The Effectiveness of Inserted Strategy Questions on Elementary Students’ Comprehension of Well-Structured and Less-Structured Expository Text

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ABSTRACT

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The present research examined the effects of inserted strategy questions (ISQs) and structured text on fifth grade students’ comprehension of expository text passages that presented the cause/effect text structure at the sentence level (least complex) and at the paragraph level (more complex). Two studies were conducted to investigate this relationship. In the first study, an independent factorial design was utilized with two between-subjects variables (ISQs and structured text). Based on the positive findings from the first study, a second study was conducted that added a within-subjects variable (cause/effect complexity). A total of 48 fifth-grade students in the first study and 95 fifth-grade students in the second study were asked to read expository text passages that presented the cause/effect structure at both the sentence level and the paragraph level. Students were randomly assigned to one of four conditions: (1) ISQs present with well-structured text; (2) ISQs absent with well-structured text; (3) ISQs present with less-structured text; or (4) ISQs absent with less-structured text.

In both studies, the effectiveness of ISQs and well-structured text was measured by performance on a written summary task. For the second study, a comprehension questions task was added. Analyses of variance (ANOVA) were carried out to analyze the data. In the first study, main effects of ISQs and structured text were found on the written summary, as was an interaction between these two factors when the cause/effect structure was presented at the more complex level. In the second study, main effects of
ISQs, structured text, and cause/effect complexity were found on the written summary task, but not for the comprehension question task. While the interaction between these three factors did not reach conventional significance on the written summary task, the relationship was investigated further due to our findings from the first study.

Taken together, these results suggest that both ISQs and well-structured text improve students’ comprehension of expository social studies passages; however, the effect is greatest when both factors are combined, especially when the text is more complex. Suggestions for extending this work and pedagogical implications based on these findings are discussed.
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J.G.O.
Chapter 1
INTRODUCTION

As students progress in their education, they are increasingly exposed to expository texts as they transition from a focus on learning how to read to a focus on learning how to learn from what they read (Chall, 1983). For many students this transition presents difficult learning challenges, as before this point they had been presented primarily with narrative texts (Duke, 2000). Along the way, these students do not receive the explicit instruction in expository text comprehension that they need to face the new challenges that this type of text presents. Hence, students exhibit a slump in reading comprehension beginning in fourth grade that often extends through middle school and beyond (Rutenberg, 2009). This is particularly troubling as success in school, and later in life, is closely linked to students’ ability to comprehend expository texts (Duke, 2000).

Researchers have addressed the question of what can be done to help students successfully comprehend expository texts; in particular researchers have asked what types of strategies should be taught within what types of text (Williams, Nubla-Kung, Pollini, Stafford, Garcia, & Snyder, 2007). This research will address this question by exploring the effectiveness of inserted strategy questions within well- and less-structured expository text on fifth grade students’ comprehension of social studies passages of differing levels of complexity. If such ISQs do in fact improve students’ comprehension of expository texts, students could be taught to internalize this type of questioning and then use it as a strategy when reading.
From early childhood through third grade, students are primarily engaged with narrative texts, with the main goal of learning to read. Things change dramatically for students as they reach fourth grade and beyond, at which point they are primarily engaged with expository texts (Stanovich & Siegel, 1994; Smith, 2000). Expository texts, which are informational in nature, differ from narrative texts in that they do not contain a story structure. Starting in fourth grade, students are suddenly expected to read, comprehend, and apply new, unfamiliar information presented in a new, unfamiliar way in their shift to the paradigm of reading to learn (Alfassi, 2004).

Because expository texts are often so dense with information and unfamiliar vocabulary, students are required to perform fairly complex cognitive tasks in order to extract, summarize, and synthesize a text’s content (Lapp, Flood, & Ranck-Buhr, 1995). Gersten, Fuchs, Williams, & Baker (2001) provide three explanations for why expository text is so much more challenging for students than narrative text: expository text involves reading long passages without prompts from a conversational partner; the logical-causal arguments typical of expository text structure are more abstract than are the events that characterize narratives; and expository texts use more complicated and varied structures than do narratives. For these reasons among others, expository material poses greater challenges to readers than does narrative material (McCutchen & Perfetti, 1982).

In recent years, there has been a greater push to expose students to expository texts as early as kindergarten, due in large part to the national focus on increasing standardized-test performance (Afflerbach, 2007). According to Moss (2005), in the fourth grade, 50%
of the section of the *National Assessment of Educational Progress* (NAEP; Grigg, Daane, Jin, & Campbell, 2003) that assesses student reading achievement requires students to read expository text. This percentage increases to 73% by the eighth grade (43% requiring students to read informational text to gain information, and 30% requiring students to perform a task related to the information, e.g., interpreting survey data, charts, and graphs). As students are increasingly exposed to expository text on standardized tests, it is certainly reasonable that students begin learning the skills needed to comprehend these texts before they are assessed on them.

While we are moving in the right direction, students in early elementary classrooms are still not sufficiently exposed to well-written expository texts (Duke, 2000; Abadiano & Turner, 2002; Yopp & Yopp, 2006), and more importantly, to effective instruction with these texts (Moss, 2005). Students reach fourth grade without the necessary literacy skills to comprehend informational texts. Research has pinpointed fourth grade as the time when many students, who had previously been reading on grade level, start to demonstrate signs of learning disabilities due to the sudden increased exposure to expository texts (Compton, 2009; Kiefer, 2010). The 2010 National Assessment of Educational Progress (NAEP) report found that only 33% of the nation’s fourth-graders demonstrated proficiency in reading,¹ a mere 2% increase from the 2005 NAEP report.

The troubles that students face in fourth grade proliferate as they progress towards middle school and beyond. According to Rutenberg (2009), in the 15 years prior to 2009,

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15 million students were below the basic level of reading upon graduating from high school (Bottoms, 2004), and almost 70% of high school students needed some form of remediation because they could not comprehend the words they read (Biancarosa & Snow, 2004). Additionally, the percentage of high school seniors performing at the proficient level or the advanced level in reading on the NAEP decreased from 80% in 1992 to 73% in 2005 (NCES, 2007).

These grim statistics make the case that more needs to be done to ensure students are able to comprehend the texts with which they are faced as they begin reading in order to obtain information. One way to assist this effort is to make sure that expository texts are accessible to students in the elementary grades; not only in quantity but in quality, and with instruction that promotes comprehension. The literature on inserted questions and strategy questions (Afflerbach, Pearson, & Paris, 2008; Graesser, et al., 1994; Meyer, Brandt, & Bluth, 1980) suggests that inserted strategy questions are one way to help alleviate expository text challenges by offering the following scaffolds: inserted strategy

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2 Twelfth-grade students performing at the Basic level should be able to demonstrate an overall understanding of the text, as well as make some interpretations based on the text. When reading text appropriate to twelfth grade, students should be able to identify and relate aspects of the text to its overall meaning, extend the ideas in the text by making simple inferences, recognizing interpretations, making connections among ideas in the text, relating the ideas in the text to their personal experiences, and drawing conclusions. They should be able to identify elements of an author’s style. Retrieved March 21, 2011, from http://nces.ed.gov/nationsreportcard/reading/achieveall.asp#grade12.

3 Twelfth-grade students performing at the Proficient level should be able to show an overall understanding of the text which includes inferential as well as literal information. When reading text appropriate to twelfth grade, students should be able to extend the ideas of the text by making inferences, drawing conclusions, and making connections to their own personal experiences and other readings. Connections between inferences and the text should be clear, even when implicit. These students should be able to analyze the author’s use of literary devices. Retrieved March 21, 2011, from http://nces.ed.gov/nationsreportcard/reading/achieveall.asp#grade12.

4 Twelfth-grade students performing at the Advanced level should be able to describe more abstract themes and ideas in the overall text. When reading text appropriate to twelfth grade, they should be able to analyze both the meaning and the form of the text and explicitly support their analyses with specific examples from the text. They should be able to extend the information from the text by relating it to their experiences and to the world. Their responses should be thorough, thoughtful, and extensive. Retrieved March 21, 2011, from http://nces.ed.gov/nationsreportcard/reading/achieveall.asp#grade12.
questions complement expository text by guiding students to contemplate the important information in the text; inserted strategy questions make more explicit the logical-causal arguments present in the information; and inserted strategy questions increase students’ sensitivity to the structure, which allows them to create more organized mental representations of the information.

**Inserted Strategy Questions**

Inspired by the Socratic Method, educational researchers have been investigating the effectiveness of inserting questions in instructional texts since the early twentieth century; hence, there is an abundance of literature on this type of questioning (Thorndike, 1917; Rothkopf, 1966; Faw & Waller, 1976; Hamaker, 1986; van den Broek, Tzeng, Risden, Trabasso, & Basche, 2001; Peverly & Wood, 2001; Graesser, Lu, Jackson, Mitchell, Ventura, Olney, & Louwerverse, 2004; E. Kintsch, 2005; Callender & McDaniel, 2007). However, the participants from the earliest studies to those being conducted today have been, and still are, predominantly secondary and college students. Even as researchers are realizing the importance of exposure to expository text in the elementary grades (Cote, Goldman, & Saul, 1998; Duke, 2000), especially texts that are well-structured (Meyer, Theodorou, Brezinski, Middlemiss, McDougall, & Bartlett, 2002; Lauer, 2002; Hall, Sabey, & McClellan, 2005), more studies need to be conducted that provide insight into the effectiveness of inserted questions within expository texts, especially for fourth- and fifth-graders who are experiencing the “reading slump” (Chall, Jacobs, & Baldwin, 1990).
The literature on inserted questions has addressed numerous types of questions (e.g., self-evaluation review questions (Hershberger, 1964), application questions (Watts & Anderson, 1971), factual versus higher level questions (Hamilton, 1985; Hamaker, 1986)); however, it has not focused on the importance of strategy questions. In their research on the expository cause/effect text structure, Williams et al. (2007) found that strategy questions are one component of a successful comprehension program for elementary students as early as the second grade. Furthermore, much of the literature has dealt with inserting questions placed before or after a passage (Rothkopf, 1966; Rothkopf & Bisbicos, 1967; Rickards, 1979; Hamilton, 1985). While more recent studies have dealt with questions inserted within narrative passages, inadequate attention has been paid to the placement of questions inserted within expository passages for elementary students.

**Text Structure**

According to Gersten et al. (2001), awareness of text structure leads students to ask relevant questions about the material they are reading as they are reading it. Yet, one must consider which instructional strategies need be in place to lead students to text structure awareness. The question then becomes how to scaffold strategic processing so as to maximize text structure sensitivity. Studies have shown that providing strategic elements within a text, such as inserted questions, will increase students' sensitivity to the text structure, which in turn will increase their comprehension of the material (E. Kintsch, 2005). Studies have also shown that providing students with text structure instruction that utilizes well-structured texts when teaching strategic processes is an effective way to
increase text structure sensitivity with students as early as the second grade (Williams, Hall, & Lauer, 2004).

Knowledge of text structure is an important element in increasing students’ comprehension of expository texts (Meyer, Brandt, & Bluth, 1980). When students have knowledge of text structure, they are able to treat the material as more than a series of unrelated facts. They can utilize signals to recognize the text’s organization, and thus extract the important information more easily. Unfortunately, however, many students, regardless of age, often fail to recognize the structure of expository text (Cook & Mayer, 1988). Often times, this is because the text is poorly structured. Much of the writing found in textbooks is not organized in a discernible way, does not contain signals that indicate specific informational structures, and fails to follow a structure that is recognizable to the reader (Chambliss, 1994). Without an established informational structure to follow, readers face difficulties understanding the text.

Recognizing this problem, several studies have taken authentic passages found in textbooks, revised them to more clearly present an organized structure, and investigated the differences in students’ comprehension of the well-structured and less-structured texts (Beck, McKeown, Sinatra, & Loxterman, 1991; Taylor & Samuels, 1983; Lauer, 2002). In each of these studies, the researchers found that students showed increased performance on a recall task after reading the well-structured texts over the less-structured texts. These findings speak to the importance of providing students with well-structured text that assists them in organizing the information therein. In this way, students will be able to more easily comprehend the material, and thus learn from it.
Based on the work of Meyer (1985), there is consensus among reading researchers that there are five main types of expository text structure: description, sequence, compare/contrast, problem/solution, and cause/effect. While there is not agreement on the exact hierarchy of salience of these structures, many researchers have found that the cause/effect text structure tends to be one of the least salient (Richgels, McGee, Lomax, & Sheard, 1987; Cheuvront, 2002). Understanding the abstract causal concept that one event causes another event to occur is challenging for students.

Within the cause/effect text structure, there are varying levels of complexity. For instance, the causal relationship may be presented at the sentence level (least complex), the paragraph level (more complex), or other levels that are even more complex such as the passage or chapter level. At the sentence level, one cause is related to one effect within one sentence, whereas at the paragraph level, one cause may be related to two or more effects and vice-versa over multiple sentences. Thus, when the cause/effect text structure is presented at the paragraph level and beyond, it increases the challenges students already face when trying to grasp causal relationships. Students must realize that one cause can create multiple effects, and that one effect may have multiple causes in order to comprehend the text. To do this, students must have awareness of the overall causal structure, even when there are no explicit clues (e.g., clue words) for the individual cause/effect relationships. Hence, providing a well-structured text that explicitly states the causal relationships of the material assists students in grasping the concept.
The Present Research

The present research consisted of two studies that examined the effect of inserted strategy questions (ISQs), structured text, and cause/effect complexity on fifth graders’ comprehension of expository social studies text by asking students to read passages and to complete comprehension tasks for each passage. In study one, students read two passages; one passage presented the cause/effect structure at the sentence level (least complex), and the other passage presented the cause/effect structure at the paragraph level (more complex). In study two, students read six passages; three passages presented the cause/effect structure at the sentence level, and the other three passages presented the cause/effect structure at the paragraph level. The two passages from study one were used in study two. In both studies, the combination of passages was prepared in four versions.

In version one, the passages contained strategy questions inserted within well-structured text. The strategy questions alerted students to the structure of the text, as well as the important information, by asking, “Why…?” and “What happened because…?” The well-structured passages were adapted from material presented in fifth grade social studies textbooks to more explicitly state the causal structure inherent in the text. In version two, the passages contained only the well-structured text; strategy questions were not inserted within the text. In version three, the passages contained strategy questions inserted within less-structured text. The less-structured passages were excerpted verbatim from fifth grade social studies textbooks. Version four also consisted of the less-structured text; strategy questions were not inserted within the text.
In summary, both studies were designed to show that by providing a line of strategic questioning inserted within expository text passages, especially texts that are well-structured, elementary students’ attention will be drawn to the important information. Once young students learn how to use inserted strategy questions as a way to identify the important information in an expository text passage, the questions themselves may serve as an instructional tool that teaches students to generate their own strategy questions during reading. It is anticipated that the findings of this study will provide useful information to teachers, as well as writers of textbooks and trade books and developers of computer-based educational programs, all of whom are seeking to design instruction aimed at improving elementary students’ comprehension of informational materials.

**Research Questions**

In order to examine the effects of ISQs and structured text on fifth grade students’ comprehension of expository texts of varying levels of complexity, the following questions were addressed:

1) Does the presence of ISQs aid elementary students’ comprehension of expository social studies passages?

2) Does well-structured text positively affect elementary students’ comprehension of expository social studies passages?

3) How will ISQs and structured text, in combination, affect elementary students’ comprehension of expository social studies passages?
4) Does cause/effect complexity affect elementary students’ comprehension of expository social studies passages?

5) Are the effects of ISQs and structured text the same for different levels of cause/effect complexity?

6) Are the effects of ISQs, structured text, and cause/effect complexity the same for different comprehension tasks?

**Hypotheses**

The following outcomes were expected for the research questions.

1) Students will show increased performance when strategy questions are inserted in the expository text. ISQs draw students’ attention to the important material in the text. They guide students to be more intentional and self-regulated in their reading, as they not only direct attention to the most important information in the text; they also encourage students to realize that a section of a passage might have been confusing. If they are unable to answer the question, students will be cued to go back and reread. Hence, a main effect of the presence of ISQs on students’ recall of expository social studies passages is predicted.

2) Students will show increased performance when expository text is well-structured. When a text has an organized structure, it facilitates students’ ability to follow the organization of the material, and thus form a mental representation that will increase the likelihood they will comprehend the important information
contained within the text. Hence, a main effect of structured expository text on students’ recall of expository social studies passages is predicted.

3) ISQs and well-structured text will have independent effects on comprehension. Students will show increased performance when ISQs are present in both the well- and less-structured text. While ISQs will be more beneficial when inserted within well-structured text, they will also be beneficial when inserted within less-structured text. Likewise, students will show increased performance when presented with well-structured text in which ISQs are both present and absent. While well-structured text will be more beneficial when ISQs are present, well-structured text will also be beneficial when ISQs are absent. Hence, an interaction between ISQs and structured text is not expected.

4) Students will show increased performance when the cause/effect structure is presented at the sentence level (least complex), than when the cause/effect structure is presented at the paragraph level (more complex). Since recognizing cause/effect relationships is difficult for students, it is expected that students will be able to identify and use the causal structure more effectively when it is presented at the sentence level. Hence, a main effect of cause/effect complexity on students’ recall of expository social studies passages is predicted.

5) When passages contain both ISQs and well-structured text, the combined effect will be the same when cause/effect is presented at the paragraph level as when cause/effect is presented at the sentence level. However, neither ISQs nor well-structured text alone will be as effective when cause/effect is presented at the paragraph level as when cause/effect is presented at the sentence level. Hence, an
interaction between ISQs, well-structured text, and cause/effect complexity is predicted.

6) As stated above, it is expected that ISQs, structured text, and cause/effect complexity will have independent effects, as well as an interaction effect of the three factors, on recall for the written summarization task. Van den Broek et al. (2001) found that when students correctly answered inserted questions, they were more likely to include the information from the questions in a written summary. Lauer (2002) found that when students read passages that were revised to include structure, their performance on a summarization task was increased. For the comprehension questions task, it is expected that students will answer more explicit questions correctly than implicit questions, as explicit questions are less cognitively demanding in that they do not require inferencing (Raphael & Pearson, 1985); however, hypotheses were not formed for the effects of ISQs, well-structured text, or cause/effect complexity on this task. Callendar and McDaniel (2007) found that students who received inserted questions in a passage performed better on comprehension questions delivered after reading if the comprehension questions directly targeted the information in the inserted questions, but not when the comprehension questions were unrelated to the inserted questions. Since the comprehension questions in this study are indirectly related to the inserted questions, it can not be said with certainty what effect the inserted questions will have. Lauer (2002) found that students who received well-structured text performed better on comprehension questions pertaining to the structure of the text, but not on comprehension questions pertaining to details
from the text. Again, since the comprehension questions in this study are indirectly related to the structure of the text, it can not be said with certainty what affect the well-structured text will have.
Cognitive comprehension strategies are specific, learned procedures that foster active, competent, self-regulated, and intentional reading (Trabasso & Bouchard, 2002). Answering questions is a cognitive strategy that helps students actively monitor their comprehension, one of seven strategies Adler (2004) deems as successful in improving text comprehension. When presented with a question to which a student does not know the answer, s/he is prompted to go back and reread the confusing part of the passage. Adler builds a case for question answering, stating that this strategy gives students a purpose for reading, focuses students’ attention on what they are to learn, helps students to think actively as they read, and helps students to review content and relate what they have learned to what they already know. While Beck and McKeown (2001) use a questioning strategy that is quite specific in its scope (Questioning the Author), it is based on the same premise, i.e., questions encourage students to become more deeply involved with a text by “digging in and grappling with text ideas.”

Considered as a scaffolded approach to improving comprehension, questions aid students as they begin to internalize a way to systematize new information. Understanding a text depends on the ability to build a mental model of the situation represented in the text (Oakhill, Cain, & Bryant, 2003). By deleting irrelevant material and superordinating that which is relevant, students are better able to identify and
construct the important information in a passage. Questions help with this as students are
guided in forming connections that explain why and how various ideas in a text are
connected (Chi, 2000). As students are presented with questions while reading a text,
over time they can begin to internalize the questions, thus gradually improving their
ability to generate questions as they proceed in their education, a strategy deemed
imperative to comprehension by the National Reading Panel (2000). In this way, students
will build the capacity needed to automatically ask pertinent questions when they read
expository texts, an important skill to develop early as these texts become more frequent
and difficult in later grades.

In the work of Williams et al. (2007, 2009) with second graders, students utilize
strategy questions relevant to specific expository text structures. For example, instruction
with the compare/contrast text structure teaches students to employ three strategy
questions that will alert them to the most important information in a structured passage by
increasing their sensitivity to the structure of the text: (1) What two things is this
paragraph about? (2) How are they the same? (3) How are they different? Instruction with
the cause/effect text structure contains the following two strategy questions: (1) Why…?
(2) What happened because…? Williams makes use of strategy questions in combination
with other structure strategies, thus the questions are an integral part of an instructional
program that research has proven successful in improving comprehension of expository
text (Williams, Stafford, Lauer, Hall, & Pollini, 2009).
History of the Research on Inserted Questions (1900s)

The case for strategy questions that are placed within a text is grounded in the research on inserted (also referred to as adjunct or embedded) questions. A chronological review of some of the research on questioning is presented below.

In 1917, Thorndike conducted an experiment with sixth-graders in which questions were placed after a simple paragraph. His purpose was to determine the features of a text that are characteristic of how students reason when reading. Thorndike found that the potency of words in a question, as well as in a text, have an impact on the mistakes that a student might make while reading. For example, the question “What is the general topic of the paragraph?” was over-potent in that students responded by describing what a paragraph is, especially the top (instead of topic) part of the paragraph (e.g., “Leave a half-inch space”). The question “On what day would a ten-year-old girl not be expected to attend school?” was under-potent in that students did not attend to the word “day” (e.g., “She is allowed to go to school when 6 years”). Thorndike’s findings suggest the importance of the words chosen for a paragraph, as well as the wording of the questions associated with the paragraph.

Rothkopf, a trail blazer in the research that has been conducted with adjunct questions, asked whether questions presented before and/or after a text passage improved student learning from written instructive materials in his 1966 study with college students. He found that adjunct questions presented after students had read a text passage increased post-test performance for both specific effects (a repeat of the adjunct questions presented after reading a text passage) and general effects (questions related to the text that were not asked during reading). Adjunct questions presented before students read a
text only increased post-test performance for the specific effects. These findings indicate
that questions placed after a passage produce more facilitative effects of learning from
text than do questions presented before a passage.

Two reviews of the research conducted before 1990 on adjunct/inserted questions
(Faw & Waller, 1976; Hamaker, 1986) discuss their positive effects on learning from
prose materials. In Faw and Waller’s (1976) review, the work of Rothkopf is credited as
reminding researchers that “what the student does in the learning situation is an important
key to how much he will retain.” Faw and Waller delineate four techniques that influence
student activities in the learning situation -- advance organizers, response modes, objects,
and inserted questions; however, Faw and Waller claim that out of the four techniques,
inserted questions are “in many ways the most promising method available.”

After reviewing Rothkopf’s (1966) study, Faw and Waller mention studies that
have built upon his findings. For example, Swenson and Kulhavy (1974) found that when
assessed by an immediate post-test fill in the blank measure of retention, as well as by a
lexically similar delayed post-test fill in the blank measure of retention, students
demonstrated better recall of critical items than incidental items after reading a text with
postquestions than after reading a text with prequestions. Unlike most of the published
studies on inserted questions that have included only secondary and college students
(with similar findings), Swenson and Kulhavy’s study included fifth- and sixth-graders.

In the mid 1970s, researchers switched from inserted questions that dealt only
with factual materials to inserted questions used with meaningful textbook-type materials
(Shavelson, Berliner, Ravitch, & Loeding, 1974; Felker & Dapra, 1975). With textbook-
type materials, these studies found that inserted questions had similar facilitative effects
on learning. Additionally, researchers began looking at different types of inserted questions. Shavelson et al. (1974) found that higher-order inserted questions (those that are on the comprehension and application levels of Bloom’s taxonomy) were the most beneficial for junior college students’ as measured by performance on an achievement test. In Hamaker’s (1986) review, additional studies supported the finding that higher-order adjunct questions increased performance on higher order criterion tests, as well as possibly on related tests (Andre, 1979; Frase, 1969).

Recent Research on Inserted Questions (2000s)

Research on the type of question that is inserted before, after, and/or within both narrative and expository texts for students of different ages and reading abilities has continued through the past decade. Peverly and Wood’s (2001) research on inserted questions brings to light the benefit of placing questions within a text for adolescents identified as reading disabled. Peverly and Wood administered a reading comprehension test after students had practiced using inserted questions for six weeks. They found that questions placed within a text significantly improved students’ comprehension beyond that of postquestions or no questions. Similarly, van den Broek et al. (2001) found that inserted questions significantly increased comprehension on a summarization recall task beyond that of questions asked at the end of the text; however, this was only true for older students. With fourth grade students, they found that both inserted questions and questions at the end of the text interfered with comprehension. It is important to note that van den Broek et al.’s study utilized inferential questions with narrative text for grades 4, 7, 10, and college. Peverly and Wood’s study incorporated inference, main idea, and
detail questions, again with narrative text, for high school students. Research is needed to
determine the effectiveness of a different type of inserted question (strategy) with a
different type of text (expository), and whether the effectiveness varies with age.

In a similar vein to the aforementioned studies, research has emphasized the
effectiveness of inserted questions with computer-based comprehension instruction. For
instance, Auto-Tutor, a question-based computer tutor, guides college students through
reading and reasoning about complex subject matter such as Newtonian physics,
computer literacy, and scientific reasoning (Graesser, Lu, Jackson, Mitchell, Ventura,
Olney, & Louwerse, 2004). AutoTutor presents problems expressed as questions as
students are reading and interacts with them as they develop answers. According to
Graesser, et al., the program has significantly increased comprehension learning.
Summary Street ®, another question-based computer tutor that focuses on writing
summaries with fifth grade to high school students and beyond, intersperses questions
interactively as students are writing summaries based on the information they have read
about a topic (E. Kintsch, 2005). In a study of this tutor (Franzke, E. Kintsch,
Caccamise, Johnson, & Dooley, 2005), researchers found that eighth-grade students who
used Summary Street ® to practice summary writing significantly outperformed students
who practiced summary writing without the guidance of the tutor on comprehension test
items that tapped gist-level comprehension. The benefits were even greater for students
with low-to-moderate achievement levels.

More recently, Callendar and McDaniel (2007) investigated how effective
different types of adjunct questions within expository texts were for readers of varying
comprehension abilities. The participants were undergraduate students who were either
deemed as in the high or low comprehension range (referred to as high or low structure builders (Gernsbacher, 1990)); students in the middle comprehension range were dropped from the study. The two groups of high or low structure builders were asked to do one of three things: (1) answer embedded questions (e.g., What is a scapegoat?); (2) answer elaborative interrogative questions (e.g., Why do we scapegoat?); or (3) read the passage twice. After answering various comprehension questions in the form of multiple-choice and short answer tasks, Callendar and McDaniel found that high structure builders were not helped by either the embedded questions or the elaborative interrogative questions; however, the low structure builders were better able to remember and comprehend information when they received both types of adjunct questions.

**Summary of the Findings**

While it is encouraging that these studies have demonstrated the benefits of different types of inserted questions for older students’ comprehension of narrative and expository text, research has not been conducted that addresses the effectiveness of inserted questions presented as strategy questions, that is, when the questions are designed to assist students in using the structural organization of a text to improve comprehension. Strategy questions present a particular benefit to students’ comprehension as they cue students to the structure of a text, providing them with a framework from which to build comprehension of texts that are all too often unstructured. With practice developing this framework via inserted strategy questions, comprehension can be improved.
Moreover, there is a dearth of knowledge about the effectiveness of inserted questions for elementary students. As young students are initially facing the challenges of expository text in a variety of contexts, research on the ways to best help them comprehend these texts is imperative.

Text Structure

Well-Structured and Less-Structured Expository Text

Well-structured texts are those that are written to highlight the inherent structure of the text. Texts that are well-structured make explicit the relationship among the concepts presented by providing structural clues such as main ideas and clue words. Less-structured or authentic texts, the predominant form of texts used in classrooms, are often the trade books and textbooks widely distributed by publishing companies. Texts that are less-structured primarily cover content without providing the information in an organized way. Without structure, it is much more difficult for students to understand how the various concepts presented in the text are related.

Previous studies have shown that a well-structured text that guides students to an understanding of the connections between the pieces of important information in a meaningful way will be more effective than an authentic text that often lacks coherence (van Dijk & Kintsch, 1983; Meyer & Poon, 2001; RAND, 2002; Hall et al., 2005). In their literature review, Meyer and Poon (2001) refer to a study by Pressley and McCormick (1995) which stated that when students read expository text, text structure knowledge helps readers separate the “wheat from the chaff.” In her work, Meyer (1985,
1980) has found that when authors present text in a structured way, students are able to follow the organization of the text to better retain the information contained within it. When a text lacks organization, students are not able to assemble the information in a meaningful way, and their retrieval of the information is seemingly random. Exposure to well-structured text provides a scaffold that guides elementary students in recognizing the inherent text structure(s) an author may be presenting so that they can use this awareness even when the text is less-structured. When students are able to recognize text structure, they can better organize the material, thus increasing the likelihood they will comprehend it (Williams et. al, 2009).

While many expository text structure studies have utilized researcher developed texts to investigate the differences between well-structured and less-structured text on readers’ comprehension, there is a body of research that has instead revised the authentic texts that are found in the textbooks that students read in school (Beck et al., 1991; Taylor & Samuels, 1983; Lauer, 2002). In the Beck et al. study, the researchers modified the structure of text from authentic informational textbooks to more clearly represent a well-structured text. To do this, they used a causal/explanatory style to explicitly state the reasoning that connected a cause to an event and an event to a consequence by highlighting the relationships between words, as well as the sequential ordering of ideas presented in the text. Beck et al. used clarifications, elaborations, and explanations to explicitly state the connections between the events. When students read the revised text in its structured form, fourth and fifth grade students performed better on a recall task and a questioning task than students who read the text from the authentic textbook.
Working with fifth and sixth-graders, Taylor and Samuels (1983) investigated how awareness of text structure would affect students’ recall of well- and less-structured texts. Students were first presented with authentic texts and asked to provide a written summarization of the material. If students’ recall followed the organization of the authentic text, the students were classified as aware of the text structure, and vice-versa, if students’ recall did not follow the authentic text’s organization, the students were classified as unaware of the text structure. Both groups of students then read well-structured and less-structured texts, and they provided written summarizations of the material. Taylor and Samuels found that both groups of students performed equally well when the text was less-structured; however, when the text was well-structured, students who were aware of text structure demonstrated superior performance on the recall task. The researchers concluded that the increase in performance could not have been due to better memorization, but instead was attributable to the students’ use of text structure knowledge.

Lauer (2002) presented second grade students with paragraphs that represented an authentic history textbook structure or a revised-narrative version that followed a more clear and accessible structure. On a summarization task, a resummarization task, and a structure questions task, students demonstrated better recall of the material presented in the paragraphs when they were exposed to the well-structured revised-narrative version.

**Cause/Effect Text Structure**

Meyer et al. (1980) defined text structure as “the logical connections among ideas in text as well as the subordination of some ideas to other.” In Meyer’s work (1985), she
identified five basic organizational structures of expository text that are generally agreed upon by reading researchers: description, sequence, compare/contrast, problem/solution, and cause/effect. Nubla-Kung (2007) explained each of these structures in the following way: (1) Description – elements are grouped by association with one element of the association subordinate to another (topic); (2) Sequence – elements are groups in temporal order; (3) Cause/Effect – elements are grouped before and after time, and are causally or quasi-causally related; (4) Problem/Solution – elements are organized in the same fashion as cause/effect with the addition of overlapping elements between problem and solution, and one element of the solution’s ability to block an antecedent to the problem; and (5) Compare/Contrast – elements are organized on the basis of similarities and differences between two topics (Meyer & Freedle, 1984).

Of these structures, several researchers have found cause/effect to be one of the most challenging structures for students (Richgels et al., 1987; Cheuvront, 2002). Richgels et al. investigated the differences in sixth grade students’ comprehension of four structures; description, compare/contrast, cause/effect, and problem/solution. In their study, they found that the compare/contrast structure was the most salient for students, while the cause/effect structure was the least salient. Students were not more aware of the description structure than the compare/contrast structure, nor were they less aware of the problem/solution structure than the cause/effect structure.

In a more recent study conducted by Cheuvront (2002), the differences in difficulty of the same four structures (description, compare/contrast, cause/effect, problem/solution) was investigated with fourth grade students. While Cheuvront’s findings were similar to Richgels et al. (1987), her study differed in that she controlled
for the effects of content familiarity and text readability by creating passages that were
equivalent in passage length, number of sentences, signals and idea units, reading level,
and sentence complexity. Additionally, in each passage there was a title, and the main
idea was always the first sentence. Cheuvront determined that the problem/solution and
compare/contrast structures were more salient for students than the cause/effect and
description structures, respectively.

The cause/effect structure poses unique challenges to students as they must first
understand the abstract causal concept that one event causes another event to occur, as
well as the aspects of the organization of the text structure that differentiate it from other
structures, such as the appropriate clue words (so, therefore, because, since). To
compound this challenge, within the cause/effect structure there are varying levels of
complexity. Within a paragraph or passage, the relationship between the cause and the
effect might be presented in one sentence (least complex), or it might be presented in
consecutive sentences across a paragraph (more complex). 5 Thus, when the cause/effect
text structure is presented at the paragraph level, it increases the challenges students
already face when trying to grasp the causal relationships. Students must realize that one
cause can create multiple effects, and that one effect may have multiple causes in order to
comprehend the text.

Recognizing the challenges that students face with the cause/effect structure,
Williams et al. (2007) developed an instructional program to teach this text structure,
embedded in social studies content, to second grade students. The program explicitly
taught cognitive strategies relevant to text structure instruction, tailoring these strategies

5 The cause/effect structure can be presented at even more complex levels such as across a passage, a
chapter, or an entire body of writing.
to the cause/effect text structure. In the first lesson for each content feature pair, students were taught the concept of cause and effect; specifically they learned that an effect is a thing or event that happens, and that the cause is the person, thing, or event that makes the effect happen. Students were introduced to the cause/effect clue words (because, since, therefore, thus) and the generic questions (What is the cause? What is the effect?) that would alert them to the structure of the text. Students then used the clue words and questions to conduct close analyses of well-structured target paragraphs. There were two types of target paragraphs; one that presented the cause/effect structure at the sentence level, and one that presented the cause/effect structure at the paragraph level. In the second lesson for each content feature pair, students organized the important causal information from the target paragraphs into two different graphic organizers that represented the cause/effect relationship at either the sentence level or the paragraph level. Students answered three comprehension questions about the material; one noncausal question, one question that asked about a cause, and one question that asked about an effect. At the end of the second lesson, the students reviewed the strategies that were taught, as well as the content. During both of the lessons in each pair, students learned content through vocabulary instruction, trade book read-alouds and discussion, and a community chart.

Williams et al. (2007) found that on posttest measures, students who received the text structure instruction, in addition to the content, performed significantly better than a content only group on questions that involved effects. Additionally, students who received the text structure instruction performed just as well as the content only group on the content measures. These findings indicate that text structure instruction can be
incorporated into instructional practice in a way that teaches both reading comprehension and academic content at the same time.

**Explicit Strategy Instruction**

A growing body of research explores the relationship between strategy instruction, text structure sensitivity, and a student’s comprehension. When students know how to strategically process well-structured text, recall and comprehension are boosted as students become more sensitive to the text structure (Pearson & Dole, 1987). In their review of research, Pearson and Dole explain how comprehension instruction has evolved from comprehension skill instruction to explicit comprehension instruction. In the 1920s, comprehension skill instruction mainly involved practicing reading until eventually a student would comprehend what he or she was reading. Durkin (1978-1979) referred to this type of instruction as “mentioning,” which involved mentioning the skill that students were supposed to apply, “practicing,” which involved having students practice the skill on workbook pages, and “assessing,” which involved assessing whether or not students got the answer correct. After observing these comprehension skill instruction practices in classrooms, Durkin argued that this kind of instruction could not help students learn what the comprehension skills were, how to apply them, why to use them, or when to use them.

According to Pearson and Dole (1987), during this time there was “a feverish pace of research on the basic processes of comprehension” that moved the field of comprehension instruction forward to explicit comprehension instruction. Pearson and Dole identified three variables that are generally accepted in explicit approaches to
teaching comprehension: (1) the teacher’s direct explanation of comprehension strategies; (2) guided practice of students and teachers together; and (3) transfer and application of what is learned to new materials. Teachers who utilize explicit instruction first provide a direct explanation of what, how, why, and when a comprehension strategy should be used. Next, they provide guided practice in which the responsibility for task completion is gradually handed over to the students, and finally, teachers require students to apply the strategy to novel reading situations. Some methods for providing explicit comprehension instruction, as suggested by Pearson and Dole, are inference training, reciprocal teaching, program evaluation, and process training.

The RAND Reading Study Group (RRSG) report (2002) suggests that explicitly teaching comprehension strategies improves learner outcomes, especially for low-achieving students. The RRSG defines explicit instruction as that which “provides a clear explanation of the criterion task, encourages students to pay attention, activates prior knowledge, breaks the tasks into small steps, provides sufficient practice at every step, and incorporates teacher feedback.” The report emphasizes the importance of teacher modeling of the comprehension strategies being taught with careful attention to slowly fading the scaffolding, yet the report also states that the success of this model is reliant on teachers being effective in successfully delivering strategy instruction.

According to the RRSG report, effective strategy instruction should incorporate multiple strategies into a comprehension instruction program that is constantly adapting to meet the needs of students. Strategies to be encouraged are self-monitoring, concept mapping, question generating, question answering, summarizing, story mapping, mental imagery, knowledge activation, mnemonics, and expository pattern identification. These
strategies help readers retain, organize, and evaluate the information they are reading in order to better understand and learn from it.

More recently, Gajria, Jitendra, Sood, & Sacks (2007) provided a research synthesis of the work on explicit comprehension training for students with learning disabilities. In developing the synthesis, the researchers utilized six criteria to evaluate whether studies would or would not be included: (1) incorporated a content area intervention or provided opportunities to practice or apply expository text strategies; (2) recipients of the intervention were identified as school-age children or adolescents with learning disabilities; (3) utilized an experimental or quasi-experimental group design intervention that had a control group; (4) included at least one measure of expository text comprehension; (5) provided sufficient quantitative information regarding outcomes so that effect sizes could be calculated; and (6) the studies were published in English.

In their synthesis, Gajria et al. discuss two types of interventions that support the expository text comprehension of students with learning disabilities; content enhancement and cognitive strategy instruction. Effective components of content enhancement interventions included mnemonic illustrations, as well as visual representations of key text ideas and their interrelationships using advance or graphic organizers or a matrix of semantic features.

Cognitive strategy instruction was divided into two sections; the use of single strategies (interventions that focus on one cognitive strategy) and the use of multiple strategies (interventions that incorporate multiple cognitive strategies as well as self-regulation of the strategies). Effective components of single cognitive strategies include main idea identification, paraphrasing or summarizing, text structure training,
questioning, cognitive mapping, and critical thinking. With the success of single cognitive strategies, researchers started to combine two or more of these strategies into interventions that utilized explicit, direct instruction procedures and reciprocal teaching formats. Gajria et al. found larger effects for interventions that incorporated multiple cognitive strategies than for interventions that used a single cognitive strategy. They concluded that when instruction is focused on teaching students how to learn rather than mastering content, the cognitive strategy instruction approach is effective, and that this is especially true when the instruction integrates multiple cognitive strategies. Citing Gersten et al. (2001), Gajria et al. reinforce the finding that explicit strategy instruction consistently improves readers’ comprehension, in particular for students with learning disabilities.

Williams et al. (2009) evaluated the positive effects of explicit comprehension training at the primary level by teaching the compare-contrast structure embedded in science content to second grade students. Building upon the previous work of Williams et al. (2005), this study investigated three questions: (1) Can explicit instruction in text structure improve students’ comprehension as demonstrated in written and oral performance?; (2) Can a limited amount of explicit training in a second structure (pro-con) help students’ comprehension of that structure?; and (3) Can explicit instruction in text structure improve students’ comprehension of authentic texts? There were three conditions in the study, a text structure (treatment) condition, a content only (comparison) condition, and a no-instruction (business as usual) control condition; however, only the text structure program will be discussed here.
The text structure lessons consisted of several components: compare-contrast clue words for all lessons (alike, both, compare, but, however, contrast) and pro-con clue words for two lessons (advantage, disadvantage, bad, good); trade book reading and discussion; vocabulary development; reading and analysis of researcher-developed target paragraphs; a matrix graphic organizer; compare-contrast questions (What two things is this paragraph about? How are they the same? How are they different?); a prompted summary and a free summary; and lesson review. There were 12 lessons in all that were taught over 22 sessions for a 2 month period. The classroom teachers taught the lessons at a rate of approximately 3 lessons per week.

At the completion of the program, two individual posttests were administered to participants in the three conditions. Results indicated that the performance of students in the text structure group was significantly higher than the content group and the no-instruction group on a written summary of a compare-contrast paragraph. No significant difference was present between the content group and the no-instruction group. Additionally, results indicated that students in the text structure group performed significantly better than the control group and the no-instruction group on both prompted and free oral summaries of pro-con paragraphs that were hybrid text (the paragraph contained more than one text structure) and single-structure pro-con text. Lastly, for the authentic text, results indicated that the text structure group performed significantly better on the prompted oral summary than the control group and the no-instruction group. When the oral summary was free, the text structure group still performed better than the control group; however, this difference did not reach conventional significance. The text structure group did perform significantly better than the no–instruction group.
In summary, students who were trained in text structure exhibited increased comprehension on written summary measures of compare-contrast text, on oral summary measures of pro-con text, and on oral summary measures of authentic text.

Also working with second-graders, Hall et al. (2005) investigated the effectiveness of instruction in expository text comprehension during small-group guided reading that focused on text structure awareness, specifically of the compare/contrast text structure. Six classrooms were randomly assigned to either text structure, control, or no instruction conditions, and within each classroom there were four small-groups of three to five students per group; however, only the text structure program will be discussed here.

Within the text structure program, there were three main components; introducing the text to students, reading the text, and discussing and revisiting it. To introduce the text to the students, teachers discussed the content, the major vocabulary words, and the compare/contrast clue words (alike, both, similar, but, different, however, contrast). Two different types of text were used; informational books from a guided-reading collection and well-structured compare/contrast paragraphs that were developed by the researchers. After the teacher introduced a text, the students read it aloud as the teacher listened in, pointed out clue words and vocabulary, and assisted students with word identification difficulties. When the students finished reading, the teacher discussed and revisited the text to make sure that students understood the material, were able to demonstrate their understanding, and were able to make comparisons between the concepts presented. To do this, vocabulary words were reviewed, matrix graphic organizers that highlighted the
compare/contrast structure were completed, and summaries were written with and without paragraph frames.

Pre- and post-assessments were administered. There were no significant differences among the conditions on the pre-assessment as all of the students scored close to zero on the measures; however, there were significant differences among the conditions on the post-assessment. The post-assessment consisted of nine measures: three summaries of compare/contrast text (one far transfer summary, one near transfer summary, and one instructional summary); a summary of an unstructured text; recall of clue words; matrix; overall use of clue words; vocabulary; and conceptual understanding of compare/contrast. These measures were then divided into three categories: summaries; strategies; and concepts.

On the summary measures, students in the text structure group performed significantly better than the control and no instruction groups on the near transfer summary and the instructional summary. There were no treatment effects for the far transfer summary or the summary of an unstructured text. On the strategies measures, students in the text structure group performed significantly better than the control and no instruction groups on the recall of clue words, the matrix, and the use of clue words. On the concepts measures, the text structure group performed significantly better than the control and no instruction group on the conceptual understanding of compare/contrast, but there was no treatment effect for vocabulary.

In summary, Hall et al. found that students who received the text structure training were better able to produce well-structured summaries, effectively use comprehension strategies, and develop a conceptual understanding of the
compare/contrast text structure. These findings suggest that students at this early age benefit from explicit comprehension instruction that increases their awareness of expository text structure.

Summary of the Findings

When a text is well-structured, students are more sensitive to the text structure, and can more easily use the structure to their advantage. Strategy instruction that teaches students to recognize the structure of a text increases the likelihood that they will comprehend the material they are reading. Comprehension strategy instruction is most effective when multiple strategies are taught together utilizing direct, explicit instruction. There is consensus among researchers that successful comprehension strategies include self-monitoring, text structure recognition, questioning, summarizing, cognitive mapping, content enhancements such as graphic organizers and mnemonics, and critical thinking. By providing explicit comprehension instruction that includes the teaching of these strategies with well-structured texts, students’ chances of learning from the expository texts to which they are exposed can be increased.
Chapter III

METHOD

General Purpose

It is well documented that students in early elementary classrooms do not have enough exposure to well-written expository texts (Duke, 2000; Abadiano & Turner, 2002; Yopp & Yopp, 2006). Moreover, they are not receiving effective instruction in how to comprehend these texts (Moss, 2005). Before fourth grade, narrative texts are the primary materials to which children are exposed as the goal of instruction is learning to read; however, once students reach fourth grade and beyond, expository texts are the materials with which students are primarily engaged (Smith, 2000) as the goal of instruction transitions to reading to learn (Alfassi, 2004). At this time, many students, who had previously been reading on grade level, start to demonstrate signs of learning disabilities due to the increased exposure to expository texts (Compton, 2009; Kiefer, 2010). Often, these difficulties increase as students progress towards middle school and beyond (Rutenberg, 2009).

Inserted questions and strategy questions have been shown in several studies to help alleviate expository text challenges (Afflerback, Pearson, & Paris, 2008; Graesser, et al., 1994; Meyer, Brandt, & Bluth, 1980). When students are provided with strategic elements, such as inserted strategy questions, within a text, especially one that is well-
structured, their text structure sensitivity will be increased, which will in turn increase their comprehension of the material (E. Kintsch, 2005).

To measure student comprehension, written summaries and comprehension questions are two widely used methods (Hamaker, 1986; van den Broek et al., 2001; Pollini, 2009). In the van den Broek et al. study, students were required to read three passages, answer inferential questions about each passage, and complete a recall task which required them to provide a written summary of the material covered in each passage. Pollini’s study required students to provide a written summary after reading eight passages; however, a factor of her study was the presence or absence of writing prompts when writing the summary. After writing the summary, students in all conditions were required to answer structure and non-structure questions about the material covered in each passage.

The current research utilized a written summarization task for study one and study two, with the addition of a comprehension questions task for study two, to investigate the effects of three factors, ISQs, structured text, and cause/effect complexity, on the reading comprehension of fifth-graders. The written summarization task required students to provide written summaries of expository social studies passages, and the comprehension questions task required students to answer explicit and implicit comprehension questions about the passages. Specifically, the studies were designed to determine whether or not ISQs would benefit fifth grade students’ comprehension of expository social studies text, and whether the effect would be greater for well-structured text than for less-structured text. Based on the findings from the first study, the second study also investigated whether this effect would differ depending on the level of cause/effect complexity.
To examine the effects of ISQs and structured text on fifth grade students’ comprehension of expository texts of varying levels of complexity, the following questions were addressed:

1) Does the presence of ISQs aid elementary students’ comprehension of expository social studies passages?

2) Does well-structured text positively affect elementary students’ comprehension of expository social studies passages?

3) How will ISQs and structured text, in combination, affect elementary students’ comprehension of expository social studies passages?

4) Does cause/effect complexity affect elementary students’ comprehension of expository social studies passages?

5) Are the effects of ISQs and structured text the same for different levels of cause/effect complexity?

6) Are the effects of ISQs, structured text, and cause/effect complexity the same for different comprehension tasks?

**Hypotheses**

The following outcomes were expected for the research questions.

1) Students will show increased performance when strategy questions are inserted in the expository text. ISQs draw students’ attention to the important material in the text. They guide students to be more intentional and self-regulated in their reading, as they not only direct attention to the most important information in the
text; they also encourage students to realize that a section of a passage might have been confusing. If they are unable to answer the question, students will be cued to go back and reread. Hence, a main effect of the presence of ISQs on students’ recall of expository social studies passages is predicted.

2) Students will show increased performance when expository text is well-structured. When a text has an organized structure, it facilitates students’ ability to follow the organization of the material, and thus form a mental representation that will increase the likelihood they will comprehend the important information contained within the text. Hence, a main effect of structured expository text on students’ recall of expository social studies passages is predicted.

3) ISQs and well-structured text will have independent effects on comprehension. Students will show increased performance when ISQs are present in both the well- and less-structured text. While ISQs will be more beneficial when inserted within well-structured text, they will also be beneficial when inserted within less-structured text. Likewise, students will show increased performance when presented with well-structured text in which ISQs are both present and absent. While well-structured text will be more beneficial when ISQs are present, well-structured text will also be beneficial when ISQs are absent. Hence, an interaction between ISQs and structured text is not expected.

4) Students will show increased performance when the cause/effect structure is presented at the sentence level (least complex), than when the cause/effect structure is presented at the paragraph level (more complex). Since recognizing cause/effect relationships is difficult for students, it is expected that students will
be able to identify and use the causal structure more effectively when it is presented at the sentence level. Hence, a main effect of cause/effect complexity on students’ recall of expository social studies passages is predicted.

5) When passages contain both ISQs and well-structured text, the combined effect will be the same when cause/effect is presented at the paragraph level as when cause/effect is presented at the sentence level. However, neither ISQs nor well-structured text alone will be as effective when cause/effect is presented at the paragraph level as when cause/effect is presented at the sentence level. Hence, an interaction between ISQs, well-structured text, and cause/effect complexity is predicted.

6) As stated above, it is expected that ISQs, structured text, and cause/effect complexity will have independent effects, as well as an interaction effect of the three factors, on recall for the written summarization task. Van den Broek et al. (2001) found that when students correctly answered inserted questions, they were more likely to include the information from the questions in a written summary. Lauer (2002) found that when students read passages that were revised to include structure, their performance on a summarization task was increased. For the comprehension questions task, it is expected that students will answer more explicit questions correctly than implicit questions, as explicit questions are less cognitively demanding in that they do not require inferencing (Raphael & Pearson, 1985); however, hypotheses were not formed for the effects of ISQs, well-structured text, or cause/effect complexity on this task. Callendar and McDaniel (2007) found that students who received inserted questions in a passage
performed better on comprehension questions delivered after reading if the comprehension questions directly targeted the information in the inserted questions, but not when the comprehension questions were unrelated to the inserted questions. Since the comprehension questions in this study are indirectly related to the inserted questions, it can not be said with certainty what effect the inserted questions will have. Lauer (2002) found that students who received well-structured text performed better on comprehension questions pertaining to the structure of the text, but not on comprehension questions pertaining to details from the text. Again, since the comprehension questions in this study are indirectly related to the structure of the text, it can not be said with certainty what affect the well-structured text will have.
Study One

Participants

Forty eight fifth grade students from six demographically similar classrooms in a New York City public school in Harlem were recruited to participate in study one. According to the 2009-2010 New York State Accountability and Overview Report (the most recent report available), the school received Title 1 school funds, with 98% of the students receiving state aid in the form of free or reduced-rate lunch. The school consisted of 850 students. The ethnic breakdown was as follows: Hispanic, 85%; African-American, 13%; Asian, 2%; and Caucasian, 0%. English language learners comprised 36% of the population. According to the 2010-2011 Special Education Service Delivery Report, 17.5% of the students in the school were in special education. Of these students, 69.3% were in the “least restrictive environment” and 30.7% were in a “more restrictive environment.” As of the 2010-2011 New York City Progress Report, the school received an overall ‘B’ school report card score with a ‘C’ for student progress, a ‘C’ for student performance, and an ‘A’ for school environment.

Materials

Two passages from the fifth-grade social studies textbook that was used in the school, *We the People* (Houghton Mifflin Harcourt Publishing Company, 2000), were either excerpted verbatim (less-structured text) or rewritten in a more structured form.

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6 The U.S. Individuals with Disabilities Act (IDEA) refers to a “least restrictive environment” as one in which a student who has a disability should have the opportunity to be educated with non-disabled peers, to the greatest extent possible. A “more restrictive environment” is one in which students with disabilities in the school are educated in a self-contained special education class.
(well-structured text). Per teacher verification, the students in this study had not been previously exposed to the passages. To make the passages more structured, sentences were revised to represent the causal structure of the passage, and **clue words** were inserted within the causal statements. **Inserted strategy questions**, that highlighted the structure of the text, were formulated to be used in both the less-structured and well-structured passages. Table 1 provides the word count for the passages, the word count for the questions, and the grade level readability of the passages for each of the conditions.

### Table 1
**Word Count and Flesh-Kincaid Grade Level Readability of the Two Passages**

<table>
<thead>
<tr>
<th></th>
<th>Passage 1 (Cause/Effect at the Sentence Level)</th>
<th>Passage 2 (Cause/Effect at the Paragraph Level)</th>
<th>Combined Passages:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Word Count</td>
<td>Question Word Count</td>
<td>Grade Level</td>
</tr>
<tr>
<td>Condition 1: Q-WS</td>
<td>379</td>
<td>111</td>
<td>7.0</td>
</tr>
<tr>
<td>Condition 2: NQ-WS</td>
<td>268</td>
<td>--</td>
<td>7.4</td>
</tr>
<tr>
<td>Condition 3: Q-LS</td>
<td>373</td>
<td>111</td>
<td>6.0</td>
</tr>
<tr>
<td>Condition 4: NQ-LS</td>
<td>262</td>
<td>--</td>
<td>6.1</td>
</tr>
</tbody>
</table>

For the first passage, “From Colonies to States,” there was a total of seven paragraphs. For both of the inserted strategy questions conditions, either one or two questions were asked after each paragraph, making a total of nine questions. For the second passage, “New York City Expands,” there was a total of four paragraphs. Again,
for both of the inserted strategy questions conditions, either one or two questions were asked after each paragraph, making a total of seven questions. Since the passages were excerpted verbatim from the social studies text, the number of questions that were asked per passage reflected the number of times that the causal structure was present in the authentic text. The causal structure was present in the instances that the text contained both a cause statement and the related effect statement. A question was developed for each time the causal structure was present.

Figure 1 provides an example of how a paragraph from a passage differed for each condition when the cause/effect structure was presented at the sentence level (least complex). Figure 2 provides an example of how a paragraph from a passage differed for each condition when the cause/effect structure was presented at the paragraph level (more complex). (See Appendix A for the full passages that were presented in each condition.)

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Fig. 1

*Cause/Effect Structure at the Sentence Level (Least Complex)*

Paragraph from a well-structured passage with ISQs:

_The colonists and England had a war (effect), because the king of England did not want the colonies to be free (cause). This war was called the American Revolution. George Washington led the American Army against the English Army (cause); therefore, he helped the Americans win the war (effect)._ 

**Q:** _Why did the colonies and England have a war?_

**Q:** _What happened because George Washington led the American Army against the English Army?_

---

7 In the sample paragraphs, the causes and effects are indicated and the clue words are bolded. Student copies did not contain this information.
Paragraph from a well-structured passage without ISQs:

The colonists and England had a war (effect), because the king of England did not want the colonies to be free (cause). This war was called the American Revolution. George Washington led the American Army against the English Army (cause); therefore, he helped the Americans win the war (effect).

Paragraph from a less-structured passage with ISQs:

The king of England did not want the colonies to be free. The colonies and England had a war. This war was called the American Revolution. George Washington led the American Army against the English Army. He helped the Americans win the war.

Q: Why did the colonies and England have a war?

Q: What happened because George Washington led the American Army against the English Army?

Paragraph from a less-structured passage without ISQs:

The king of England did not want the colonies to be free. The colonies and England had a war. This war was called the American Revolution. George Washington led the American Army against the English Army. He helped the Americans win the war.

Paragraph from a well-structured passage with ISQs:

New York City grew. Crowded streets made travel difficult (cause); therefore, people needed better ways to move around the city (effect). In 1904, the first section of the New York City subway system opened. Since the subway moved
people quickly underground (cause), traffic was eased on the streets above (effect 1). It also allowed people to live farther from the center of the city and still travel to work (effect 2). Today, New York City’s subway system is the largest in the world.

**Q:** What happened because crowded streets made travel difficult?  
**Q:** Why was traffic eased on the streets above?

Paragraph from a well-structured passage without ISQs:

New York City grew. Crowded streets made travel difficult (cause); therefore, people needed better ways to move around the city (effect). In 1904, the first section of the New York City subway system opened. Since the subway moved people quickly underground (cause), traffic was eased on the streets above (effect 1). It also allowed people to live farther from the center of the city and still travel to work (effect 2). Today, New York City’s subway system is the largest in the world.

Paragraph from a less-structured passage with ISQs:

As New York City grew, crowded streets made travel difficult. People needed better ways to move around the city. In 1904, the first section of the New York City subway system opened. The subway moved people quickly underground. This eased traffic on the streets above. It also allowed people to live farther from the center of the city and still travel to work. Today, New York City’s subway system is the largest in the world.

**Q:** What happened because crowded streets made travel difficult?  
**Q:** Why was traffic eased on the streets above?
Paragraph from a less-structured passage without ISQs:

As New York City grew, crowded streets made travel difficult. People needed better ways to move around the city. In 1904, the first section of the New York City subway system opened. The subway moved people quickly underground. This eased traffic on the streets above. It also allowed people to live farther from the center of the city and still travel to work. Today, New York City’s subway system is the largest in the world.

For the first passage, the mean word count was 320.50 (SD=64.18). According to the Flesch-Kincaid Grade Level Readability Scale (Flesch, 1948), the average grade level readability was 6.63 (SD=.68). The mean word count for the second passage was 280.50 (SD=45.74), and the average grade level readability was 6.95 (SD=.60). When both passages were combined, the mean word count was 601.00 (SD=109.92) and the average grade level readability was 6.83 (SD=.64).

According to the Flesh-Kincaid Grade scale, the grade level readability of each of the passages was above the fifth-grade level; however, since the passages were excerpted verbatim from the social studies textbook that was being used in the fifth-grade classrooms at the school, it is reasonable to assume that the readability of the passages was appropriate for students in the fifth grade. However, it is interesting to note that researchers have lamented the fact that many content area textbooks are written above the grade level reading ability of students (Gajria, Jitendra, Sood, and Sacks, 2007).
Measure

Comprehension was measured with a written summarization task in which students were asked to read a passage independently, and then to write a summary of the most important information from the text. This procedure was followed for both passages, with the first summary completed before the student proceeded to read and summarize the second passage. (See Appendix B for an example of the student pages for the written summarization task.)

Procedure

Students with parental consent were randomly assigned to one of four conditions. Students in each of the conditions received a booklet that contained two passages in one of four formats. In the first condition, students received both of the passages in their well-structured form with inserted strategy questions; in the second condition, students received both of the passages in their well-structured form without inserted strategy questions; in the third condition, students received both passages in their less-structured form with inserted strategy questions; and in the fourth condition, students received both passages in their less-structured form without questions. The passages were accompanied by lined sheets on which all of the students were instructed to write summaries of the most important information from the passages.

In small groups of three to four, students were taken out of the classroom during regular school hours to an office area that the school used for pull-out instruction. The students were seated in adjacent corners of the room facing a wall, and they were given individualized instructions that pertained to the type of passages that they received.
Students were told to wait until they had received the instructions to begin working in the booklet. The sets of instructions took approximately fifteen seconds per passage to explain to each student. The students were seated far enough apart from each other to ensure that they would not hear the directions given to other students.

Students in conditions one and three, which contained ISQs, were instructed to silently read the first passage and think about the ISQs before writing a summary of the most important information from the passage. They were given the same directions for passage two after completing the first passage. Students in conditions two and four, which did not contain ISQs, were instructed to silently read the first passage and then reread it before writing a summary of the most important information from the passage. Again, the students were given the same directions for passage two after completing the first passage. Having students reread passages is an approach commonly used in studies on inserted questions to control for the time that students in conditions with inserted questions spend with the materials relative to the conditions without inserted questions (Peverly & Wood, 2001; Callender & McDaniel, 2007). To counterbalance practice effects, as well as differences due to fatigue, the order in which the passages were presented was alternated, such that one student was first introduced to “New York City Expands,” while another student was first introduced to “From Colonies to States.” Additionally, each of the small groups consisted of students in different conditions to minimize the impact of external factors on assessment performance.

Students were allowed 45 minutes to complete the task. Upon completion they were given five minutes to talk about the assessment as a group, as well as to discuss the educational activities going on in their classrooms. This debriefing time was incorporated
to assist participants in returning to their normal state before returning to class (i.e., focusing on their in-class academic work instead of an out-of-class assessment).

**Scoring of the Dependent Measure**

Adapting the scoring guidelines used by Williams, et al. (2007) in their research with the cause/effect text structure, scoring guidelines were developed in which students were either given one point or a zero depending on whether or not they correctly included each causal statement in their summaries. (See Appendix D for details on the scoring system.) The summary measure required students to include a full cause/effect statement that contained both the cause and effect parts of the sentence, as well as an appropriate structural clue word (e.g., because, since, so, therefore, as a result, hence). Across the two passages, there was a possible total of 19 full cause/effect statements, 18 cause statements, and 17 effect statements (there was a difference in these totals, because the second passage, “New York City Expands,” contained one cause that had two effects and one effect that had three causes).

In the first passage, “From Colonies to States,” there were 8 causal sentences, each of which contained one cause and one effect. Students received a point (max=8) if a sentence in their summary included a full cause/effect statement that included both the cause and effect parts of the sentence, as well as an appropriate structural **clue word** (e.g., *The Declaration of Independence said that the thirteen colonies were free from England* (cause); **so** each colony was now a state (effect)).

In the second passage, “New York City Expands,” there were 11 causal sentences. Students received a point (max=11) for inclusion of a full cause/effect statement that
included both the cause and effect parts of the sentence, as well as an appropriate structural clue word (e.g., *Crowded streets made traffic difficult* (cause); *therefore, people needed better ways to move around the city* (effect)). In contrast to the first passage, there were 10 cause statements and nine effect statements in the second passage. The reason for the difference in the number of cause, effect, and full statements is that this passage contained one cause statement that was followed by two effects across sentences: *Since the subway moved people quickly underground* (cause), *traffic was eased on the streets above* (effect one). *It also allowed people to live farther from the center of the city and still travel to work* (effect two). The passage also contained three causes across sentences that led to one effect: *Living conditions within New York City also improved* (effect), *because the city’s government passed laws to fight disease* (cause one). *Also, officials made sure trash was picked up, the water supply was clean, and that food in the city was safe to eat* (cause two). *Individuals made the city healthier, too* (cause three). To account for the multiple causes and effects in this passage, a student that included the cause statement with both effects received two points; one point for including the cause statement and the first effect, and one point for including the cause statement and the second effect. Likewise, a student that included the effect statement with three causes received three points; one point for including the effect statement and the first cause, one point for including the effect statement and the second cause, and one point for including the effect statement and the third cause.
**Inter-rater Reliability**

Two scorers, the author and a graduate assistant in education, were able to attain almost complete inter-rater reliability (99%) on the summarization task for both passages after scoring five sets (9.6%) of the passages. For the measures on which our scores differed, we came to agreement through discussion. (See Appendix E for details.)

**Analysis Plan**

An independent factorial design was used with two between-subjects variables (presence or absence of ISQs and well- or less-structured text). A 2 (presence or absence of ISQs) x 2 (well- or less-structured text) analysis of variance (ANOVA) was carried out to analyze the data for the comprehension measure. Because there was an interaction for one of the passages, a simple effects analysis was conducted to determine the differences between the four conditions.

**Study Two**

**Participants**

Ninety-five fifth grade students from five demographically similar classrooms participated in study two. As the classrooms were from the same school that was used in study one, the school characteristics were the same (see page 42).
Materials

Six passages were adapted from three social studies textbooks that are commonly used in fifth grade classrooms; however, per teacher verification, the students in this study had not been previously exposed to the chosen passages. (See Appendix A for the full passages that were presented in each condition.) Three passages presented the cause/effect text structure at the sentence level (least complex), and three passages presented the cause/effect text structure at the paragraph level (more complex). In the less-structured condition, the passages contained sentences that were excerpted verbatim from a textbook. In the well-structured condition, these passages were revised to clearly represent the causal structure, and clue words were inserted within the causal statements. Inserted strategy questions, that highlighted the structure of the text, were formulated for each passage. Table 2 provides the word count, the question word count, and the grade level readability of each of the passages.

Table 3 provides the mean word counts, question word counts, and grade level readabilities for each condition. For condition 1 (Q-WS) the mean word count of the six passages was 358.17 ($SD=29.44$), and the mean grade level readability was 7.3 ($SD=.44$). The mean word count of the six passages in condition 2 (NQ-WS) was 251.67 ($SD=15.64$), and the mean grade level readability was 8.1 ($SD=.67$). The six condition 3 passages (Q-LS) had a mean word count of 350.33 ($SD=29.64$) and a mean grade level readability of 6.5 ($SD=.27$). And the six condition 4 passages (NQ-LS) had a mean word count of 243.83 ($SD=10.50$) and a mean grade level readability of 7.0 ($SD=.66$).
<table>
<thead>
<tr>
<th>Passage 1 (Passage 1 in Study One):</th>
<th>Word Count</th>
<th>Question Word Count</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition 1: Q-WS</td>
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<td>111</td>
<td>7.1</td>
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<td>Condition 2: NQ-WS</td>
<td>250</td>
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<td>7.6</td>
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<td>Condition 3: Q-LS</td>
<td>354</td>
<td>111</td>
<td>6.1</td>
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<td>Condition 4: NQ-LS</td>
<td>243</td>
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<td>6.1</td>
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<td>Passage 2:</td>
<td></td>
<td></td>
<td></td>
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<td>386</td>
<td>137</td>
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</tr>
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<td>Condition 2: NQ-WS</td>
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<td>Condition 3: Q-LS</td>
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</tr>
<tr>
<td>Condition 4: NQ-LS</td>
<td>254</td>
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<td>7.2</td>
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<td>Passage 3:</td>
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<td></td>
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<td>Condition 1: Q-WS</td>
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<td>111</td>
<td>8.1</td>
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<td>Condition 2: NQ-WS</td>
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<td>6.5</td>
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<td>Condition 4: NQ-LS</td>
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<td>Cause/Effect at the Paragraph Level: More Complex</td>
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<td>Passage 4 (Passage 2 in Study One):</td>
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<td>Question Word Count</td>
<td>Grade Level</td>
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<td>8.0</td>
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<td>85</td>
<td>6.5</td>
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<tr>
<td>Condition 4: NQ-LS</td>
<td>239</td>
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<td>7.0</td>
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### Table 3

**Mean Word Count and Flesch-Kincaid Grade Level Readability of the Passages by Condition**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean Word Count</th>
<th>Mean Question Word Count</th>
<th>Mean Grade Level</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tr>
<tr>
<td>Condition 1: Q-WS</td>
<td>358.17</td>
<td>106.50</td>
<td>7.3</td>
</tr>
<tr>
<td>Condition 2: NQ-WS</td>
<td>251.67</td>
<td>--</td>
<td>8.1</td>
</tr>
<tr>
<td>Condition 3: Q-LS</td>
<td>350.33</td>
<td>106.50</td>
<td>6.5</td>
</tr>
<tr>
<td>Condition 4: NQ-LS</td>
<td>243.83</td>
<td>--</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>Cause/Effect at the Sentence Level: Least Complex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition 1: Q-WS</td>
<td>365.00</td>
<td>119.67</td>
<td>7.3</td>
</tr>
<tr>
<td>Condition 2: NQ-WS</td>
<td>245.33</td>
<td>--</td>
<td>8.2</td>
</tr>
<tr>
<td>Condition 3: Q-LS</td>
<td>363.33</td>
<td>119.67</td>
<td>6.4</td>
</tr>
<tr>
<td>Condition 4: NQ-LS</td>
<td>243.67</td>
<td>--</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Cause/Effect at the Paragraph Level: More complex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition 1: Q-WS</td>
<td>351.33</td>
<td>93.33</td>
<td>7.2</td>
</tr>
<tr>
<td>Condition 2: NQ-WS</td>
<td>258.00</td>
<td>--</td>
<td>7.9</td>
</tr>
<tr>
<td>Condition 3: Q-LS</td>
<td>337.33</td>
<td>93.33</td>
<td>6.6</td>
</tr>
<tr>
<td>Condition 4: NQ-LS</td>
<td>244.00</td>
<td>--</td>
<td>7.3</td>
</tr>
</tbody>
</table>

The mean word counts and grade level readabilities of the three passages with the cause/effect structure presented at the sentence level (least complex) were as follows. For condition 1 (Q-WS) the mean word count of the three sentence level passages was 365.00 ($SD=19.31$), and the mean grade level readability was 7.3 ($SD=.68$). The mean word count of the three sentence level passages in condition 2 (NQ-WS) was 245.33 ($SD=7.23$), and the mean grade level readability was 8.2 ($SD=1.01$). The three condition 3 passages at the sentence level (Q-LS) had a mean word count of 363.33 ($SD=24.38$) and a mean grade level readability of 6.4 ($SD=.23$). And the three condition 4 passages at the sentence level (NQ-LS) had a mean word count of 243.67 ($SD=10.02$) and a mean grade level readability of 6.7 ($SD=.57$).
The mean word counts and grade level readabilities of the three passages with the cause/effect structure presented at the paragraph level (more complex) were as follows. For condition 1 (Q-WS) the mean word count of the three paragraph level passages was 351.33 ($SD=40.67$), and the mean grade level readability was 7.2 ($SD=.10$). The mean word count of the three paragraph level passages in condition 2 (NQ-WS) was 258.00 ($SD=20.95$), and the mean grade level readability was 7.9 ($SD=.21$). The three condition 3 passages at the paragraph level (Q-LS) had a mean word count of 337.33 ($SD=33.08$) and a mean grade level readability of 6.6 ($SD=.31$). And the three condition 4 passages at the paragraph level (NQ-LS) had a mean word count of 244.00 ($SD=13.23$) and a mean grade level readability of 7.3 ($SD=.74$).

For all passages combined, analysis of variance of the word count indicated that there was a significant difference between the conditions on the mean word count, $F(5,18) = 43.44, p < .001$. Pairwise comparisons showed that there were significantly more words in the passages that contained questions ($p < .001$), but the mean word count did not differ significantly between the well-structured and less-structured passages ($p = .41$). This was to be expected as the questions added an average of 106.50 words to the passages. Analysis of variance of the grade level readability indicated that there was a significant difference between the conditions on readability, $F(5,18) = 9.47, p < .001$. Pairwise comparisons showed that the grade level readability was significantly higher when the passages contained questions ($p = .006$), as well as when the text was structured ($p < .001$).

For the three passages with the cause/effect structure presented at the sentence level (least complex), analysis of variance of the word count indicated that there was a
significant difference between the conditions on the mean word count, $F(2,9) = 51.15, p < .001$. Pairwise comparisons showed that there were significantly more words in the passages that contained questions ($p < .001$), but the mean word count did not differ significantly between the well-structured and less-structured passages ($p = .87$). Analysis of variance of the grade level readability indicated that there was a significant difference between the conditions on readability, $F(2,9) = 4.28, p = .04$. Pairwise comparisons showed that there was not a significant difference in the passages on grade level readability when the passages contained questions ($p = .15$); however, there was a significant difference when the text was structured ($p = .01$).

For the three passages with the cause/effect structure presented at the paragraph level (more complex), analysis of variance of the word count indicated that there was a significant difference between the conditions on the mean word count, $F(2,9) = 10.60, p = .004$. Pairwise comparisons showed that there were significantly more words in the passages that contained questions ($p = .001$), but the mean word count did not differ significantly between the well-structured and less-structured passages ($p = .43$). Analysis of variance of the grade level readability indicated that there was a significant difference between the conditions on readability, $F(2,9) = 5.43, p = .03$. Pairwise comparisons showed that the grade level readability was significantly higher when the passages contained questions ($p = .02$), as well as when the text was structured ($p = .03$).

An additional analysis of variance of the difference between the three cause/effect passages presented at the sentence level (least complex) and the three cause/effect passages presented at the paragraph level (more complex) on word count and grade level
readability indicated that there was not a significant difference on either of these; $F(1,22) = 0.08, p = .79$, and $F(1,22) = 0.05, p = .82$, respectively.

There was an average of 9 questions asked per passage, with a range of 7-11 questions asked per passage. One or two questions were asked after each paragraph. Table 4 shows the number of ISQs asked per passage. Since the passages were excerpted verbatim from social studies text, the number of questions that were asked per passage reflects the number of times that the causal structure was present in the authentic text. The causal structure was present in the instances that the text contained both a cause statement and the related effect statement.

Table 4  
*Number of Inserted Strategy Questions Asked per Passage*

<table>
<thead>
<tr>
<th>Cause/Effect at the Sentence Level: Least Complex</th>
<th>Number of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passage 1 (Passage 1 in Study One)</td>
<td>9</td>
</tr>
<tr>
<td>Passage 2</td>
<td>11</td>
</tr>
<tr>
<td>Passage 3</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cause/Effect at the Paragraph Level: More Complex</th>
<th>Number of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passage 4 (Passage 2 in Study One)</td>
<td>7</td>
</tr>
<tr>
<td>Passage 5</td>
<td>11</td>
</tr>
<tr>
<td>Passage 6</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
</tr>
</tbody>
</table>

**Measures**

Two tasks were presented to the students in order to assess their comprehension of the passages: (1) Written Summarization Task; and (2) Comprehension Questions Task.
Measures 1 and 2: Written Summarization Task

Comprehension was measured with a summarization task in which students were asked to read a passage independently, and then to write a summary of the most important information from the text. This procedure was followed for each of the passages, with the first summary completed before the student proceeded to read and summarize the next passage. (See Appendix B for an example of the student pages for the written summarization task.) For Measure 1, the students completed the summarization task for the three passages that presented the cause/effect structure at the sentence level. For Measure 2, the students completed the same summarization task for the three passages that presented the cause/effect structure at the paragraph level.

Measures 3 and 4: Comprehension Questions Task

Additional comprehension measures included two multiple choice questions for each of the six passages, one comprehension question that was explicit and one comprehension question that was implicit. Measure 3, the explicit questions (max=6), asked students to identify the main idea (i.e., What is this paragraph about?), and Measure 4, the implicit questions (max=6), asked students to come to a conclusion based on the knowledge they gained from the passage (e.g., How does New York City continue to change over time?). (See Appendix C for a list of the questions that were asked for each passage, as well as the multiple choice options.)
Procedure

Permission to recruit students was granted by the Institutional Review Board of Teachers College, Columbia University and the New York City Department of Education. The principal, assistant principal, and fifth grade teachers that participated in the study authorized the student recruitment. Subsequently, consent was given by the parents or guardians of the students. Across the five classrooms, parental consent was obtained for approximately 80% of the students.

Students with parental consent were randomly assigned to one of four conditions: (1) presence of questions with well-structured text (Q-WS); (2) absence of questions with well-structured text (NQ-WS); (3) presence of questions with less-structured text (Q-LS); and (4) absence of questions with less-structured text (NQ-LS). Students in each of the four conditions received a booklet that contained all of the passages in one of four formats, as well as the corresponding comprehension tasks (van den Broek et al., 2001). In the first condition, students received the six passages in their well-structured form with ISQs (Q-WS). In the second condition, students received the passages in their well-structured form without ISQs (NQ-WS). In the third condition, students received the passages in their less-structured form with ISQs (Q-LS). And in the fourth condition, students received the passages in their less-structured form without questions (NQ-LS). The order of the passages and their corresponding tasks were counterbalanced within and across conditions. After each passage, the students received lined sheets on which they were instructed to write a summary of the most important information, and then they received two multiple choice questions for which they were instructed to circle the correct answer for each question.
The assessments were administered over two days to each classroom as a whole class activity. All students in the class participated in the study; however, data obtained from students who did not provide consent was discarded. Students were allowed 60 minutes to complete the tasks in part one of their booklet. On the following day, students were allowed 60 minutes to complete the tasks in part two of their booklet. On both days, students were instructed to raise their hand as soon as they finished the respective part of the booklet so that it could be collected. When the booklet was collected, the amount of time the student spent completing it was recorded.

Since the directions for the comprehension tasks varied by condition, all directions were clearly printed in the booklets. Students in conditions one (Q-WS) and three (Q-LS), which contained ISQs, were provided with written directions that instructed them to silently read the first passage and to think about the ISQs before writing a summary of the most important information from the passage (see Appendix B). After writing the summary, students were provided with written directions that instructed them to read two multiple choice questions and then circle the correct answer to each question (see Appendix C). There was one explicit comprehension question and one implicit comprehension question about the passage. They were given the same written directions for the remaining passages. Students in conditions two (NQ-WS) and four (NQ-LS), which did not contain ISQs, were provided with written directions that instructed them to silently read the first passage and then reread it before writing a summary of the most important information from the passage (see Appendix B). After writing the summary, the students received the same directions as conditions one (Q-WS) and three (Q-LS) for answering the explicit and implicit comprehension questions (see Appendix C). Again,
the directions were the same for the remaining passages. If students were unsure about the directions, their concerns were addressed individually, so that they were not aware of the directions given to students in a different condition.

After the 60 minute time allotment for completing the booklet, students were given five minutes to talk about the tasks as a class, as well as to discuss the educational activities going on in their classrooms. This debriefing time was included to assist participants in adjusting to the return to their usual classroom activities (e.g., focusing on their math lesson).

**Scoring of the Dependent Measures**

The same scoring procedure was used for study two as was used in study one. Scoring guidelines were developed for the written summarization task based on the information presented in the passages. (See Appendix D for details on the scoring system.) Table 5 shows the total number of points a student could receive per passage, the total number of points a student could receive when the passages were grouped by cause/effect complexity, and the total number of points a student could receive in all.

For the explicit multiple-choice comprehension question measure, students received one point for each question that was answered correctly. Since there was one explicit multiple-choice question per passage, students could receive a total of six points; three points for correctly answering the explicit multiple-choice questions for the passages with the cause/effect structure presented at the sentence level (least complex), and three points for correctly answering the explicit multiple-choice questions for the passages with the cause/effect structure presented at the paragraph level (more complex).
Table 5
Total Possible Points per Passage

<table>
<thead>
<tr>
<th>Cause Statements</th>
<th>Effect Statements</th>
<th>Multiple Cause and Effect Statements</th>
<th>Full C/E Statements with Clue Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause/Effect at the Sentence Level: Least Complex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passage 1</td>
<td>9</td>
<td>9</td>
<td>--</td>
</tr>
<tr>
<td>Passage 2</td>
<td>11</td>
<td>11</td>
<td>--</td>
</tr>
<tr>
<td>Passage 3</td>
<td>8</td>
<td>8</td>
<td>--</td>
</tr>
<tr>
<td>Total Points</td>
<td>28</td>
<td>28</td>
<td>--</td>
</tr>
<tr>
<td>Cause/Effect at the Paragraph Level: More Complex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passage 4</td>
<td>9</td>
<td>9</td>
<td>1 C w/2 E, 1 C w/2 E, 3 C w/1 E</td>
</tr>
<tr>
<td>Passage 5</td>
<td>11</td>
<td>14</td>
<td>1 C w/2 E, 1 C w/2 E</td>
</tr>
<tr>
<td>Passage 6</td>
<td>9</td>
<td>10</td>
<td>2 C w/1 E, 1 C w/1 E, 1 C w/1 E</td>
</tr>
<tr>
<td>Total Points</td>
<td>29</td>
<td>33</td>
<td>--</td>
</tr>
<tr>
<td>TOTAL Points</td>
<td>57</td>
<td>61</td>
<td>--</td>
</tr>
</tbody>
</table>

For the implicit multiple-choice comprehension question measure, students received one point for each question that was answered correctly. Again, since there was one implicit multiple-choice question per passage, students could receive a total of six points; three points for correctly answering the implicit multiple-choice questions for the passages with the cause/effect structure presented at the sentence level (least complex), and three points for correctly answering the implicit multiple-choice questions for the passages with the cause/effect structure presented at the paragraph level (more complex).

For each of the four comprehension measures (the written summarization task with the cause/effect structure presented at the sentence level, the written summarization task with the cause/effect structure presented at the paragraph level, the explicit comprehension question task, and the implicit comprehension question task), a proportion correct score was calculated by dividing the total score of the measure by the maximum number of points for the measure; this score was used in the data analysis (Lauer, 2002).
**Inter-Rater Reliability**

Ten sets (10.5%) of the passages were scored by two independent raters, the author and a graduate student in education, in order to establish inter-rater reliability. For each of the four measures, the inter-rater reliability coefficient was 97% or higher. (See Appendix E for details.)

**Analysis Plan**

A mixed factorial design was used, with two between-subjects variables (presence or absence of ISQs and well- or less-structured text) and one within-subjects variable (cause/effect presented at the sentence level (least complex) or cause/effect presented at the paragraph level (more complex)). A 2 (presence or absence of ISQs) x 2 (well- or less-structured text) x 2 (level of cause/effect complexity) ANOVA was carried out to analyze the data for each measure (i.e., full cause/effect statements with an appropriate structural clue word for passages with cause/effect presented at the sentence level of complexity, full cause/effect statements with an appropriate structural clue word for passages with cause/effect presented at the paragraph level of complexity, correctly answered explicit comprehension questions, and correctly answered implicit comprehension questions). A simple effects analysis was conducted to determine the differences between the four conditions. An additional ANOVA was carried out to analyze the difference between student performance on explicit comprehension questions and implicit comprehension questions.
Chapter IV

RESULTS

Study One

Participant Characteristics

Analyses were carried out to examine whether pre-existing differences among the four conditions existed in terms of age, gender, and reading ability. The characteristics of the 48 students are displayed in Table 6. Results based on ANOVAs\(^8\) indicated that there was no significant difference among the four conditions in (a) mean age, \(F(3,44) = 0.81, p = .50\); and (b) reading ability as measured by continuous scale scores on the New York State English Language Arts exam, \(F(3,44) = 1.28, p = .29\). With respect to gender, a Chi-Square analysis was conducted and no significant differences in the distribution of males and females across the four conditions was found, \(\chi^2(1, N = 48) = 0.08, p = .77\).

Table 6

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Condition 1 (N=13)</th>
<th>Condition 2 (N=13)</th>
<th>Condition 3 (N=12)</th>
<th>Condition 4 (N=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>10.99</td>
<td>10.88</td>
<td>10.86</td>
<td>10.86</td>
</tr>
<tr>
<td>(SD)</td>
<td>.26</td>
<td>.27</td>
<td>.26</td>
<td>.28</td>
</tr>
<tr>
<td>ELA Test (scale score)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(M)</td>
<td>669.79</td>
<td>654.69</td>
<td>658.46</td>
<td>664.00</td>
</tr>
<tr>
<td>(SD)</td>
<td>26.85</td>
<td>22.50</td>
<td>32.83</td>
<td>14.63</td>
</tr>
</tbody>
</table>

Condition 1: Q-WS; Condition 2: NQ-WS; Condition 3: Q-LS; Condition 4: NQ-LS

\(^8\) All analyses are based on Type III Sums of Squares (SPSS).
Data Analysis

Dependent Variables

Two dependent variables were examined: number of full cause/effect statements with an appropriate structural clue word in the written summarization of passage one; and number of full cause/effect statements with an appropriate structural clue word in the written summarization of passage two. A score for the total number of full cause/effect statements with an appropriate clue word that were included in the summary for each student was computed for each of the dependent variables. These scores were then converted into proportions by dividing the total score by the maximum score possible.

Written Summarization

The written summarization task assessed students’ comprehension of two expository social studies passages; passage one presented the cause/effect structure at the sentence level (least complex), and passage two presented the cause/effect text structure at the paragraph level (more complex). The number of full cause/effect statements with an appropriate structural clue word was determined for the passages. Full cause/effect statements were sentences generated by the students that contained both the cause and effect parts of the sentence, as well as an appropriate structural clue word, e.g., *Crowded streets made travel difficult* (cause), *so people needed better ways to move around the city* (effect). These statements were generated from the material presented in each passage. The students were required to include an appropriate structural clue word as it showed their understanding of the causal structure. A proportion correct score for full
cause/effect statements with an appropriate structural clue word (out of a possible score of eight for passage one and 11 for passage two) was obtained for each passage.

Table 7 displays the means and standard deviations for the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) that were included in the summarization task for each passage.

Table 7

Means and Standard Deviations for Proportion Correct on the Written Summarization Task

<table>
<thead>
<tr>
<th></th>
<th>Presence of Questions (Q)</th>
<th>Absence of Questions (NQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.30</td>
<td>.27</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.14</td>
<td>.14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Presence of Questions (Q)</th>
<th>Absence of Questions (NQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.21</td>
<td>.17</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.05</td>
<td>.05</td>
</tr>
</tbody>
</table>

Figure 3 illustrates these findings.
Fig. 3
Proportion Correct on the Written Summarization Task

For passage one, the mean proportion of correct statements (full cause/effect statements with clue words) was .30 ($SD = .27$) for the Q-WS condition; .12 ($SD = .13$) for the NQ-WS condition; .14 ($SD = .14$) for the Q-LS condition; and .01 ($SD = .04$) for the NQ-LS condition. Analysis of variance indicated two main effects: There was a significant difference among the presence or absence of questions groups, in favor of the presence of questions group, $F(3,44) = 9.70, p = .003$, as well as between the well-structured and less-structured text groups, in favor of the well-structured text group, $F(3,44) = 7.43, p = .01$.

For passage two, the mean proportion of correct full cause/effect statements with clue words was .21 ($SD = .17$) for the Q-WS condition; .03 ($SD = .08$) for the NQ-WS
condition; .05 ($SD = .05$) for the Q-LS condition; and .02 ($SD = .04$) for the NQ-LS condition. Analysis of variance indicated two main effects: There was a significant difference among the presence or absence of questions groups, in favor of the presence of questions group, $F(3,44) =12.07, p = .001$, as well as between the well-structured and less-structured text groups, in favor of the well-structured text group, $F(3,44) = 8.00, p = .01$.

With two fixed factors, presence of questions and structured text, we tested for an interaction between these factors on the comprehension measure for each of the passages. There was a significant interaction for the second passage, $F(3,44) = 6.09, p = .02$; for the first passage, an interaction did not occur.

Because there was an interaction for the second passage, a one-way ANOVA with pairwise comparisons was conducted to determine the differences between the four conditions. Simple effects indicated that when strategy questions were inserted within well-structured text that presented cause/effect at the paragraph level, the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher than when the passages were well-structured only ($p < .001$), contained ISQs only ($p < .001$), or provided neither well-structured text or ISQs ($p < .001$). At the sentence level of cause/effect complexity, again when ISQs were presented within well-structured text, the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher than when the passages were well-structured only ($p = .01$), contained ISQs only ($p = .02$), or provided neither well-structured text or ISQs ($p < .001$).
Table 8

Pairwise Comparisons of Passages

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pairwise Comparisons</strong></td>
<td></td>
</tr>
<tr>
<td>Passage 1: Full Cause/Effect Statements</td>
<td></td>
</tr>
<tr>
<td>with Structural Clue Word</td>
<td>*C1&gt;C2, *C1&gt;C3, ***C1&gt;C4</td>
</tr>
<tr>
<td>Passage 2: Full Cause/Effect Statements</td>
<td>***C1&gt;C2, ***C1&gt;C3, ***C1&gt;C4</td>
</tr>
<tr>
<td>with Structural Clue Word</td>
<td></td>
</tr>
<tr>
<td>Condition 1: Q-WS; Condition 2: NQ-WS; Condition 3: Q-LS; Condition 4: NQ-LS</td>
<td></td>
</tr>
<tr>
<td>*p&lt;.05, **p&lt;.01, ***p&lt;.001</td>
<td></td>
</tr>
</tbody>
</table>

Study Two

Participant Characteristics

Analyses were carried out to examine whether pre-existing differences among the four conditions existed in terms of age, gender, reading ability, and time spent on task. The characteristics of the 95 participants are displayed in Table 9. Results based on ANOVAs\(^9\) indicated that there were no significant differences among the four conditions in (a) mean age, \(F(3,91) = 1.33, p = .27\); (b) reading ability as measured by continuous scale scores on the New York State English Language Arts (ELA) exam, \(F(3,91) = 1.28, p = .29\); and (c) time spent on task as measured in minutes, \(F(3,91) = 0.25, p = .86\). With respect to gender, a Chi-Square analysis was conducted and no significant differences in the distribution of males and females across the four conditions was found, \(\chi^2(1, N = 95) = 0.52, p = .47\).

---

\(^9\) All analyses are based on Type III Sums of Squares (SPSS).
### Table 9
*Characteristics of Participants: Means and Standard Deviations (N=95)*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>12</td>
<td>16</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>8</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Age (years)</td>
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<td></td>
</tr>
<tr>
<td>M</td>
<td>11.13</td>
<td>11.33</td>
<td>11.06</td>
<td>11.01</td>
</tr>
<tr>
<td>SD</td>
<td>.38</td>
<td>.89</td>
<td>.49</td>
<td>0.51</td>
</tr>
<tr>
<td>ELA Test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>667.68</td>
<td>658.42</td>
<td>665.38</td>
<td>668.08</td>
</tr>
<tr>
<td>SD</td>
<td>22.90</td>
<td>18.64</td>
<td>21.25</td>
<td>14.49</td>
</tr>
<tr>
<td>Time (minutes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>83.60</td>
<td>84.04</td>
<td>79.71</td>
<td>82.40</td>
</tr>
<tr>
<td>SD</td>
<td>18.45</td>
<td>16.23</td>
<td>19.92</td>
<td>18.79</td>
</tr>
</tbody>
</table>

Condition 1: Q-WS; Condition 2: NQ-WS; Condition 3: Q-LS; Condition 4: NQ-LS

### Data Analysis

*Dependent Variables*

Four dependent variables were examined: number of full cause/effect statements with an appropriate structural clue in the written summarization of passages with cause/effect presented at the sentence level (least complex); number of full cause/effect statements with an appropriate structural clue in the written summarization of passages with cause/effect presented at the paragraph level (more complex); number of explicit comprehension questions answered correctly for both levels of cause/effect complexity; and number of implicit comprehension questions answered correctly for both levels of cause/effect complexity.

A score for the total number of full cause/effect statements with a clue word that were included in the summaries of passages with cause/effect presented at the sentence level was calculated, and then this was repeated for the summaries of passages with
cause/effect presented at the paragraph level. These scores were then converted into proportions by dividing the total score by the maximum score possible (28 points for the passages with cause/effect presented at the sentence level and 36 points for the passages with cause/effect presented at the paragraph level). A score for the total number of comprehension questions answered correctly was computed for the two comprehension questions measures. These scores were also converted into proportions by dividing the total score by the maximum score possible (three points for the explicit questions and three points for implicit questions for the passages with cause/effect presented at the sentence level; three points for the explicit questions and three points for the implicit questions for the passages with cause/effect presented at the paragraph level).

Written Summarization

The written summarization task assessed students’ comprehension of six expository social studies passages; three passages presented the cause/effect text structure at the sentence level (least complex), and three passages presented the cause/effect text structure at the paragraph level (more complex). The number of full cause/effect statements with an appropriate structural clue word was determined for the three passages with cause/effect presented at the sentence level, as well as for the three passages with cause/effect presented at the paragraph level. Full cause/effect statements were sentences generated by the students that contained both the cause and effect parts of the sentence, as well as an appropriate structural clue word (e.g., because, since, so, therefore, as a result, hence). These statements were generated from the material presented in each passage. The students were required to include an appropriate structural clue word as it showed
their understanding of the causal structure. A proportion correct score (out of a total possible score of 28) for full cause/effect statements with an appropriate structural clue word from the three passages with cause/effect presented at the sentence level was obtained for each student, and a proportion score (out of a total possible score of 36) for full cause/effect statements with an appropriate structural clue word from the three passages with cause/effect presented at the paragraph level was obtained for each student.

Table 10 displays the means and standard deviations for the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) that were included in the summarization task for the three passages with cause/effect presented at the sentence level, as well as for the three passages with cause/effect presented at the paragraph level.

Table 10
Means and Standard Deviations for Proportion Correct on the Written Summarization Task: Cause/Effect at the Sentence Level (Least Complex) and Paragraph Level (More Complex)

<table>
<thead>
<tr>
<th>Sentence Level: Full Cause/Effect Statements with Clue Word (max=28)</th>
<th>Presence of ISQs (Q)</th>
<th>Absence of ISQs (NQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.221</td>
<td>.146</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.16</td>
<td>.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paragraph Level: Full Cause/Effect Statements with Clue Word (max=36)</th>
<th>Presence of ISQs (Q)</th>
<th>Absence of ISQs (NQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.219</td>
<td>.150</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.12</td>
<td>.14</td>
</tr>
</tbody>
</table>

Figure 4 illustrates these findings.
For the three passages with cause/effect presented at the sentence level, the mean proportion of correct statements (full cause/effect statements with clue words) was .22 (SD = 0.15) for the Q-WS condition; .09 (SD = 0.07) for the NQ-WS condition; .16 (SD = 0.15) for the Q-LS condition; and .01 (SD = 0.02) for the NQ-LS condition. Two main effects were found: There was a significant difference among the presence or absence of ISQs groups, in favor of the presence of ISQs group, $F(3,91) = 36.90$, $p < .001$, as well as
between the well-structured and less-structured text groups, in favor of the well-structured text group, $F(3, 91) = 9.31, p = .003$. However, the level of positive effect of the presence of ISQs did not depend on whether or not the text was well-structured; and vice-versa, the level of positive effect of well-structured text did not depend on the presence of ISQs. Hence, a significant interaction between these factors was not found, $F(3, 91) = 0.15, p = .701$.

For the three passages with cause/effect presented at the paragraph level, the mean proportion of correct statements (full cause/effect statements with clue words) was .22 ($SD = 0.15$) for the Q-WS condition; .07 ($SD = 0.09$) for the NQ-WS condition; .12 ($SD = 0.14$) for the Q-LS condition; and .002 ($SD = 0.01$) for the NQ-LS condition. Two main effects were found: There was a significant difference among the presence or absence of ISQs groups, in favor of the presence of ISQs group, $F(3, 91) = 33.92, p < .001$, as well as between the well-structured and less-structured text groups, in favor of the well-structured text group, $F(3, 91) = 13.65, p < .001$. However, the level of positive effect of the presence of ISQs did not depend on whether or not the text was well-structured; and vice-versa, the level of positive effect of well-structured text did not depend on the presence of ISQs. Hence, a significant interaction between these factors was not found, $F(3, 91) = 0.25, p = .62$.

Across the six passages, a main effect of presence or absence of ISQs was found, such that the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher when ISQs were present in the passages ($M = .18, SD = 0.15$) than when ISQs were not present ($M = .05, SD = 0.07$), $F(3, 91) = 38.43, p < .001$. A main effect of well-structured or less-structured text was
also found, such that the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher when the passages were well-structured \((M = .15, SD = 0.13)\) than when they were less-structured \((M = .07, SD = 0.12)\), \(F(3,91) = 12.35, p = .001\). However, the level of positive effect of the presence of ISQs did not depend on whether or not the text was well-structured; and vice-versa, the level of positive effect of well-structured text did not depend on the presence of ISQs. Hence, a significant interaction between these factors was not found, \(F(3,91) = 0.004, p = .95\).

Across the six passages, a main effect of cause/effect complexity (cause/effect presented at the sentence level or at the paragraph level) was found, such that the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher when cause/effect was presented at the sentence level (least complex) than when cause/effect was presented at the paragraph level (more complex), \(F(3,91) = 7.49, p = .007\).

The level of positive effect of cause/effect presented at the sentence level did not depend on the presence of ISQs; and vice-versa, the level of positive effect of the presence of ISQs did not depend on the level of cause/effect complexity. Hence, a significant interaction between these factors was not found, \(F(3,91) = .18, p = .67\). Additionally, the level of positive effect of cause/effect presented at the sentence level did not depend on the presence of well-structured text; and vice-versa, the level of positive effect of well-structured text did not depend on the level of cause/effect complexity. Hence, a significant interaction between these factors was not found, \(F(3,91) = 1.34, p = .25\).
The interaction between presence or absence of ISQs, well-structured or less-structured text, and the level of cause/effect complexity did not reach conventional significance, $F(3,91) = 2.51, p = .12$; however, we investigated this relationship further due to our findings from the first study. When ISQs were presented within well-structured text, the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was almost the same when cause/effect was presented at the sentence level as when it was presented at the paragraph level, $M = .221$, $SD = 0.15$ and $M = .219$, $SD = 0.15$, respectively. Simple effects indicated that when strategy questions were inserted within well-structured text that presented cause/effect at the paragraph level, the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher than when the passages were well-structured only ($p < .001$), contained ISQs only ($p = .004$), or provided neither well-structured text or ISQs ($p < .001$). When only well-structured text was presented, the proportion of correct statements was significantly higher than when the passages provided neither well-structured text or ISQs ($p = .02$). When only ISQs were presented, the proportion of correct statements was significantly higher than when the passages provided neither well-structured text or ISQs ($p < .001$).

At the sentence level of cause/effect complexity, when ISQs were presented within well-structured text, the proportion of correct statements (full cause/effect statements with an appropriate structural clue word) was significantly higher than when the passages were well-structured only ($p < .001$), or provided neither well-structured text or ISQs ($p < .001$). When only well-structured text was presented, the proportion of correct statements was significantly higher than when the passages provided neither well-
structured text or ISQs ($p = .02$). When only ISQs were presented, the proportion of correct statements was significantly higher than when the passages were well-structured only ($p = .04$), or provided neither well-structured text or ISQs ($p < .001$).

Table 11
*Pairwise Comparisons of Passages*

<table>
<thead>
<tr>
<th>Pairwise Comparisons</th>
<th>Sentence Level: Full Cause/Effect Statements with Structural Clue Word</th>
<th>Paragraph Level: Full Cause/Effect Statements with Structural Clue Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition 1: Q-WS; Condition 2: NQ-WS; Condition 3: Q-LS; Condition 4: NQ-LS</td>
<td>***C1&gt;C2, ***C1&gt;C4, *C2&gt;C4, *C3&gt;C2, ***C3&gt;C4</td>
<td>***C1&gt;C2, **C1&gt;C3, ***C1&gt;C4, *C2&gt;C4, ***C3&gt;C4</td>
</tr>
<tr>
<td>*p&lt;.05, **p&lt;.01, ***p&lt;.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An additional analysis was conducted to determine whether a difference existed between the classrooms on the summarization task. Table 12 displays the means and standard deviations for the proportion of correct statements for each classroom that were included in the summarization task. There was not a significant difference between the classrooms for the three passages with cause/effect presented at the sentence level ($F(3,91) = 0.44$, $p = .78$), nor was there a significant difference between the classrooms for the three passages with cause/effect presented at the paragraph level ($F(3,91) = 0.83$, $p = .51$).
Table 12
Means and Standard Deviations for Proportion Correct on the Written Summarization Task: Cause/Effect at the Sentence Level (Least Complex) and Paragraph Level (More Complex) by Classroom

<table>
<thead>
<tr>
<th>Written Summarization Task: Full Cause/Effect Statements with Clue Word</th>
<th>Sentence Level (max=28)</th>
<th>Paragraph Level (max=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Classroom 1</td>
<td>0.15</td>
<td>.18</td>
</tr>
<tr>
<td>Classroom 2</td>
<td>0.12</td>
<td>.13</td>
</tr>
<tr>
<td>Classroom 3</td>
<td>0.13</td>
<td>.13</td>
</tr>
<tr>
<td>Classroom 4</td>
<td>0.10</td>
<td>.12</td>
</tr>
<tr>
<td>Classroom 5</td>
<td>0.10</td>
<td>.10</td>
</tr>
</tbody>
</table>

Comprehension Questions

The comprehension questions task required students to answer one explicit question and one implicit question for each passage after reading and completing the written summarization task. The multiple-choice explicit question task required students to identify the main idea of each passage. A proportion score (out of a total possible score of 3) for cause/effect presented at the sentence level, and a proportion score (out of a total possible score of 3) for cause/effect presented at the paragraph level were obtained for each student. The multiple-choice implicit questions task required students to come to a conclusion based on the knowledge they gained from the passage. A proportion score (out of a total possible score of 3) for cause/effect presented at the sentence level, and a proportion score (out of a total possible score of 3) for cause/effect presented at the paragraph level were obtained for each student.

Table 13 displays the means and standard deviations for the proportion correct of explicit and implicit questions on the comprehension questions task when the cause/effect structure was presented at both the sentence and paragraph levels of complexity.
Table 13
Means and Standard Deviations for Proportion Correct on the Comprehension Questions
Task: Cause/Effect at the Sentence Level (Least Complex) and Paragraph Level (More Complex)

<table>
<thead>
<tr>
<th></th>
<th>Presence of ISQs (Q)</th>
<th>Absence of ISQs (NQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Sentence Level: Explicit Questions (max=3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.84</td>
<td>.24</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.78</td>
<td>.30</td>
</tr>
<tr>
<td>Paragraph Level: Explicit Questions (max=3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.81</td>
<td>.19</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.79</td>
<td>.22</td>
</tr>
<tr>
<td>Sentence Level: Implicit Questions (max=3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.61</td>
<td>.30</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.51</td>
<td>.29</td>
</tr>
<tr>
<td>Paragraph Level: Implicit Questions (max=3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well-structured Text (WS)</td>
<td>0.68</td>
<td>.30</td>
</tr>
<tr>
<td>Less-structured Text (LS)</td>
<td>0.67</td>
<td>.30</td>
</tr>
</tbody>
</table>

Explicit and Implicit Questions

Findings concerning the total number of explicit and implicit questions answered correctly showed that there was an interaction between type of comprehension question (explicit or implicit) and level of cause/effect complexity (sentence level or paragraph level), $F(3,91) = 8.68$, $p = .004$ (see Figure 5). That is, the level of effect of type of comprehension question depended on the level of cause/effect complexity of the passages. Students answered implicit questions with greater accuracy when cause/effect was presented at the paragraph level of complexity ($M = .67$, $SD = .30$) than when cause/effect was presented at the sentence level of complexity ($M = .55$, $SD = .30$), $p <$
However, there was minimal difference in students’ ability to answer explicit questions when cause/effect was presented at either the sentence level of complexity or the paragraph level of complexity ($M = .81, SD = .29$, and $M = .79, SD = .23$, respectively.)

**Fig. 5**
*Interaction of Question Type and Cause/Effect Complexity*

There was a main effect for type of comprehension question, such that students answered significantly more explicit questions correctly across all of the passages ($M = .80, SD = .21$) than implicit questions ($M = .61, SD = .24$), $F(3,91) = 70.67, p < .001$.

There were no effects for presence or absence of ISQs, $F(3,91) = .11, p = .74$, or well- or less-structured text, $F(3,91) = 2.08, p = .15$. That is, regardless of the condition to which students belonged, they displayed similar performance on the comprehension questions. There were also no interactions among the factors: presence or absence of ISQs and well- or less-structured text, $F(3,91) = 0.05, p = .82$, presence or absence of ISQs and type of
comprehension question, $F(3,91) = 0.002, p = .96$, well- or less-structured text and type of comprehension question, $F(3,91) = 0.40, p = .53$, and presence or absence of ISQs, well- or less-structured text, and type of comprehension question, $F(3,91) = 1.08, p = .30$.

*Explicit Questions*

Results with regards to explicit questions showed that there were no effects for presence or absence of ISQs, $F(3,91) = 0.08, p = .77$, well- or less-structured text, $F(3,91) = 2.93, p = .09$, or level of cause/effect complexity, $F(3,91) = 0.18, p = .67$, on students’ ability to correctly answer these questions. That is, regardless of the condition to which students belonged or the level of cause/effect complexity of the passages, they displayed similar performance on the explicit questions. There were also no interactions among the factors: presence or absence of ISQs and well- or less-structured text, $F(3,91) = 0.59, p = .45$; presence or absence of ISQs and level of cause/effect complexity, $F(3,91) = 0.06, p = .80$; well- or less-structured text and level of cause/effect complexity, $F(3,91) = 0.22, p = .64$; and presence of absence of ISQs, well- or less-structured text, and level of cause/effect complexity, $F(3,91) = 0.05, p = .82$.

*Implicit Questions*

Results with regards to implicit questions showed that there was a main effect for level of cause/effect complexity, such that students answered significantly more implicit questions correctly when cause/effect was presented at the paragraph level ($M = .67, SD = .30$) than when cause/effect was presented at the sentence level ($M = .55, SD = .30$), $F(3,91) = 13.16, p < .001$. 

There were no effects for presence or absence of ISQs, $F(3,91) = 0.08, p = .77,$ or well- or less-structured text, $F(3,91) = 0.80, p = .37,$ on students’ ability to correctly answer these questions. That is, regardless of the condition to which students belonged, they displayed similar performance on the implicit questions. There were also no interactions among the factors: presence or absence of ISQs and well- or less-structured text, $F(3,91) = 0.08, p = .78;\,$ presence or absence of ISQs and level of cause/effect complexity, $F(3,91) = 0.19, p = .66;\,$ well- or less-structured text and level of cause/effect complexity, $F(3,91) = 0.02, p = .90;\,$ and presence of absence of ISQs, well- or less-structured text, and level of cause/effect complexity, $F(3,91) = 1.38, p = .24.$
Chapter V
DISCUSSION

The purpose of this research was to explore how ISQs and structured text influence fifth grade students’ comprehension of expository social studies passages of different levels of cause/effect complexity. We investigated whether students would comprehend the passages better when strategy questions were inserted within the text than when the strategy questions were not present. We also investigated whether students would comprehend the passages better when the text was well-structured to more clearly represent the cause/effect text structure than when it was in its less-structured, authentic form. The question of how ISQs and well-structured text, in combination, influence comprehension was examined. The literature suggests that both ISQs (E. Kintsch, 2005) and well-structured texts (Williams, 2004) improve comprehension; however, the question of how the two factors do or do not interact has not been addressed.

In study two, we investigated whether the level of cause/effect complexity of the text (i.e., cause/effect presented at the sentence level (least complex) and cause/effect presented at the paragraph level (more complex)) would vary the level of effectiveness of both ISQs and well-structured text. Results from study one indicated that when cause/effect was presented at the sentence level, students performed best when both ISQs and well-structured were present; however, they also performed better when just ISQs were present or when the text was well-structured only than when neither factor was present. Alternatively, when cause effect was presented at the paragraph level, students performed best when both ISQs and well-structured were present; however, their
performance was similar when just ISQs were present or when the text was well-structured only to their performance when neither factor was present. While the first study indicated that the combination of both ISQs and well-structured text provide greater benefits than either factor alone, the second study included more passages of varying levels of complexity to determine whether this effect is indeed greater as text increases in complexity.

Finally, in study two, we asked whether these effects would differ depending on the comprehension task. Since studies have found that both ISQs (van den Broek et al., 2001) and structured text (Lauer, 2000) improve students’ ability to produce written summaries of the information provided within a text, we wanted to examine these effects with fifth grade students who were reading expository social studies texts of differing levels of complexity. We also wanted to examine whether these factors would improve students’ ability to answer explicit and implicit comprehension questions, as the literature reviewed did not directly address the effects of ISQs and well-structured text on these types of comprehension questions.

Our results indicated that ISQs, structured text, and cause/effect complexity have independent effects, as well as a near interaction effect of the three factors together, on reading comprehension when the measures involved a written summarization task, but not when the measures involved answering comprehension questions. In study one, there was an interaction effect of ISQs and structured text when cause/effect was presented at the paragraph level, but not when cause/effect was presented at the sentence level. In study two, while an interaction effect of ISQs, structured text, and cause/effect complexity did not reach conventional significance on the written summarization task,
the relationship between these factors was considered due to the findings from study one.
There were no interaction effects of ISQs and structured text, ISQs and cause/effect complexity, and structured text and cause/effect complexity on either the written summarization task or the comprehension questions task.

Building on the findings from study one, study two revealed that when students were asked to provide written summaries of the passages with cause/effect presented at the sentence level (Measure 1) and at the paragraph level (Measure 2), both ISQs and well-structured text positively influenced student performance. Students provided significantly more correct statements (full cause/effect statements with an appropriate structural clue word) when strategy questions were inserted in the text, and students provided significantly more correct statements when the text was well-structured. Additionally, students provided significantly more correct statements when the cause/effect structure was presented at the sentence level than when the cause/effect structure was presented at the paragraph level. An investigation of the interaction between ISQs, well-structured text, and cause/effect complexity revealed that students provided significantly more correct statements when strategy questions were inserted within well-structured text, and that this effect was greatest when the cause/effect structure was presented at the more complex paragraph level.

Alternatively, ISQs and well-structured text did not have an effect on student performance on either the explicit comprehension questions (Measure 3) or the implicit comprehension questions (Measure 4). Students answered the comprehension questions equally well regardless of the presence or absence of questions and how well the text was structured. There was a difference for the type of comprehension question and the level
of cause/effect complexity. Students answered significantly more explicit questions than implicit questions; however, when cause/effect was presented at the paragraph level, students answered significantly more implicit questions than when cause/effect was presented at the sentence level. Hence, there was an interaction between type of comprehension question and cause/effect complexity.

Comprehension as a Function of ISQs

ISQs were found to be a significant factor in both of the studies on the written summarization task. In both studies, ISQs had a significant main effect: they positively affected students’ ability to provide correct responses (full cause/effect statements with an appropriate structural clue word) in summaries of passages that presented the cause/effect structure at the sentence level; and they positively affected students’ ability to provide correct responses in summaries of passages that presented the cause/effect structure at the paragraph level.

Interestingly, when the passages in study two presented the cause/effect structure at the sentence level, participants who received ISQs only performed significantly better than participants who received well-structured text only. This finding suggests that ISQs might have a greater effect on comprehension than well-structured text; however, this can only be stated with caution as it was only for this set of passages that this result occurred.

Consistent with the findings of studies that have involved students in middle school, high school, and college (van den Broek, et al., 2001; Peverly & Wood, 2001; Callendar & McDaniel, 2007), this research demonstrated that inserting questions within
Expository social studies texts can improve the comprehension of students as young as the fifth grade as measured by a written summarization task.

**Comprehension as a Function of Structured Text**

Well-structured text was found to be a significant factor in both of the studies on the written summarization task. In both studies, well-structured text had a significant main effect: it positively affected students’ ability to provide correct responses (full cause/effect statements with an appropriate structural clue word) in summaries of passages that presented the cause/effect structure at the sentence level; and it positively affected students’ ability to provide correct responses in summaries of passages that presented the cause/effect structure at the paragraph level.

Consistent with the findings of studies that have involved students in the second, fourth, fifth and sixth grades (Williams et al, 2004; Lauer, 2002; Beck et al., 1991; Taylor & Samuels, 1983), this research demonstrated that structuring authentic text from a fifth grade social studies textbook to more clearly represent the cause/effect text structure can improve the comprehension of fifth-graders as measured by a written summarization task.

**Comprehension as a Function of Cause/Effect Complexity**

On the written summarization task, cause/effect complexity was found to be a significant factor in study two. Students were able to provide more correct responses (full cause/effect statements with an appropriate structural clue word) in summaries of the
passages that presented cause/effect at the sentence level than they were in summaries of the passages that presented cause/effect at the paragraph level.

On the comprehension questions task in study two, cause/effect complexity was also found to be a significant factor when the comprehension questions were implicit. Students were able to correctly answer more implicit questions when the cause/effect structure was presented at the paragraph level than when the cause/effect structure was presented at the sentence level; however, there was not a difference in the students’ ability to answer explicit question based on the level of cause/effect complexity. Overall, students were able to correctly answer more explicit questions than implicit questions. Hence, for the comprehension questions task, there was an interaction between type of comprehension question and cause/effect complexity, such that students were able to answer significantly more implicit questions when the cause/effect structure was more complex than when the cause/effect structure was less complex. This finding is unusual, in that implicit questions, which ask readers to make inferences about the material they have read in order to come to a conclusion, are generally agreed to be more cognitively demanding (Raphael & Pearson, 1985). In addition, cause/effect presented at the paragraph level, which asks students to realize that one cause can create multiple effects, and that one effect may have multiple causes, is also generally agreed to be more cognitively demanding (Williams et al., 2007). In the literature reviewed for this study, there is no explanation for this finding. Future research should include a greater number of implicit and explicit questions within passages of each level of cause/effect complexity to determine if this interaction does in fact exist.
Comprehension as a Function of the Combination of ISQs, Structured Text, and Cause/Effect Complexity

Our findings from study two confirmed that the combination of both ISQs and well-structured text improved students’ comprehension of expository social studies texts as demonstrated on the written summarization task, and that this effect was greater for passages that presented the cause/effect structure at the paragraph level. That is, when students received passages that contained both ISQs and well-structured text, they were able to provide as many correct responses (full cause/effect statements with an appropriate structural clue word) in their written summaries for the passages that contained the cause/effect structure at the paragraph level (more complex) as for the passages that contained the cause/effect structure at the sentence level (least complex). However, when students received passages that contained only ISQs or only well-structured text in isolation, they did not perform as well on the passages that presented the cause/effect structure at the paragraph level as they did on the passages that presented the cause/effect structure at the sentence level. These findings demonstrate that ISQs and well-structured text together work above and beyond that of either factor alone to improve students’ comprehension of more complex text as measured by a written summarization task.

Consistent with the findings from study one, study two demonstrated that ISQs and well-structured text improve fifth grade students’ comprehension of expository social studies passages, and that this effect is greatest when both factors are combined, especially as the text increases in structural complexity.
Limitations

In this research, only one text structure (cause/effect), out of the five text structures (description, sequence, compare/contrast, problem/solution, and cause/effect) identified by Meyer (1985) as representative of expository text, was investigated. While the combination of ISQs and well-structured text demonstrated positive effects within the cause/effect text structure, it is unclear what the effect of these factors together would be with different text structures. Additionally, only two levels of cause/effect complexity were examined. More complex levels of cause/effect complexity, such as cause/effect presented at the passage level or beyond, might have elicited more robust findings.

The moderating effect that reading ability may have on the effectiveness of ISQs, structured text, and cause/effect complexity is another factor that should be investigated in future studies. In Peverly and Wood’s study (2001), they found that inserted questions had positive effects on comprehension for learning disabled high school students. Additionally, Calendar and McDaniel (2007) found that inserted questions were beneficial for college students who were deemed as low structure builders (i.e., students unable to inhibit irrelevant information, and thus form less coherent structures (Gernsbacher, 1990)), but inserted questions did not provide additional benefit for students who were high structure builders (i.e., students able to form coherent structures). In contrast, van den Broek et al. (2001) found that inserted questions were beneficial for seventh grade and college students, but not for fourth or tenth grade students. For fourth grade students, who were deemed to have the least reading proficiency, van den Broek
asserted that inserted questions placed too large of a demand on the management of working-memory resources. Alternatively, van den Broek found that college students, who were deemed to have the highest reading proficiency, benefited from inserted questions. Future research should address these discrepancies in the literature.

Additionally, the comprehension questions measure was limited in its use of explicit and implicit questions as the comprehension questions task, since this type of questioning did not appear to directly measure the students’ response to ISQs, structured text, or cause/effect complexity. Based on the work of Pollini (2009) and Lauer (2002), a questioning task that primed students’ understanding of structure (causal) and non-structure (detail) elements might have been more appropriate.

Finally, the student sample was limited. All of the participants were from one grade within one public elementary school in Harlem. It can not be stated with assurance that the sample is representative of fifth grade students from other schools or other locations. Additionally, it can not be stated with assurance what the effects of ISQs and well-structured text would be for students in various grades, especially in the earlier grades. In order to generalize the results to more diverse populations, this research would need to be replicated with students from various grades within multiple schools of different geographical locations and organizational structures.

**Instructional Implications**

The results of this research indicate that strategy questions inserted within well-structured text have a positive impact on elementary students’ comprehension of
expository materials that present varying levels of text structure complexity. Too often, students are faced with texts that are poorly structured. The writing is not organized in a discernible way, does not contain signals that indicate specific informational structures, and fails to follow a structure that is recognizable to the reader (Chambliss, 1994).

Providing students with a well-structured text that includes structural signals, such as ISQs, presents them with an established informational structure that they can follow.

Considering that students start to face increased reading challenges as they approach fourth grade and beyond due to the increase in expository materials, namely in the form of textbooks that are often lacking in a coherent structure, perhaps we should expose students to more expository materials that contain a coherent structure earlier in their education. As students are still learning to read, providing them with well-structured expository texts that make explicit the structural elements of the text is imperative. Since the participants in our research were better able to comprehend the texts that were well-structured, perhaps we should consider introducing these types of texts to students in earlier grades. Only after sufficient exposure to well-structured texts, should we gradually begin to expose students to the less-structured texts that are commonly found in authentic content area textbooks. In this way, the transition from well-structured to less-structured/authentic texts will be easier for students.

Moreover, within structured texts there are varying levels of complexity. For example, within the cause/effect text structure there are many levels of complexity; cause/effect presented at the sentence level (least complex), cause/effect presented at the paragraph level (more complex), and cause/effect presented at the passage level and beyond. As the cause/effect text structure becomes more complex, students face
increased challenges in grasping the causal relationships as they must realize that one cause can lead to multiple effects, and that one effect may have multiple causes. For this reason, if we introduce expository texts to students in earlier grades, we should start with the least complex form of each text structure. As students gain an understanding of the basic text structure, more complex forms of the structure may be gradually introduced until students are ready to comprehend the less-structured/authentic texts with which they will be faced as they progress in their education.

In addition to providing students with well-structured texts that contain structural signals, such as ISQs, explicit comprehension instruction in how to use the signals to strategically process texts is crucial. In explicit comprehension instruction, first teachers provide direct explanation of comprehension strategies, next they provide guided practice in which students and teachers practice the strategies together, and finally students are given an opportunity to apply what they have learned to new materials. The literature has emphasized the importance of explicit comprehension instruction in improving students’ comprehension of texts, especially instruction that incorporates multiple strategies into comprehension instruction (Pearson & Dole, 1987; RAND Reading Study Group, 2002; Gajria et al., 2007). While studies in explicit comprehension instruction have emphasized the use of multiple strategies such as clue words, generic questions, graphic organizers, text analysis, and summaries (Williams et al., 2009; Hall et al., 2005), future studies, for upper elementary students who are exposed to multiple paragraph passages, might also incorporate the use of ISQs as an additional practical and effectual strategy.
Conclusions

This research investigated the relationship between ISQs, structured text, and the complexity of causal relationships with the hopes of raising expository text writers’ and publishers’ awareness of the types of texts that will provide the maximum benefits for young learners. Since research has shown that well-structured expository text improves comprehension (Williams et al., 2004), and that inserted questions improve comprehension (E. Kintsch, 2005), this research expected to find that both factors would be independently effective. This was the case when the cause/effect structure was presented at the sentence level and at the paragraph level. This research also expected to find that in combination the two factors together would be even more effective than either factor alone. Again, this was the case when the cause/effect structure was presented at the sentence level and at the paragraph level; however, the effect was even greater when the cause/effect structure was presented at the more complex paragraph level.

Students are naturally interested in expository texts (Duke, 2000), and while it seems that schools have been working towards incorporating more content area reading across the curriculum (Moss, 2005), students still struggle with these texts. Teachers often instruct students to read text that is at least one grade level below their reading level when the texts are expository, as students have more trouble with this genre. Instead of asking students to move down to more simply written texts that are often lacking in content, students should have an opportunity to be exposed to all of the information they desire, in a way that they can comprehend. By making sure that expository texts that are
well-structured, whether they be textbooks, trade books, or materials available through computer-based educational programs, are accessible not only in number but with plenty of opportunities to read them, we are supplying young students with the tools they need to become lifelong learners. But that is not enough. We also need to make sure that students are provided with explicit instruction in the cognitive strategies necessary to identify the connections between the information presented in these texts. In this way, they will be more equipped to form a situation model (Mannes & W. Kintsch, 1987), allowing them to create a more meaningful whole between the relationships of the different concepts presented in the texts.

Inserting strategy questions within a well-structured text alerts students to an understanding of how a text is structured. Accompanied with explicit instruction in how to use this knowledge to recognize the important information in the text, there is a potential for improving student comprehension. That a student might not be able to expand his or her knowledge of the world because s/he does not have the necessary tools to comprehend informational texts is unthinkable. We have to come up with ways to put unlimited information in the hands of our kids in a way that keeps them asking for more.


Appendix A
Passages for Study One and Study Two

Passage 1: From Colonies to States (C/E at the sentence level - least complex) – used in both studies

Condition 1 (Q-WS)

Many colonists came to America from England. They lived in 13 colonies ruled by England, so they still had to follow England’s laws. Some colonists thought that this was not fair.
Q: Why did the colonists have to follow England’s laws?
   The colonists and England had a war, because the king of England did not want the colonies to be free. This war was called the American Revolution. George Washington led the American Army against the English Army; therefore, he helped the Americans win the war.
Q: Why did the colonies and England have a war?
Q: What happened because George Washington led the American Army against the English Army?
   Since the Americans won the war, leaders of the colonies met on July 4, 1776 to sign a paper called the Declaration of Independence. Independence means being free from other people or places.
Q: Why did the leaders of the colonies meet to sign the Declaration of Independence?
   The Declaration of Independence said that the thirteen colonies were free from England; so each colony was now a state. It also said that all the states together were a country called the United States of America.
Q: What happened because the colonists were free from England?
Q: Why did George Washington become the first President of the United States?
   The United States was now a free country; therefore, Americans no longer had to follow the laws of England. The leaders from twelve of the thirteen states had a meeting, since they needed to make their own laws. They planned a new government. They called the plan the Constitution.
Q: What happened because the United States was now a free country?
Q: Why did the leaders from twelve of the thirteen states have a meeting?
   The Constitution lists the rights of our country’s citizens; therefore, citizens have rights such as saying whatever we think without being put in jail.
Q: What happened because the Constitution lists the rights of our country’s citizens?

Condition 2 (NQ-WS)

The colonists lived in thirteen colonies ruled by England. The colonists had to follow England’s laws. Some colonists thought this was not fair, so many colonists moved to America from England.
Appendix A (continued)

The colonists and England had a war, because the king of England did not want the colonies to be free. This war was called the American Revolution. George Washington led the American Army against the English Army; therefore, he helped the Americans win the war.

Since the Americans won the war, leaders of the colonies met on July 4, 1776 to sign a paper called the Declaration of Independence. Independence means being free from other people or places.

The Declaration of Independence said that the thirteen colonies were free from England; so each colony was now a state. It also said that all the states together were a country called the United States of America.

Since many Americans wanted George Washington to lead our new country after the war, he became the first President of the United States. The President is the leader of our country.

The United States was now a free country; therefore, Americans no longer had to follow the laws of England. The leaders from twelve of the thirteen states had a meeting, since they needed to make their own laws. They planned a new government. They called the plan the Constitution.

The Constitution lists the rights of our country’s citizens; therefore, citizens have rights such as saying whatever we think without being put in jail.

Condition 3 (Q-LS)

Many colonists came to America from England. They lived in 13 colonies ruled by England, so they still had to follow England’s laws. Some colonists thought that this was not fair.

Q: Why did the colonists have to follow England’s laws?
   The king of England did not want the colonies to be free. The colonies and England had a war. This war was called the American Revolution. George Washington led the American Army against the English Army. He helped the Americans win the war.

Q: Why did the colonies and England have a war?
   Q: What happened because George Washington led the American Army against the English Army?
      Leaders of the colonies met on July 4, 1776. They signed a piece of paper called the Declaration of Independence. Independence means being free from other people or places.

Q: Why did the leaders of the colonies meet to sign the Declaration of Independence?
   The Declaration of Independence said that the 13 colonies were free from England. It said that each colony was now a state. Now all the states together were a country. It was called the United States of America.

Q: What happened because the colonists were free from England?
   After the war, many Americans wanted George Washington to lead our new country. George Washington became the first President of the United States. The President is the leader of our country.

Q: Why did George Washington become the first President of the United States?
Appendix A (continued)

The United States was now a free country. Americans no longer had to follow the laws of England. They needed to make their own laws. The leaders from 12 of the 13 states had a meeting. They planned a new government. They called this plan the Constitution.

Q: What happened because the United States was now a free country?
Q: Why did the leaders from twelve of the thirteen states have a meeting?

The Constitution also lists the rights of our country’s citizens. One right is that we can say whatever we think without being put in jail.

Q: What happened because the Constitution lists the rights of our country’s citizens?

Condition 4 (NQ-LS)

Many colonists came from England to America. They lived in 13 colonies ruled by England. The colonists had to follow England’s laws. Some colonists thought that this was not fair.

The king of England did not want the colonies to be free. The colonies and England had a war. This war was called the American Revolution. George Washington led the American Army against the English Army. He helped the Americans win the war.

Leaders of the colonies met on July 4, 1776. They signed a piece of paper called the Declaration of Independence. Independence means being free from other people or places.

The Declaration of Independence said that the 13 colonies were free from England. It said that each colony was now a state. Now all the states together were a country. It was called the United States of America.

After the war, many Americans wanted George Washington to lead our new country. George Washington became the first President of the United States. The President is the leader of our country.

The United States was now a free country. Americans no longer had to follow the laws of England. They needed to make their own laws. The leaders from 12 of the 13 states had a meeting. They planned a new government. They called this plan the Constitution.

The Constitution also lists the rights of our country’s citizens. One right is that we can say whatever we think without being put in jail.

Passage 2: History of the Southwest (C/E at the sentence level - least complex)

Condition 1 (Q-WS)

In 1540, Francisco Coronado marched his army into the Southwest looking for great wealth. Coronado claimed southwestern lands for Spain since his army found no gold or silver. The Spanish also introduced ranching to North America. Coronado led a herd of 500 Spanish cattle, called “longhorns,” into the Southwest, so settlers raised thousands of cattle on huge farms called ranchos.
Appendix A (continued)

Q: Why did Coronado claim southwestern lands for Spain?
Q: What happened because Coronado led a herd of 500 Spanish cattle into the Southwest?
   Many people moved to the Southwest because it became part of the United States. People who worked ranches herded cattle; therefore, they were known as cowboys. About one-fourth of all cowboys were African American.
Q: Why did many people move to the Southwest?
Q: What happened because people who worked ranches herded cattle?
   Ranchers hired cowboys to protect and keep track of their herds since there were no fences dividing the land.
Q: Why did ranchers hire cowboys to protect and keep track of their herds?
   There was a great demand for beef in the Northeast, so cattle were worth $40 each. In Texas, cattle sold for $4 each. Ranchers began using the cattle drive to move their herd to market because there were not enough ranches in that region.
Q: Why did ranchers begin using the cattle drive to move their herd to market?
   In 1874, an Iowa farmer named Joseph Glidden invented barbed wire. Since the sharp metal wire fenced off huge areas of land, it made it hard for herds to reach grass and water. Cowboys could not drive cattle across fenced lands, so this made cattle drives difficult.
Q: What happened because the sharp metal wire fenced off huge areas of land?
Q: What happened because cowboys could not drive cattle across fenced lands?
   By the early 1900s, the petroleum industry brought many newcomers to the region; therefore, oil workers can be found on the land and on the water. Factories in the Southwest built airplanes, tanks, and bridges, because World War II created a need for new products.
Q: What happened because the petroleum industry brought many newcomers to the region?
Q: Why did factories in the Southwest build airplanes, tanks, and bridges?

Condition 2 (NQ-WS)

In 1540, Francisco Coronado marched his army into the Southwest looking for great wealth. Coronado claimed southwestern lands for Spain since his army found no gold or silver. The Spanish also introduced ranching to North America. Coronado led a herd of 500 Spanish cattle, called “longhorns,” into the Southwest, so settlers raised thousands of cattle on huge farms called ranchos.
   Many people moved to the Southwest because it became part of the United States. People who worked ranches herded cattle; therefore, they were known as cowboys. About one-fourth of all cowboys were African American.
   Ranchers hired cowboys to protect and keep track of their herds since there were no fences dividing the land.
Appendix A (continued)

There was a great demand for beef in the Northeast, so cattle were worth $40 each. In Texas, cattle sold for $4 each. Ranchers began using the cattle drive to move their herd to market because there were not enough ranches in that region.

In 1874, an Iowa farmer named Joseph Glidden invented barbed wire. Since the sharp metal wire fenced off huge areas of land, it made it hard for herds to reach grass and water. Cowboys could not drive cattle across fenced lands, so this made cattle drives difficult.

By the early 1900s, the petroleum industry brought many newcomers to the region; therefore, oil workers can be found on the land and on the water. Factories in the Southwest built airplanes, tanks, and bridges, because World War II created a need for new products.

Condition 3 (Q-LS)

In 1540, Francisco Coronado marched his army into the Southwest looking for great wealth. He and his army found no gold or silver. Coronado claimed southwestern lands for Spain. The Spanish also introduced ranching to North America. Coronado led a herd of 500 Spanish cattle, called "longhorns," into the Southwest. Settlers raised thousands of cattle on huge farms called ranchos.

Q: Why did Coronado claim southwestern lands for Spain?
Q: What happened because Coronado led a herd of 500 Spanish cattle into the Southwest?

When the Southwest became part of the United States, many people moved there. Those who worked ranches and herded cattle were known as cowboys. About one-fourth of all cowboys were African American.

Q: Why did many people move to the Southwest?
Q: What happened because people who worked ranches herded cattle?

Ranchers hired cowboys to protect and keep track of their herds because there were no fences dividing the land.

Q: Why did ranchers hire cowboys to protect and keep track of their herds?

There was a great demand for beef in the Northeast by the middle 1860s, but there were not enough ranches in that region. In Texas, cattle sold for $4 each, but they were worth $40 each in the Northeast. Ranchers began using the cattle drive to move their herd to market.

Q: What happened because there was a great demand for beef in the Northeast?
Q: Why did ranchers begin using the cattle drive to move their herd to market?

In 1874, an Iowa farmer named Joseph Glidden invented barbed wire. Farmers used this sharp metal wire to fence off huge areas of land, making it hard for herds to reach grass and water. This made cattle drives difficult because cowboys could not drive cattle across fenced lands.

Q: What happened because the sharp metal wire fenced off huge areas of land?
Q: What happened because cowboys could not drive cattle across fenced lands?

By the early 1900s, the petroleum industry brought many newcomers to the region. Today, oil workers can be found on the land and on the water. World War II
Appendix A (continued)

created a need for new products. Factories in the Southwest built airplanes, tanks, and bridges.
Q: What happened because the petroleum industry brought many newcomers to the region?
Q: Why did factories in the Southwest build airplanes, tanks, and bridges?

Condition 4 (NQ-LS)

In 1540, Francisco Coronado marched his army into the Southwest looking for great wealth. He and his army found no gold or silver. Coronado claimed southwestern lands for Spain. The Spanish also introduced ranching to North America. Coronado led a herd of 500 Spanish cattle, called "longhorns," into the Southwest. Settlers raised thousands of cattle on huge farms called ranchos.

When the Southwest became part of the United States, many people moved there. Those who worked ranches and herded cattle were known as cowboys. About one-fourth of all cowboys were African American.

Ranchers hired cowboys to protect and keep track of their herds because there were no fences dividing the land.

There was a great demand for beef in the Northeast by the middle 1860s, but there were not enough ranches in that region. In Texas, cattle sold for $4 each, but they were worth $40 each in the Northeast. Ranchers began using the cattle drive to move their herd to market.

In 1874, an Iowa farmer named Joseph Glidden invented barbed wire. Farmers used this sharp metal wire to fence off huge areas of land, making it hard for herds to reach grass and water. This made cattle drives difficult because cowboys could not drive cattle across fenced lands.

By the early 1900s, the petroleum industry brought many newcomers to the region. Today, oil workers can be found on the land and on the water. World War II created a need for new products. Factories in the Southwest built airplanes, tanks, and bridges.

Passage 3: An Island Climate (C/E at the sentence level - least complex)

Condition 1 (Q-WS)

In the Middle West, there are no ocean breezes to cool the land during the summer and warm it in the winter, so temperatures can reach extreme highs and lows for much of the summer and winter seasons. In the northeastern part of the region, the Great Lakes affect the land much like the ocean in other parts of the country; therefore, the area has a gentler climate than other parts of the region. This is called the lake effect.

Q: What happens because there are no ocean breezes to cool the land of the Middle West during the summer and warm it in the winter?
Q: What happens because the Great Lakes affect the land much like the ocean in other parts of the country?
   Farmers must worry about droughts because the growing season of the Middle West is short. There is not much rain, so farmers use irrigation to make sure their crops get enough water.
Q: Why do farmers worry about droughts?
Q: What happens because there is not much rain?
   From June to September, people in this region stay alert for thunderstorms and tornadoes since the force of these winds can destroy everything in its path. Tornadoes, or twisters, can move at speeds up to 200 miles per hour.
Q: Why do people in this region stay alert for thunderstorms and tornadoes?
   Many winter storms begin in the colder parts of Canada; therefore, cities near the Great Lakes, such as Chicago, Illinois and Green Bay, Wisconsin, receive heavy snowfall every winter. Blizzards are winter storms with temperatures below 20 degrees, strong winds, and a lot of snow.
Q: What happens because winter storms begin in the colder parts of Canada?
   The lake-effect snow occurs because cold, dry air from Canada meets warmer, damp air over the Great Lakes, Some areas can receive more than 200 inches of lake-effect snow each year, so ice skating, skiing, and snowshoeing are popular winter sports.
Q: Why does the lake-effect snow occur?
Q: What happens because some areas receive more than 200 inches of lake-effect snow each year?

Condition 2 (NQ-WS)

In the Middle West, there are no ocean breezes to cool the land during the summer and warm it in the winter, so temperatures can reach extreme highs and lows for much of the summer and winter seasons. In the northeastern part of the region, the Great Lakes affect the land much like the ocean in other parts of the country; therefore, the area has a gentler climate than other parts of the region. This is called the lake effect.
   Farmers must worry about droughts because the growing season of the Middle West is short. There is not much rain, so farmers use irrigation to make sure their crops get enough water.
   From June to September, people in this region stay alert for thunderstorms and tornadoes since the force of these winds can destroy everything in its path. Tornadoes, or twisters, can move at speeds up to 200 miles per hour.
   Many winter storms begin in the colder parts of Canada; therefore, cities near the Great Lakes, such as Chicago, Illinois and Green Bay, Wisconsin, receive heavy snowfall every winter. Blizzards are winter storms with temperatures below 20 degrees, strong winds, and a lot of snow.
   The lake-effect snow occurs because cold, dry air from Canada meets warmer, damp air over the Great Lakes, Some areas can receive more than 200 inches of lake-effect snow each year, so ice skating, skiing, and snowshoeing are popular winter sports.
Appendix A (continued)

Condition 3 (Q-LS)

In the Middle West, there are no ocean breezes to cool the land during the summer and warm it in the winter. Temperatures can reach extreme highs and lows for much of the summer and winter seasons. In the northeastern part of the region, the Great Lakes affect the land much like the ocean in other parts of the country. This is called the lake effect. It gives the area a gentler climate than other parts of the region.

Q: What happens because there are no ocean breezes to cool the land of the Middle West during the summer and warm it in the winter?
Q: What happens because the Great Lakes affect the land much like the ocean in other parts of the country?

The growing season of the Middle West is short. Farmers must also worry about droughts. Most use irrigation to make sure their crops get enough water when there is not much rain.

Q: Why do farmers worry about droughts?
Q: What happens because there is not much rain?

From June to September, people in this region stay on alert for thunderstorms and tornadoes. Tornadoes, or twisters, can move at speeds up to 200 miles per hour. The force of these winds can destroy everything in its path.

Q: Why do people in this region stay alert for thunderstorms and tornadoes?

Many winter storms begin in the colder parts of Canada. Blizzards are winter storms with temperatures below 20 degrees, strong winds, and a lot of snow. Cities near the Great Lakes, such as Chicago, Illinois and Green Bay, Wisconsin, receive heavy snowfall every winter.

Q: What happens because winter storms begin in the colder parts of Canada?

This lake-effect snow occurs when cold, dry air from Canada meets warmer, damp air over the Great Lakes. Some areas can receive more than 200 inches of lake-effect snow each year. Ice skating, skiing, and snowshoeing are popular winter sports.

Q: Why does the lake-effect snow occur?
Q: What happens because some areas receive more than 200 inches of lake-effect snow each year?

Condition 4 (NQ-LS)

In the Middle West, there are no ocean breezes to cool the land during the summer and warm it in the winter. Temperatures can reach extreme highs and lows for much of the summer and winter seasons. In the northeastern part of the region, the Great Lakes affect the land much like the ocean in other parts of the country. This is called the lake effect. It gives the area a gentler climate than other parts of the region.

The growing season of the Middle West is short. Farmers must also worry about droughts. Most use irrigation to make sure their crops get enough water when there is not much rain.
From June to September, people in this region stay on alert for thunderstorms and tornadoes. Tornadoes, or twisters, can move at speeds up to 200 miles per hour. The force of these winds can destroy everything in its path.

Many winter storms begin in the colder parts of Canada. Blizzards are winter storms with temperatures below 20 degrees, strong winds, and a lot of snow. Cities near the Great Lakes, such as Chicago, Illinois and Green Bay, Wisconsin, receive heavy snowfall every winter.

This lake-effect snow occurs when cold, dry air from Canada meets warmer, damp air over the Great Lakes. Some areas can receive more than 200 inches of lake-effect snow each year. Ice skating, skiing, and snowshoeing are popular winter sports.

Passage 4: New York City Expands (C/E at the paragraph level - more complex) – used in both studies

Condition 1 (Q-WS)

Immigrants arrived in New York City in large numbers in the 1800s; therefore, the city’s population grew rapidly. The city had to adapt. For example, people needed many new buildings for housing and businesses. Since the space was limited, New Yorkers decided that if they built taller buildings, they could make the most of the city’s space.

Q: What happened when large numbers of immigrants arrived in New York City in the 1800s?
Q: Why did New Yorkers build taller buildings?

Before people could build tall buildings, they had to solve several problems. One problem was how to get to the top, because not many people wanted to climb long staircases to reach the upper floors. Early elevators were unsafe for passengers. In the 1850s, new technology made elevators safe, so workers soon put elevators in stores, hotels, and other tall buildings.

Q: Why was there a problem with getting to the top of tall buildings?
Q: What happened because new technology made elevators safe?

New York City grew. Crowded streets made travel difficult; therefore, people needed better ways to move around the city. In 1904, the first section of the New York City subway system opened. Since the subway moved people quickly underground, traffic was eased on the streets above. It also allowed people to live farther from the center of the city and still travel to work. Today, New York City’s subway system is the largest in the world.

Q: Why did people need better ways to move around the city?
Q: What happened because the subway moved people quickly underground?

Living conditions within New York City also improved, because the city’s government passed laws to fight disease. Also, officials made sure trash was picked up, the water supply was clean, and that food in the city was safe to eat. Individuals made the city healthier, too.
Q: Why did living conditions improve in New York City?

**Condition 2 (NQ-WS)**

Immigrants arrived in New York City in large numbers in the 1800s; therefore, the city’s population grew rapidly. The city had to adapt. For example, people needed many new buildings for housing and businesses. Since the space was limited, New Yorkers decided that if they built taller buildings, they could make the most of the city’s space.

Before people could build tall buildings, they had to solve several problems. One problem was how to get to the top, because not many people wanted to climb long staircases to reach the upper floors. Early elevators were unsafe for passengers. In the 1850s, new technology made elevators safe, so workers soon put elevators in stores, hotels, and other tall buildings.

New York City grew. Crowded streets made travel difficult; therefore, people needed better ways to move around the city. In 1904, the first section of the New York City subway system opened. Since the subway moved people quickly underground, traffic was eased on the streets above. It also allowed people to live farther from the center of the city and still travel to work. Today, New York City’s subway system is the largest in the world.

Living conditions within New York City also improved, because the city’s government passed laws to fight disease. Also, officials made sure trash was picked up, the water supply was clean, and that food in the city was safe to eat. Individuals made the city healthier, too.

**Condition 3 (Q-LS)**

Immigrants arrived in New York City in large numbers in the 1800s. As the city’s population grew rapidly, it had to adapt. For example, people needed many new buildings for housing and businesses. Space was limited, however. New Yorkers decided that if they built taller buildings, they could make the most of the city’s space.

Q: What happened when large numbers of immigrants arrived in New York City in the 1800s?

Q: Why did New Yorkers build taller buildings?

Before people could build tall buildings, they had to solve several problems. One problem was how to get to the top. Not many people wanted to climb long staircases to reach the upper floors. Early elevators were unsafe for passengers. In the 1850s, though, new technology made them safe. Workers soon put elevators in stores, hotels, and other tall buildings.

Q: Why was there a problem with getting to the top of tall buildings?

Q: What happened because new technology made elevators safe?

As New York City grew, crowded streets made travel difficult. People needed better ways to move around the city. In 1904, the first section of the New York City
subway system opened. The subway moved people quickly underground. This eased traffic on the streets above. It also allowed people to live farther from the center of the city and still travel to work. Today, New York City’s subway system is the largest in the world.

Q: Why did people need better ways to move around the city?
Q: What happened because the subway moved people quickly underground?

Living conditions within New York City also improved. The city’s government passed laws to fight disease. Officials made sure trash was picked up, the water supply was clean, and that food in the city was safe to eat. Individuals made the city healthier, too.

Q: Why did living conditions improve in New York City?

Condition 4 (NQ-LS)

Immigrants arrived in New York City in large numbers in the 1800s. As the city’s population grew rapidly, it had to adapt. For example, people needed many new buildings for housing and businesses. Space was limited, however. New Yorkers decided that if they built taller buildings, they could make the most of the city’s space.

Before people could build tall buildings, they had to solve several problems. One problem was how to get to the top. Not many people wanted to climb long staircases to reach the upper floors. Early elevators were unsafe for passengers. In the 1850s, though, new technology made them safe. Workers soon put elevators in stores, hotels, and other tall buildings.

As New York City grew, crowded streets made travel difficult. People needed better ways to move around the city. In 1904, the first section of the New York City subway system opened. The subway moved people quickly underground. This eased traffic on the streets above. It also allowed people to live farther from the center of the city and still travel to work. Today, New York City’s subway system is the largest in the world.

Living conditions within New York City also improved. The city’s government passed laws to fight disease. Officials made sure trash was picked up, the water supply was clean, and that food in the city was safe to eat. Individuals made the city healthier, too.

Passage 5: The First Americans (C/E at the paragraph level - more complex)

Condition 1 (Q-WS)

The Olmec were farmers, so the Olmec culture was able to grow in specific areas, such as government, education, religion, and architecture. Also, the Olmec were one of the first groups to develop its own civilization in the Americas.

Q: What happened because the Olmec were farmers?
Appendix A (continued)

The Adena were one of the first groups of Mound builders; therefore, they were known for the large mounds they built to bury their dead. They also built mounds for religious regions. Because the Hopewell settled in the Ohio River area where the Adena had been situated, they continued the tradition.

Q: What happened because the Adena were one of the first groups of Mound Builders?

Q: Why did the Hopewell continue the tradition of mound building?

Since the Aztec joined with nearby peoples in 1430 to defeat the rulers of the Valley of Mexico, the Aztec battles created enemies who crushed their empire. Like the Aztec, the Inca of southern Peru created an empire because they conquered their neighbors.

Q: What happened because the Aztec joined with nearby peoples to defeat the rulers of the Valley of Mexico?

Q: What happened because the Inca of southern Peru conquered their neighbors?

Since the Inca had time, they built 19,000 miles of roads as well as bridges. They also devised canals to irrigate crops, which they grew on mountainside terraces. In 1532 there was a civil war. The civil war made it easy for the Spanish to defeat the Inca, so by 1572, the empire fell.

Q: What happened because the Inca had time?

Q: Why did the Inca empire fall?

The tall mountains and steep mesas of northeastern Arizona are home to the Hopi. Since the Hopi were skilled farmers, they devised dry farming methods to grow crops where water was scarce. One of the oldest settlements in the U.S., a pueblo called Old Orabi, still stands because the Hopi were excellent builders.

Q: What happened because the Hopi were skilled farmers?

Q: Why does Old Orabi still stand?

The Hopi were excellent builders. Homes were made with adobe and doors were high up on the rooftop; therefore, entry was by ladder. The Hopi lived peacefully with the Navaho, since they shared their farming, weaving, and jewelry-making skills with them.

Q: What happened because doors were high on the rooftop?

Q: Why did the Hope live peacefully with the Navaho?

Condition 2 (NQ-WS)

The Olmec were farmers, so the Olmec culture was able to grow in specific areas, such as government, education, religion, and architecture. Also, the Olmec were one of the first groups to develop its own civilization in the Americas.

The Adena were one of the first groups of Mound builders; therefore, they were known for the large mounds they built to bury their dead. They also built mounds for religious regions. Because the Hopewell settled in the Ohio River area where the Adena had been situated, they continued the tradition.

Since the Aztec joined with nearby peoples in 1430 to defeat the rulers of the Valley of Mexico, the Aztec battles created enemies who crushed their empire. Like the Aztec, the Inca of southern Peru created an empire because they conquered their neighbors.
Appendix A (continued)

Since the Inca had time, they built 19,000 miles of roads as well as bridges. They also devised canals to irrigate crops, which they grew on mountainside terraces. In 1532 there was a civil war. The civil war made it easy for the Spanish to defeat the Inca, so by 1572, the empire fell.

The tall mountains and steep mesas of northeastern Arizona are home to the Hopi. Since the Hopi were skilled farmers, they devised dry farming methods to grow crops where water was scarce. One of the oldest settlements in the U.S., a pueblo called Old Oraibi, still stands because the Hopi were excellent builders.

The Hopi were excellent builders. Homes were made with adobe and doors were high up on the rooftop; therefore, entry was by ladder. The Hopi lived peacefully with the Navaho, since they shared their farming, weaving, and jewelry-making skills with them.

Condition 3 (Q-LS)

Farming allowed the Olmec culture to grow in specific areas, such as government, education, religion, and architecture. The Olmec were one of the first groups to develop its own civilization in the Americas.

Q: What happened because the Olmec were farmers?

The Adena, one of the first groups of Mound Builders, were known for the large mounds they built to bury their dead. They also built mounds for religious reasons. In later years, the Hopewell settled in the Ohio River area where the Adena had been situated and continued the tradition.

Q: What happened because the Adena were one of the first groups of Mound Builders?

Q: Why did the Hopewell continue the tradition of mound building?

In 1430, the Aztec joined with nearby peoples to defeat the rulers of the Valley of Mexico, the Tepanec. But in the end, the Aztec battles created enemies who crushed their empire. Like the Aztec, the Inca of southern Peru created an empire by conquering their neighbors.

Q: What happened because the Aztec joined with nearby peoples to defeat the rulers of the Valley of Mexico?

Q: What happened because the Inca of southern Peru conquered their neighbors?

In time, the Inca built 19,000 miles of roads as well as bridges linking mountain peaks. They devised canals to irrigate crops, which they grew on mountainside terraces. In 1532, civil war made it easy for the Spanish to defeat the Inca. By 1572, the empire fell.

Q: What happened because the Inca had time?

Q: Why did the Inca Empire fall?

The tall mountains and steep mesas of northeastern Arizona are home to the Hopi. Skilled farmers, they devised dry farming methods to grow crops where water was scarce. One of the oldest settlements in the U.S., a pueblo called Old Oraibi, still stands.

Q: What happened because the Hopi were skilled farmers?

Q: Why does Old Oraibi still stand?
The Hopi were excellent builders. They made their homes with adobe and set doors high up on the rooftop. Entry was by ladder. They lived peacefully with the Navaho and shared their farming, weaving, and jewelry-making skills with them.

Q: What happened because doors were high on the rooftop?
Q: Why did the Hope live peacefully with the Navaho?

Condition 4 (NQ-LS)

Farming allowed the Olmec culture to grow in specific areas, such as government, education, religion, and architecture. The Olmec were one of the first groups to develop its own civilization in the Americas.

The Adena, one of the first groups of Mound Builders, were known for the large mounds they built to bury their dead. They also built mounds for religious reasons. In later years, the Hopewell settled in the Ohio River area where the Adena had been situated and continued the tradition.

In 1430, the Aztec joined with nearby peoples to defeat the rulers of the Valley of Mexico, the Tepanec. But in the end, the Aztec battles created enemies who crushed their empire. Like the Aztec, the Inca of southern Peru created an empire by conquering their neighbors.

In time, the Inca built 19,000 miles of roads as well as bridges linking mountain peaks. They devised canals to irrigate crops, which they grew on mountainside terraces. In 1532, civil war made it easy for the Spanish to defeat the Inca. By 1572, the empire fell.

The tall mountains and steep mesas of northeastern Arizona are home to the Hopi. Skilled farmers, they devised dry farming methods to grow crops where water was scarce. One of the oldest settlements in the U.S., a pueblo called Old Oraibi, still stands.

The Hopi were excellent builders. They made their homes with adobe and set doors high up on the rooftop. Entry was by ladder. They lived peacefully with the Navaho and shared their farming, weaving, and jewelry-making skills with them.

Passage 6: The West after the Gold Rush (C/E at the paragraph level - more complex)

Condition 1 (Q-WS)

Similar to the Mountain States, many towns emptied because the gold ran out. Today there are still ghost towns scattered around the West.

Q: Why did many towns empty?

San Francisco did not turn into a ghost town after the Gold Rush. Since San Francisco grew, it attracted newcomers from all over the world. The largest group of immigrants came from China. Thousands lived in an area around Sacramento Street; therefore, this neighborhood became known as Chinatown.

Q: What happened because San Francisco grew?
Q: What happened because thousands of Chinese immigrants lived in an area around Sacramento Street?
   Many immigrants came from Mexico to work on farms as migrant workers. Life was hard for migrant workers because they often worked 14 hours a day and lived in shacks or tents.

Q: Why was life hard for migrant workers?
   In 1962, Cesar Chavez and Dolores Huerta wanted to help farmworkers, so they formed the United Farm Workers, or UFW. The UFW helps farmworkers by using boycotts and strikes. In 1968, the UFW called for a boycott of grapes grown in California, so many people supported the farmworkers and did not buy California grapes. Also, in 1970, 26 grape growers signed an agreement giving workers better pay, time off for vacation, and improved conditions.

Q: What happened because Cesar Chavez and Dolores Huerta wanted to help farmworkers?
   Q: What happened because the UFW called for a boycott of grapes grown in California?

The rapid growth of the West has presented many challenges. One issue is land use. More land is used for buildings; therefore, the region’s forests and wildlife can be threatened. Because many towns are trying to limit urban sprawl, city planners are trying to make public transportation more available. Government officials are also looking for new ways to get the energy the region needs while encouraging energy conservation. Urban sprawl is the uncontrolled spread of buildings.

Q: Why are the region’s forests and wildlife threatened?

Q: What has happened because towns are trying to limit urban sprawl?

Condition 2 (NQ-WS)

Similar to the Mountain States, many towns emptied because the gold ran out. Today there are still ghost towns scattered around the West.

San Francisco did not turn into a ghost town after the Gold Rush. Since San Francisco grew, it attracted newcomers from all over the world. The largest group of immigrants came from China. Thousands lived in an area around Sacramento Street; therefore, this neighborhood became known as Chinatown.

Many immigrants came from Mexico to work on farms as migrant workers. Life was hard for migrant workers because they often worked 14 hours a day and lived in shacks or tents.

In 1962, Cesar Chavez and Dolores Huerta wanted to help farmworkers, so they formed the United Farm Workers, or UFW. The UFW helps farmworkers by using boycotts and strikes. In 1968, the UFW called for a boycott of grapes grown in California, so many people supported the farmworkers and did not buy California grapes. Also, in 1970, 26 grape growers signed an agreement giving workers better pay, time off for vacation, and improved conditions.

The rapid growth of the West has presented many challenges. One issue is land use. More land is used for buildings; therefore, the region’s forests and wildlife can be
Appendix A (continued)

threatened. Because many towns are trying to limit urban sprawl, city planners are trying to make public transportation more available. Government officials are also looking for new ways to get the energy the region needs while encouraging energy conservation. Urban sprawl is the uncontrolled spread of buildings.

**Condition 3 (Q-LS)**

Similar to the Mountain States, many towns emptied when the gold ran out. Today there are still ghost towns scattered around the West.

Q: Why did many towns in the west empty?

San Francisco did not turn into a ghost town after the Gold Rush. As it grew, it attracted newcomers from all over the world. The largest group of immigrants came from China. Thousands lived in an area around Sacramento Street. This neighborhood became known as Chinatown.

Q: What happened because San Francisco grew?

Q: What happened because thousands of Chinese immigrants lived in an area around Sacramento Street?

Many immigrants came from Mexico to work on farms as migrant workers. Life was hard for migrant workers. They often worked 14 hours a day and lived in shacks or tents.

Q: Why was life hard for migrant workers?

In 1962, Cesar Chavez and Dolores Huerta formed the United Farm Workers, or UFW. The UFW helps farmworkers by using boycotts and strikes. In 1968, the UFW called for a boycott of grapes grown in California. Many people supported the farmworkers and did not buy California grapes. In 1970, 26 grape growers signed an agreement giving workers better pay, time off for vacation, and improved conditions.

Q: What happened because Cesar Chavez and Dolores Huerta wanted to help farmworkers?

Q: What happened because the UFW called for a boycott of grapes grown in California?

The rapid growth of the West has presented many challenges. One issue is land use. As more land is used for buildings, the region's forests and wildlife can be threatened. Many towns are trying to limit urban sprawl. This is the uncontrolled spread of buildings. City planners are trying to make public transportation more available. Government officials are looking for new ways to get the energy the region needs while encouraging energy conservation.

Q: Why are the region’s forests and wildlife threatened?

Q: What has happened because towns are trying to limit urban sprawl?

**Condition 4 (NQ-LS)**

Similar to the Mountain States, many towns emptied when the gold ran out. Today there are still ghost towns scattered around the West.

San Francisco did not turn into a ghost town after the Gold Rush. As it grew, it attracted newcomers from all over the world. The largest group of immigrants came from
Appendix A (continued)

China. Thousands lived in an area around Sacramento Street. This neighborhood became known as Chinatown.

Many immigrants came from Mexico to work on farms as migrant workers. Life was hard for migrant workers. They often worked 14 hours a day and lived in shacks or tents.

In 1962, Cesar Chavez and Dolores Huerta formed the United Farm Workers, or UFW. The UFW helps farmworkers by using boycotts and strikes. In 1968, the UFW called for a boycott of grapes grown in California. Many people supported the farmworkers and did not buy California grapes. In 1970, 26 grape growers signed an agreement giving workers better pay, time off for vacation, and improved conditions.

The rapid growth of the West has presented many challenges. One issue is land use. As more land is used for buildings, the region's forests and wildlife can be threatened. Many towns are trying to limit urban sprawl. This is the uncontrolled spread of buildings. City planners are trying to make public transportation more available. Government officials are looking for new ways to get the energy the region needs while encouraging energy conservation.
Appendix B

Student Pages for the Summary Task

Summary Task for a Passage with Inserted Strategy Questions

Directions: Please read each of the questions presented in the passage, and then consider the questions as you write a summary of the most important information from the passage on the lines below.

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Appendix B (continued)

Summary Task for a Passage without Inserted Strategy Questions

Directions: Please reread the passage, and then write a summary of the most important information from the passage on the lines below.

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Appendix C

Comprehension Questions for Study Two

Directions: Please read each multiple choice question, and then circle the correct answer to each question. Each question has only one correct answer.

**Passage 1: From Colonies to States**

Explicit Question: What is this passage about?
- a) This passage is about the English colonies becoming free states in America.
- b) This passage is about the three different branches of the government.
- c) This passage is about how to fight in a battle.

Implicit Question: How did the lives of the colonists change once they became free states?
- a) They could do whatever they wanted without their actions having bad consequences.
- b) They were able to start a new government that was fairer for the people.
- c) Children no longer had to go to school if they did not want to.

**Passage 2: History of the Southwest**

Explicit Question: What is this passage about?
- a) This passage is about the way that we have hamburgers today.
- b) This passage is about the difference between cowboys and Indians.
- c) This passage is about how the Southwest has changed over time.

Implicit Question: How has the Southwest changed since the 1500s?
- a) There is no longer any gold and silver in the Southwest.
- b) The jobs that people have are continually changing.
- c) People from all over the world want to move to the Southwest.

**Passage 3: An Island Climate**

Explicit Question: What is this passage about?
- a) This passage is about how lakes and oceans are the same and different.
- b) This passage is about the climate of the Middle West.
- c) This passage is about what life is like on an island.

Implicit Question: What is life like in the Middle West?
- a) All year, people have to adapt to the changes in the weather.
- b) The entire region experiences the lake effect.
- c) Living in the Middle West is like living on the ocean.
Appendix C (continued)

Passage 4: *New York City Expands*

Explicit Question: What is this passage about?
- a) This passage is about the expansion of New York City.
- b) This passage is about things people like to do in New York City.
- c) This passage is about picking up trash.

Implicit Question: How does New York City continue to change over time?
- a) There haven’t been changes in New York City because people like it the way it is.
- b) As New York City grows, it has to make changes so that everyone can live together.
- c) People in New York City like to have lots of different restaurants that they can go to.

Passage 5: *The First Americans*

Explicit Question: What is this passage about?
- a) This passage is about the accomplishments of the first Americans.
- b) This passage is about building roads and bridges.
- c) This passage is about the oldest settlement in the U.S.

Implicit Question: What was important about the first Americans?
- a) All of the first Americans were able to get along with each other.
- b) They lived a very long time ago.
- c) They contributed many great things to the U.S. that we still use today.

Passage 6: *The West after the Gold Rush*

Explicit Question: What is this passage about?
- a) This passage is about what it was like to live on a farm.
- b) This passage is about how the West has changed over time.
- c) This passage is about protecting wildlife.

Implicit Question: How has the West changed since the Gold Rush?
- a) People have been working hard for a better life.
- b) After the boycott of grapes in California, they no longer grow grapes.
- c) There are too many people living in the West today.
Appendix D
Scoring Guidelines for Study One and Study Two

Written Summarization Task: Cause/Effect at the Sentence Level

**Passage 1:** From Colonies to States – used in both studies

Full cause/effect statements with an appropriate structural clue word: Correct response = 1 point each; max = 9

- Correct response:
  - They/the colonists lived in (13) colonies ruled by England, so/therefore they (still) had to follow England’s laws.
  - The colonists and England/theys had a war, because/since the king (of England) did not want the colonists/them to be free.
  - George Washington led the American (Army) against the English (Army); therefore/so he helped (the Americans) win the war.
  - Since/because the Americans won (the war), leaders (of the colonies) met (on July 4, 1776) to sign (a paper called) the Declaration of Independence.
  - The Declaration of Independence/it said the thirteen colonies/they were free (from England); so/therefore each colony was now a state.
  - Since/because (many) Americans wanted George Washington to lead (our new country after the war), he/George Washington became the (first) President of the United States.
  - The United StatesUS was now a free country; therefore/so, Americans no longer had to follow the laws of England.
  - The leaders (from twelve of the thirteen states) had a meeting, since/because they needed to make their own laws.
  - The Constitution lists the rights of our country’s citizens; therefore/so, citizens/people/we have rights (such as saying whatever we think without being put in jail).

**Passage 2:** History of the Southwest

Full cause/effect statements with an appropriate structural clue word: Correct response = 1 point each; max = 11

- Correct response:
  - Coronado claimed southwestern lands (for Spain) since/because his army found no gold (or silver).
  - Coronado/he led (a herd of 500 Spanish) cattle, (called “longhorns”) into the Southwest, so/therefore settlers/people raised (thousands of) cattle on (huge) farms (called ranchos).
  - (Many) people moved to the Southwest because/since it became part of the United States/US.
Appendix D (continued)

- People who worked ranches herded cattle/cows; therefore/so, they were known as/called cowboys.
- Ranchers hired cowboys to protect (and keep track of) their herds/cows since/because there were no fences (dividing the land).
- There was a (great) demand for beef in the Northeast, so/therefore cattle/cows were worth $40 (each).
- Ranchers began using the cattle drive to move their herd/cows to market because/since there were not enough ranches (in that region).
- Since/because the sharp metal/barbed wire fenced off (huge areas of) land, it made it hard for herds/cows to reach grass and water.
- Cowboys could not drive cattle across fenced lands, so/therefore this made cattle drives difficult/hard.
- By the (early) 1900s, the petroleum industry brought (many) newcomers to the region; therefore/so, oil workers can be found on the land and on the water.
- Factories (in the Southwest) built airplanes, tanks, and bridges, because/since World War II/the war created a need for (new) products.

Passage 3: An Island Climate

Full cause/effect statements with an appropriate structural clue word: Correct response = 1 point each; max = 8

- Correct response:
  - In the Middle West, there are no ocean breezes to cool the land during the summer and warm it in the winter, so/therefore temperatures can reach extreme highs and lows for (much of) the summer and winter (seasons).
  - In the northeastern part (of the region), the Great Lakes affect the land much like the ocean in other parts (of the country); therefore/so, the area has a gentler climate (than other parts of the region).
  - Farmers (must) worry about droughts because/since the growing season (of the Middle West) is short.
  - There is not much rain, so/therefore farmers use irrigation to make sure their crops get (enough) water.
  - (From June to September), people in this region stay alert for thunderstorms and tornadoes since/because (the force of) these winds can destroy everything (in its path).
  - (Many) winter storms begin in the colder parts of Canada; therefore/so, cities near the Great Lakes (such as Chicago, Illinois and Green Bay, Wisconsin) receive heavy snowfall (every winter).
  - The lake-effect snow occurs because/since cold, dry air from Canada meets warmer, damp air over the Great Lakes.
Appendix D (continued)

• Some areas receive more than 200 inches of lake-effect snow each year, so/therefore ice skating (skiing and snowshoeing) are popular winter sports.

Written Summarization Task: Cause/Effect at the Paragraph Level

Passage 4: New York City Expands – used in both studies

Full cause/effect statements with an appropriate structural clue word: Correct response = 1 point each; max = 11

- Correct response:
  • Immigrants/people arrived in New York City in large numbers in the 1800s; therefore/so the city’s population grew (rapidly).
    ▪ The city had to adapt.
  • Since/because the space was limited, New Yorkers/people decided that if they built taller buildings, they could make the most/have more of the city’s space.
  • One problem was how to get to the top, because/since not many people wanted to climb (long) staircases/stairs to reach/get to the upper floors/top.
  • (In the early 1850s,) new technology made elevators safe, so/therefore workers (soon) put elevators in (stores, hotels, and other) tall buildings.
  • Crowded streets made travel difficult/hard; therefore/so, people needed better ways to move around the city/get around.
  • Since/because the subway moved people (quickly) underground, traffic was eased/less on the streets (above).
    ▪ It (also) allowed people to live further from (the center of) the city and still travel/get to work.
  • Living conditions (within New York City also) improved, because/since the city’s government/they passed laws to fight disease.
    ▪ (Also, officials made sure) trash was picked up, (the water supply was clean, and that food in the city was safe to eat).
    ▪ Individuals/people made the city healthier, (too).

Passage 5: The First Americans

Full cause/effect statements with an appropriate structural clue word: Correct response = 1 point each; max = 14

- Correct response:
Appendix D (continued)

- The Olmec were farmers, so therefore the Olmec/their culture was able to grow (in specific areas).
  - The Olmec culture/they developed government, (education, religion, and architecture).
  - (Also), the Olmec/they (were one of the first groups to) develop its/developed their own civilization.
- The Adena were (one of the first groups of) Mound builders; therefore/so, they were known for the large mounds they built to bury their dead.
- Because/since the Hopewell settled in the Ohio River area where the Adena had been (situated), they continued the tradition/were mound builders.
- Since/because the Aztec joined with nearby peoples (in 1430) to defeat the (rulers of) the Valley of Mexico, the Aztec battles created enemies who crushed their empire.
- Like the Aztec, the Inca (of southern Peru) created an empire because/since they conquered their neighbors.
- Since/because the Inca had time, they built 19,000 miles of roads (as well as bridges).
  - They (also) devised/made canals to irrigate/water crops, (which they grew on mountainside terraces).
- The civil war made it easy for the Spanish to defeat the Inca, so therefore (by 1572), the empire fell.
- Since/because the Hopi were (skilled) farmers, they devised/came up with dry farming methods to grow crops where water was scarce.
- One of the oldest settlements in the U.S., (a pueblo called Old Orabi), still stands because/since the Hopi were excellent builders.
- (Homes were made with adobe and) doors were high up on the rooftop; therefore/so, entry was by ladder.
- The Hopi lived peacefully with the Navaho, since/because they shared (their farming, weaving, and jewelry-making skills) with them.

Passage 6: The West after the Gold Rush

Full cause/effect statements with an appropriate structural clue word: Correct response = 1 point each; max = 11
- Correct response:
  - (Similar to the Mountain States), many towns emptied because/since the gold ran out.
  - Since/because San Francisco grew, it attracted newcomers/people from all over the world.
  - Thousands/people lived in/on (an area around) Sacramento Street; therefore/so this neighborhood became known as Chinatown.
Appendix D (continued)

- Life was hard for migrant workers because/since they worked 14 hours a day.
  - And they lived in shacks or tents.
- (In 1962), Cesar Chavez (and Dolores Huerta) wanted to help farmworkers, so/therefore they formed the (United Farm Workers, or) UFW.
- (In 1968), the UFW called for a boycott of grapes (grown in California), so/therefore many people (supported the farmworkers and) did not buy (California) grapes.
  - (Also in 1970, 26) grape growers signed an agreement giving workers better pay, time off for vacation, and improved conditions.
- More land is used for buildings; therefore/so, (the region’s) forests and wildlife can be threatened.
- Because/since many towns are trying to limit urban sprawl, city planners/people are trying to make public transportation more available.
  - Government officials are (also) looking for (new) ways to get the energy the region needs (while encouraging energy conservation).
### Appendix E

**Inter-Rater Reliability for Dependent Measures Across Paragraphs**

**Study One**

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<tr>
<th>Task</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Summarization Task: Passage One Cause/Effect at the Sentence Level</td>
<td>99%</td>
</tr>
<tr>
<td>Written Summarization Task: Passage Two Cause/Effect at the Paragraph Level</td>
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**Study Two**

<table>
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<tr>
<th>Task</th>
<th>Reliability</th>
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<tr>
<td>Written Summarization Task: Cause/Effect at the Sentence Level</td>
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<tr>
<td>Written Summarization Task: Cause/Effect at the Paragraph Level</td>
<td>97%</td>
</tr>
<tr>
<td>Explicit Comprehension Questions</td>
<td>100%</td>
</tr>
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</table>