each student is finished with the quiz, collect the quiz
### Treatment Integrity Checklist

#### Intervention – Self-Questioning Written Prompts and Fading:

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<tbody>
<tr>
<td>1. Tells student they will be reading an expository passage</td>
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<td>2. Tells student they will be using the self-questioning strategy to help comprehend the story</td>
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<td>3. Reminds student they need to stop at every stopping point and write a question and answer</td>
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<td>4. Gives student a copy of the story with stopping points</td>
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<td>5. Tells student to begin reading silently</td>
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<td>6. As students stop and ask answer their question, check each question for accuracy</td>
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<td>7. Teacher followed error correction methods</td>
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<td>8. Collects story</td>
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<tr>
<td>9. Administer quiz</td>
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10. When student is finished with the quiz, reviews quiz answers with student.
### Treatment Integrity Checklist

**Intervention – Self-Questioning Oral Prompts/Stop Signs:**

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<td>1. Tells student they will be reading an expository passage</td>
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<td>2. Tells student they will be using the self-questioning strategy to help comprehend the story</td>
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<td>3. Reminds student they need to stop at every stop sign and say a question and answer out loud</td>
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<td>4. Gives student a copy of the story with stop sign prompts</td>
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<td>5. Tells student to begin reading silently</td>
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<td>6. As students stop and ask answer their question, check each question for accuracy</td>
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<tr>
<td>10. When student is finished with the quiz, reviews quiz answers with student</td>
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</table>
APPENDIX E: CRITERIA FOR SELF-QUESTIONING
<table>
<thead>
<tr>
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## Study Features Ordered by Author.

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<thead>
<tr>
<th>Author</th>
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<th>Main DV</th>
<th>n</th>
<th>Grade Level</th>
<th>Age</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Identification of Abilities</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benito, Foley, Lewis, &amp; Perry, (2005)</td>
<td>QAR Strategy</td>
<td>Comprehension, response to reading for social studies content</td>
<td>29</td>
<td>1 – 3rd grade</td>
<td>20 – 4th grade</td>
<td>Not stated</td>
<td>29 – Chamorro decent</td>
<td>Various reading abilities</td>
<td>Comparison group design</td>
</tr>
<tr>
<td>Chan (1991)</td>
<td>Generic self-questions for identifying main ideas</td>
<td>Comprehension, identifying main ideas</td>
<td>60</td>
<td>40 – 5th, 7th grade</td>
<td>20 – 3rd grade</td>
<td>36 – male</td>
<td>Not stated</td>
<td>20 – reading disabilities</td>
<td>Comparison group design</td>
</tr>
<tr>
<td>Ezell, Hussicker, Quineque, &amp; Randolph, (1996)</td>
<td>QAR Strategy</td>
<td>Comprehension, skill maintenance &amp; skill generalization</td>
<td>34</td>
<td>34 – 4th grade</td>
<td>16 – male</td>
<td>20 – Caucasian</td>
<td>High, average, and low ability readers</td>
<td>Comparison group design</td>
<td></td>
</tr>
<tr>
<td>Gaulney (1995)</td>
<td>Student generated questions – Asking why questions</td>
<td>Comprehension &amp; metacognitive knowledge</td>
<td>45</td>
<td>45 – 5th grade</td>
<td>45 – male</td>
<td>39 – Caucasian</td>
<td>Poor readers and baseball experts</td>
<td>Comparison group design</td>
<td></td>
</tr>
<tr>
<td>Hagaman, Casey, &amp; Reid, (2010)</td>
<td>RAP Strategy (using SRSD Model)</td>
<td>Comprehension, main ideas and details</td>
<td>6</td>
<td>6 – 3rd grade</td>
<td>2 – male</td>
<td>6 – Caucasian</td>
<td>6 – Poor comprehenders</td>
<td>Single subject design</td>
<td></td>
</tr>
</tbody>
</table>


### Study Features Ordered by Author Continued.

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<tbody>
<tr>
<td>Johnson, Graham, &amp; Harris, (1997)</td>
<td>Self-Regulated Strategy Development (SRSD)</td>
<td>Comprehension, main ideas, details, and grammar parts</td>
<td>47</td>
<td>11 - 4th grade</td>
<td>34 - male</td>
<td>11 - Caucasian</td>
<td>47 – Learning disabilities</td>
<td>Comparison group design</td>
</tr>
</tbody>
</table>
**Study Features Ordered by Author Continued.**

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Student Performance Outcomes Ordered by Type of Self-Questioning Intervention.

<table>
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<tr>
<th>Self-Questioning Strategy</th>
<th>Student Performance Outcomes</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question Answer Relationship (QAR) Strategy</td>
<td>Performance on asking and answering comprehension questions improved through the use of QAR strategies. Results replicated the positive findings of previous research on QAR strategies.</td>
<td>Benito (2005); Ezell et al., (1992); Ezell et al., (1996); Graham &amp; Wong, (1993)</td>
</tr>
<tr>
<td>Generic Self-Questioning Strategy</td>
<td>The main findings indicated that the use of generic questions were effective for increasing reading comprehension.</td>
<td>Chan (1991); Mason et al., (2004); Taylor et al., (2002); Therrien et al., (2006); Therrien &amp; Hughes, (2008)</td>
</tr>
<tr>
<td>Self Regulated Strategy Development (SRSD)</td>
<td>Results indicated that results using SRSD produced meaningful, lasting, and generalizable effects on comprehension skills.</td>
<td>Hugaman et al., (2010); Johnson et al., (1997); Mason et al., (2004); Mason et al., (2006)</td>
</tr>
<tr>
<td>RAP Paraphrasing Strategy</td>
<td>Results indicated that the use of the paraphrasing strategy increased reading comprehension as measured by the percentage of text recall and short answer questions.</td>
<td>Hugaman et al., (2010)</td>
</tr>
<tr>
<td>Picture Walk (PW), KWL (Know, Want to know, Learned), &amp; DRTA (Direct Reading Thinking Activity)</td>
<td>KWL was not as an effective strategy when compared to the Picture Walk (PW) strategy and Direct Reading and Thinking Activity (DRTA)</td>
<td>Stahl Scott (2008)</td>
</tr>
</tbody>
</table>
Student Performance Outcomes Ordered by Type of Self-Questioning Intervention
Continued.

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<tr>
<th>Self-Questioning Strategy</th>
<th>Student Performance Outcomes</th>
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</tr>
</thead>
<tbody>
<tr>
<td>TWA Strategy &amp; Reciprocal Teaching (RT) Strategy</td>
<td>The TWA intervention was the most effective intervention when compared to Reciprocal Questioning (RQ) for improving expository reading comprehension performance.</td>
<td>Mason, (2004); Mason et al., (2006)</td>
</tr>
<tr>
<td>FIST Strategy</td>
<td>Strategy training had significant effects on students’ abilities to answer inference questions (multiple choice format). Retell probes provided little evidence for significance on students’ abilities to summarize passages.</td>
<td>Manset-Williamson et al., (2008)</td>
</tr>
<tr>
<td>Repeated Readings</td>
<td>Study results confirm and extend previous findings. Students who were exposed to repeated readings intervention dramatically improved reading speed and when students read instructional-level material, repeated readings was more effective with improving factual comprehension.</td>
<td>Therrien et al., (2006); Therrien &amp; Hughes, (2008)</td>
</tr>
<tr>
<td>SRQ2R (Survey, Read, Question, Recite, Review) Strategy</td>
<td>Results of the study gave support to the contention that pre-teaching of students in structure of text or main ideas is a necessary requirement for effective use of SRQ2R.</td>
<td>Walker (1995)</td>
</tr>
<tr>
<td>Story Mapping</td>
<td>Story mapping was indicated to be an effective strategy for increasing reading comprehension. When compared to the self-questioning strategy, story mapping was not as effective on accuracy of comprehension responses.</td>
<td>Taylor et al., (2002)</td>
</tr>
</tbody>
</table>