

**THE RELATIONSHIP BETWEEN
READERS' PRIOR KNOWLEDGE AND
COMPREHENSION OF EXPOSITORY TEXTS**

by

Erin M. Kelly

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State University of New York at Fredonia
Department of Language, Learning and Leadership

CERTIFICATION OF THESIS WORK

We the undersigned certify that this thesis by Erin M. Kelly, candidate for the Degree of Master of Science in Education, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this thesis.

[Redacted Signature]

Dr. C. M. Bird
Master's Thesis Capstone Advisor
EDU 659 Course Instructor
Department of Language, Learning, and Leadership

May 14, 2014
Date

[Redacted Signature]

Dept. Chair: Dr. Anna Thibodeau
Department of Language, Learning, Leadership

May 16, 2014
Date

[Redacted Signature]

Dean: Dr. Christine Givher
College of Education
At SUNY Fredonia

5-22-14
Date

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THE RELATIONSHIP BETWEEN READERS' PRIOR KNOWLEDGE AND COMPREHENSION OF EXPOSITORY TEXTS

ABSTRACT

The Common Core Standards (CCSS) (Common, 2012) require students to read complex expository texts. One skill for increasing comprehension is activation of prior knowledge (Harvey & Goudvis, 2007). Having a greater understanding of how important prior knowledge is for readers' comprehension of expository texts, of how to help students "activate" their own prior knowledge, and of how to help students build prior knowledge when theirs is lacking will add to a teacher's collection of "tools" for assisting students to develop their skills for reading challenging and complex expository texts. This problem of teacher understanding and the role of prior knowledge has been addressed in this thesis by asking the question, what is the relationship between readers' prior knowledge and comprehension of expository texts? The most appropriate way to address the question of this relationship has been to conduct an extensive literature review, synthesize the findings, and disseminate the results to teachers through some form of professional development. This research synthesis has determined that prior knowledge appears to have a more significant role in text comprehension than does text complexity. Further results are that prior knowledge appears to have four distinct forms: the most common being content knowledge (also called domain knowledge, domain-specific knowledge and subject knowledge), followed by vocabulary knowledge, reading strategy knowledge, and structural (or text-structure) knowledge. Each form has its specific impact on reader comprehension and an impact when used in combination with other forms. Results also indicate that students' age and topic interest play a role in use of prior knowledge for comprehension. Overall, results show that for most readers, the combination of readers' prior knowledge of content knowledge and text structure knowledge positively impacts comprehension of science, animal-topic, social studies, and general topic expository texts.

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Chapter 1: Introduction

Statement of Problem

The Common Core Standards (CCSS) (Common, 2012) require students to read complex texts and teachers to consider text complexity when selecting reading material. Fisher, Fray and Lapp (2012) have determined that if students do not have the skills to “read challenging texts with understanding and concentration” (p. 3), students will read less. One such skill for increasing comprehension is activation of prior knowledge (Harvey & Goudvis, 2007). However, “sometimes students don’t access their background [prior] knowledge because they never think that it’s important” (Clewell, 2013, para. 1). Prior knowledge includes information on both the content of the text and the structure of the text; some students may lack one or both of these types of knowledge. This lack might influence how well the student reader comprehends the text (Armbruster, Anderson, & Ostertag, 1987). Another influence might be teachers who may not be clear on how to help students activate their prior knowledge or help students recognize that their prior knowledge may in fact be important in the task of comprehension. Having a greater understanding of how prior knowledge is important for students’ comprehension of expository texts, of how to help students “activate” their own prior knowledge, and of how to help build prior knowledge when theirs is lacking will add to a teacher’s collection of “tools” for assisting students to develop their skills for reading challenging and complex texts. This problem of teacher understanding and the role of prior knowledge for comprehension of complex texts can be addressed by asking the question, what is the relationship between readers’ prior knowledge and comprehension of expository texts? The most appropriate way to address the question of this relationship is to conduct an extensive literature review, synthesize the findings, and disseminate the results to teachers through some form of professional development.

Background

My own experience from working with students has taught me much about how a student’s prior knowledge might influence his or her understanding of an expository text. The

student I currently work with is a ninth grade boy who reads at or below a third grade reading level. He has trouble connecting to unknown texts and identifying basic third grade sight words. I started to see him loose interest in the texts I selected and become frustrated with the content of the text. It was hard to choose books at his reading level that were appropriate for his age. However, one day I gave him the choice of what text he would read that day. By receiving the ability to choose for himself, this student was able to connect and make a connection to the text of choice. In so doing, he was able to recall aspects of that text that he had not been able to recall in other books. Allowing the student to choose a book with content he was already familiar with precipitated the student's connection to the text and a rapid comprehension of the main idea. This literacy event made me start to think about comprehension and prior knowledge. Consequently I have selected this topic because I think it may be beneficial to both teachers and students for teachers to understand the relationship between a reader's prior knowledge and comprehension of expository texts. Professional development about the many factors that influence a text's complexity is valuable because knowing this topic might influence a teacher's instruction.

Terminology

For the purpose of this research study, terms are defined below to provide the reader with a better understanding of the topic. The first key term is "prior knowledge" (sometimes referred to as "background knowledge"): a "multidimensional construct that includes many types of knowledge, some formally and some informally acquired" (Alexander, Kulikowich, & Schulze, 1994, p. 314). According to Rumelhart (2004), there are four types of prior knowledge that a reader may access when trying to comprehend, or make meaning from a text. These types contain "specialized knowledge about some aspects of the reading process" (p. 1164). These four types are "syntactical" knowledge (grammar/structural knowledge), "semantic" knowledge (meaning/context/domain-specific), "orthographic" knowledge (spelling), and "lexical" knowledge (words themselves/meaning/vocabulary) (Rumelhart, 2004, p. 1163). Throughout this proposal and thesis, the terms "prior knowledge" and "background knowledge" will be used interchangeably and will refer only to semantic knowledge, also known as "prior content knowledge," and be defined as the "broadly represented knowledge specific to a given piece of text" (Rupley & Willson, 1996, p. 420). Therefore, when a reader is using his or her prior content

knowledge, the reader is taking what he or she already knows about the content of the text to help comprehend the text. A reader uses his or her prior knowledge to learn new information on a topic, to integrate the new “information from the text with their existing knowledge” (Lipson, 1982, p. 243). Therefore, comprehension becomes the ability to use “prior knowledge to create new knowledge” (Lipson, 1982, p. 243).

Skilled readers are able to comprehend many text types such as narrative texts, expository texts, and online texts. Each type of text also has varying degrees of “complexity” that make up a text and that affect how a reader comprehends a text. Text complexity refers to a “three-part model consisting of quantitative and qualitative dimensions as well as reader and task considerations” (Common, 2012). According to Common Core Standards (Common, 2012), there are three factors to determine text complexity: qualitative evaluation of the text, quantitative evaluation of the text, and matching the reader to the text and task. Fisher, Frey, and Lapp (2012) explain the factors this way: quantitative factors assess word length, sentence length, and number of syllables in a text; qualitative factors measure complexity through content analysis, levels of meaning and purpose, text structure and organization, and visual supports; lastly, language proficiency factors, including prior knowledge, determine based on the reader’s experiences and motivation how well a reader can comprehend a complex text. For the purpose of this study, text complexity will include the many factors that make a text complex, including qualitative and quantitative factors, and reader’s language proficiency factor.

Theoretical Stance

The theory that connects prior knowledge to the reading process is Rumelhart’s (2004) theory of the reading process. Rumelhart views reading as an interactive process in which “graphemic information enters the system and is registered in a visual information store (VIS)” (p. 1163). According to Rumelhart (2004), there are four types of prior knowledge that a reader may have: “syntactical” knowledge (grammar/structural knowledge), “semantic” knowledge (meaning/context/domain-specific), “orthographic” knowledge (spelling), and “lexical” knowledge (words themselves/meaning/vocabulary) (p. 1163). In order for a reader to comprehend and understand the varying degrees of meaning of the text, these “various sources of knowledge, both sensory and nonsensory, come together at one place, and the reading process is

the product of the simultaneous joint application of all the knowledge sources” (p. 1163). Therefore, in order for a reader to become skilled, he or she “must be able to make use of sensory, syntactic, semantic, and pragmatic information to accomplish” (p. 1149) the task.

The concept of prior knowledge also relates to the Schema Theory (Rousseau, 2001). A schema is the “cognitive organization or mental model of conceptually related elements” (Rousseau, 2001, p. 513). A reader’s schema develops over time from past experiences and “subsequently guides the way new information is organized” (Rousseau, 2001, p. 513). Every person obtains and files information in his or her schema differently. The schema theory “suggests that schemata serve at least two important functions during comprehension” (Pearson, Hansen, & Gordon, 1979, p. 201): “classifying concepts presented in the text” and allowing “readers to fill in gaps not completely specified in the text” (Pearson, Hansen, & Gordon, 1979, p. 201-2). Understanding how schemas function directly relates to teacher knowledge that will assist students to develop their schema. Students who have well developed schemas on a specific topic are able to “answer more questions about a passage than those with weakly developed schemas” (Pearson, Hansen, & Gordon, 1979, p. 207). Therefore, teachers would benefit from knowing how to implement instruction to help each student build his or her schema prior to reading a complex text.

Rationale

The Common Core Standards are being adopted by the majority of states including New York State (Common, 2012). The implementation of these standards is important to ensure that students across many states are “college and career ready” (Common, 2012, p. 2). One Standard deals specifically with text complexity: “all students must be able to comprehend texts of steadily increasing complexity as they progress through school” (Common, 2012, p. 1). Research has shown that “prior knowledge often results to be one of the most significant” (Tarchi, 2010, p. 415) indicators for reading comprehension in which students acquire new information from the text. This emphasis on text complexity and comprehension, and the knowledge that activation of prior knowledge is a proven strategy for comprehension (Fisher, Frey, & Lapp, 2012) means that the topic of this research study is very relevant for educators in New York State today.

Chapter 2: Literature Review

The most appropriate way to address the question of the relationship between a reader's prior knowledge and the comprehension of expository texts is to conduct a literature review. After searching academic databases, many articles have been found that have great relevance to the research question. These articles are reviewed below and grouped according to the subject addressed in the expository text studied; these subjects include social studies, science, two or more subject domains, sports, and animals. One group examines multiple factors that influence text comprehension. The sections are sequenced below according to the amount of prior knowledge needed to comprehend the domain-specific expository text.

Expository Texts About Social Studies

The following studies are sequenced below according to the year in which the study was published, from the earliest published year to the latest published year. The studies in this section focus on the effects of readers' prior knowledge related to comprehension of expository texts about social studies. Carr, Dewitz, and Patberg (1983) is the first study where researchers use an expository text about social studies with sixth grade participants. Researchers investigate the relationship of a reader's prior knowledge and inferential comprehension of a text using a mixed methodology. Participants were 75 sixth grade students from a suburban school. Participants were divided "into three groups, one of which served as a control group" (p. 4). The "Structured Overview-Cloze Treatment" (p. 6) group was first instructed on how to activate prior knowledge and received an overview of material to be covered. Next, participants in this group completed a cloze procedure progressing from "single sentences to paragraphs" (p. 6). Participants then practiced the cloze procedure with social studies passages and were asked "inferential questions about the completed passage" (p. 8). Lastly, participants completed a self-monitoring checklist to help them understand "the mental processes they relied on to generate appropriate answers" (p. 8). Participants in the "Cloze Treatment" (p. 9) group were first instructed on vocabulary words that were essential to the lesson, then completed a cloze procedure activity with a social studies passage and a self-monitoring checklist. Participants in the "Control Treatment" (p. 9) group

completed “supplemental work such as reading a social studies magazine and working on map skills” (p. 9) instead of learning strategies like the other groups. Results were produced using a one-way analysis of covariance and ANCOVA. Results show that “children can be trained to increase their inferential comprehension of expository text and can apply these skills to comprehending untaught material” (p. 15). Researchers conclude that the self-monitoring checklist was a contributing factor to “transfer this skill to new and different learning situations” (p. 16). Overall, results of this study indicate that a reader’s prior knowledge and inference strategies are essential to improving a reader’s comprehension of expository texts in the domain of social studies.

Three years later, Stahl and Jacobson (1986) conduct a mixed method study to assess the relationship between prior knowledge and vocabulary difficulty and comprehension of a narrative text. Participants included 61 sixth grade students from two rural schools. Before reading a 500 word passage, students were instructed on content by one of the researchers for 15 minutes. Two groups learned about the Yanomamo tribe, a topic relevant to the reading passage and the two groups learned about Hindu wedding rituals, a topic irrelevant to the reading passage. All students were then given the 500 word passage to read. Vocabulary difficulty and “relevant-irrelevant preteaching conditions were counterbalanced” (p. 314) in order to represent four different combinations. After reading, the passages were removed and participants completed a multiple choice comprehension posttest and a sentence verification posttest. Results of this study show that “knowledge-based preteaching improved comprehension but did not overcome the effects of vocabulary difficulty” (p. 316). Results also indicate that a reader’s comprehension may suffer if the reader is unable to read or understand words of difficulty. Researchers conclude that the “construct of background [prior] knowledge used in this study may have been defined too specifically” (p. 317); therefore results on readers’ prior knowledge may be skewed and could not be accurately determined by the researchers.

In the first study published in the 1990s, Carr (1991) conducts a mixed methodology study to compare the “reading comprehension abilities of learning disabled (LD) students with the performance of both their age-peers and their reading-level peers” (p. 3). Participants consisted of a total of 48 students: 16 learning disabled seventh and eighth grade students, 16 “normal achieving” (p. 8) eighth grade students, and 16 “normal achieving” (p. 8) fifth grade students. First, participants orally read one passage for the researcher to “establish a record of

word recognition accuracy and reading speed” (p. 11). Prior knowledge was assessed by having participants complete a multiple choice test about the topic of the to be assigned passages. Participants were then randomly grouped into the “subject” (p. 11) group or “experimenter-activation” (p. 11) group. Within each group there were an equal number of LD students, normal achieving eighth grade students, and normal achieving fifth grade students. During the first session, participants individually met with the researcher and were told to discuss everything they could about the topic. Next, participants silently read eight of the 16 passages about the History of New Orleans. Passages varied in complexity from familiar to unfamiliar, and easy to hard. After reading each passage, the participants were told to recall everything they could about what they read and answer “five inferential comprehension questions” (p. 13). During the second session, participants read the remaining eight passages, were asked to recall each passage, and answer comprehension questions. Two-way factorial ANOVAs were employed to determine results of the study. Results show that learning disabled students can answer inferential comprehension questions “when they have an adequately developed knowledge base” (p. 22) of the topic. Carr suggests that the performance of the three groups “may be related to the adequacy of the knowledge base” (p. 22). In order for students to have a “well developed knowledge base,” they must have both “declarative and procedural knowledge” (p. 23). Overall, participants who were familiar with the passage topic were able to answer more comprehension questions correctly compared to participants who were less familiar with the passage topic.

One year later, McKeown, Beck, Sinatra, and Loxterman (1992) also use an expository text about social studies to conduct a qualitative study that examines the “relative effects of knowledge and coherence on comprehension” (p. 8). Participants were “48 fifth graders” (p. 9) sorted into two groups. One group read the original text on the American Revolution, the other group read the “revised version of the text” (p. 9). All participants took part in a 35 minute instructional module in which researchers presented prior knowledge on the American Revolution while students were prompted and asked to participate in lesson. Next, participants individually read a text in four sections “French and Indian War, No Taxation Without Representation, Boston Tea Party, and Intolerable Acts” (p. 15). After reading, participants orally recalled what they could about the text and orally answered “open ended questions” (p. 15). Participants’ oral responses were recorded and later scored and analyzed by the researchers. Results show that “background [prior] knowledge in addition to a more coherent text” (p. 26)

results in “better comprehension than coherent text alone” (p. 26). Participants who read the “revised text were able to utilize the knowledge gained from the background [prior] knowledge instructional module” (p. 26) to help them “focus on and remember the most important information from the text” (p. 26). Results also show that prior knowledge allows readers to make connections to the text and comprehend the text in a way meaningful to them.

In the first study published in the 2000s, Shapiro (2004) conducts a qualitative study to examine “the significant role of domain [domain-specific] knowledge” (p. 169) in learning from different text types about fictional history and determine the “extent of that effect” (p. 169). Shapiro conducted two experiments; however only Experiment 1 is relevant and discussed in this review. Participants in Experiment 1 included 24 undergraduate students that were randomly assigned to groups of four to be tested. Participants first completed a multiple choice reading ability test that assessed participants’ comprehension and reading speed. Participants also completed a “personal information questionnaire” (p. 170) that asked about participants’ GPA, courses taken in history, and interest in that area. To assess participants’ domain-specific knowledge, participants answered 20 short answer questions about world history. Next, participants read two different texts that Shapiro created about fictional events: “Anchad” (p. 170) text and “Padria” (p. 170) text. The Anchad text described an invasion from a neighboring country, and the Padria text described the relationship between various countries and the “civil unrest in Padria” (p. 170). The researcher created two versions of each text. The first version was considered “sparse” (p. 170) and missing details when compared to the “detailed” (p. 170) version which provided the readers with more prior knowledge on the events. After reading the first text, participants answered 20 comprehension questions. Lastly, participants read the detailed version of the text and answered 20 comprehension questions. Data were analyzed using means and standard deviations. Results show that both reading ability and domain-specific knowledge “predicted posttest performance” (p. 172). Results further show that domain-specific knowledge “proved to be the major factor” (p. 173) in successful text comprehension and posttest performance. Overall, results suggest that domain-specific knowledge “was much more relevant to learning outcome than any other variable” (p. 174).

Four years later, Garth-McCullough (2008) conduct a mixed method study using an expository text about social studies to investigate “the relationship between cultural orientation of literature and reading comprehension” (p. 1) of African American students. Garth-

McCullough specifically analyzes the impact of students' prior knowledge and comprehension. Participants included "117 eighth grade African American" (p. 9) students classified as "low income" (p. 9). Participants first completed a "reading behavior survey" (p. 10) and prior knowledge test that assessed participants "understanding of the texts' cultural and general content" (p. 10). Over "three subsequent sessions" (p. 10), participants read six short stories. Each story represented a different culture: "African America, Chinese America, and European American" (p. 10). After reading each short story, participants completed a multiple choice reading comprehension test. Lastly, participants completed a "short post-survey" (p. 11) consisting of questions about "interest level, text difficulty, and familiarity" (p. 11). An ANOVA was conducted to produce results. Results show that participants' "level of culturally bound prior knowledge of the African American stories content significantly influenced their reading comprehension performance" (p. 20). Therefore, Garth-McCullough concludes that prior knowledge plays a significant role in successful reading comprehension. These findings provide teachers with support for integrating strategies to activate students' prior knowledge when teaching a new topic or concept, especially in the field of social studies.

In another study where researchers use an expository text about social studies, Miller and Keenan (2009) examine "text memory in children with word reading deficits to determine how those difficulties impacts representations of text meaning" (p. 99). Researchers hypothesize that activation of a student's prior knowledge might eliminate reading difficulties and unsuccessful comprehension. Participants were 87 "fourth and fifth grade" (p. 105) students. There were 29 participants in the "no prior knowledge" (p. 105) group, and 58 participants in the "prior knowledge" (p. 105) group. After completing the prior knowledge test, participants read a passage about Amelia Earhart from the *Qualitative Reading Inventory*. Immediately after reading, participants were asked to "recall everything they could" (p. 106) about the passage. Researchers recorded participants' recalls and "later scored according to the QRI idea unit checklist" (p. 106). Researchers used a "mixed design ANCOVA" (p. 107) to determine results. Results show that participants with poor word decoding skills were not able to recall much of the passage compared to participants with good word decoding skills and high prior knowledge. Results also show that when readers have "prior knowledge, fewer resources are required to form connections between text ideas" (p. 110). Thus, "prior knowledge of the passage topic" (p. 110) helps participants recall more of the text and appears to compensate for word decoding deficits.

Jeong and Kim (2009) also conduct a study in 2009 to “identify some of the conditions under which text comprehension can be preserved in old age” (p. 910). Participants included 60 volunteers, 20 “in each of the three age groups” (p. 911): young (19-27 years), middle-aged (39-57 years), and elderly (62-73 years). Participants first completed the “K-WAIS” (p. 911) vocabulary test. To assess prior knowledge, participants were instructed to talk about everything they knew about four theme words from the texts. Participants were instructed to read both texts carefully because they would be answering comprehension questions after reading. The first text was a “no advantage” (p. 913) text about politics in Togo, Africa, which no age group knew much about. The second text was an “advantage” (p. 913) text about an event in South Korea that most age groups were familiar with, particularly the elderly group. After reading, participants orally recalled the story and answered comprehension questions. Results were found using a two-way ANCOVA. Results show that young participants “recalled the text best” (p. 923). Results suggest that recall performance “declined with age” (p. 923). Results also show that the older group participants were able to interpret the text better than the younger age group because their “interpretation was aided by schematic knowledge” (p. 924).

In the first study published in the 2010s, Priebe, Keenan, and Miller (2012) use an expository text about social studies to investigate “the relationship between oral reading accuracy and comprehension” (p. 136) in order to determine the different types of errors that might predict reading comprehension. Participating in this study were 60 fourth grade students: 30 in the prior knowledge group and 30 in the non-prior knowledge group. Previous reading scores were used to classify readers as “poor” or “good” (p. 137). Researchers used a “263-word expository passage, titled *Amelia Earhart*” (p. 138) taken from the *Qualitative Reading Inventory*. Before each participant read the passage, the examiner asked “Who is Amelia Earhart?” (p. 138) to assess participants’ prior knowledge on the topic. Next, participants orally read the passage which was recorded for measurement of “rate and accuracy” (p. 138). Participants were then asked to recall the passage. Priebe, Keenan, and Miller calculated oral reading errors such as “substitutions, omissions, insertions, repetitions, and skipped lines” (p. 139). An “analysis of variance (ANOVA) was conducted” (p. 140) with independent variables of reading ability and prior knowledge and dependent variables of the “total amount of idea units recalled” (p. 140). Results indicate poor readers that had prior knowledge on the topic recalled more items from the passage than poor readers with no prior knowledge. Data also indicate that poor readers with prior

knowledge read more words correctly “compared to poor readers without prior knowledge” (p. 140). Poor readers that did not have prior knowledge on the topic appeared to rely more on graphic information from the text for their comprehension. Overall, results show that, whether classified as “poor” or “good” readers, participants with prior knowledge had higher comprehension scores than those participants without prior knowledge of the assigned expository reading in a social studies subject.

Expository Texts About Science

The following studies are sequenced below according to the year in which the study was published, from the earliest published year to the latest published year. The studies in this section focus on the effects of readers’ prior knowledge related to comprehension of expository texts about science. Taft and Leslie (1985) conduct a qualitative study to examine the “effects of prior knowledge and oral reading accuracy on miscues and comprehension” (p. 163) of elementary students. Participants included 57 third grade students who were “average readers” (p. 167). To assess participants’ prior knowledge of the food chain, participants were given 15 vocabulary words and told to discuss what other words come to mind while hearing each vocabulary word. Next, participants read a “281-word” (p. 166) expository passage about the food chain and “web of life” (p. 166). Participants orally read the passage individually with the experimenter present. After reading, participants recalled everything they could remember from the passage. Lastly, participants answered 12 comprehension questions. The comprehension questions consisted of four “textually explicit” (p. 169) questions, four “textually implicit” (p. 169) questions, and four “scriptually implicit” (p. 169) questions. Data were analyzed using multiple analyses of variance (MANOVA) and miscue analyses. Results show that participants with high prior knowledge of the science content answered “more text explicit, text implicit, and scriptually implicit questions” (p. 176) correctly than participants with low prior knowledge. Therefore, results suggest that participants’ “level of prior knowledge” (p. 176) impacted participants’ ability to answer questions, however did not impact recall. These finding also suggest that activating students’ prior knowledge before reading may be essential in order for students to more extensively comprehend the text.

In the first study published in the 1990s, Schiefele (1990) uses an expository text about psychology to investigate whether “interest exerts more influence when dealing with complex questions of knowledge and questions requiring deeper understanding” (p. 326). Schiefele also examines whether prior knowledge and intelligence have an effect on “all indicators” (p. 326) and if “the effect of interest on comprehension is independent” (p. 326) from prior knowledge and intelligence. Participants were 53 male “first semester students” (p. 326) majoring in computer science at a university. Participants were grouped into a “high interest group and a low interest group” (p. 316). After receiving the text topic of psychology and a short summary, participants completed a topic interest survey that assessed how participants would feel during reading the actual text. Participants rated their “emotional component of interest and value component of interest” (p. 327) using two different scales. Next, participants “were given 15 minutes to read the text” (p. 329). After reading, participants completed a rating scale to evaluate the text and answered 12 open ended questions for researchers to assess participants’ comprehension of the text. A “2 x 3 MANOVA” (p. 330) was conducted to produce the results of topic interest and comprehension. Results indicate that “interest exhibits more influence as the complexity of the indicators of comprehension increases” (p. 330). Participants in the high interest group provided longer responses to the 12 open ended comprehension questions. Results also indicate that “the obtained level of correlation between interest and text comprehension depends primarily on the extent of prior knowledge” (p. 336). Schiefele concludes that a participant with greater interest in the topic will learn more about the topic compared to a participant with less interest in the topic.

One year later, Alexander and Kulikowich (1991) use an expository text about science to conduct a mixed methodology study that analyzes the role of “domain [domain-specific] knowledge, analogic reasoning ability, and interactive knowledge play in the comprehension of scientific expositions” (p. 165). Participants were 211 sixth grade students from a middle school in Texas. All participants completed a multiple choice Domain Knowledge test for researchers to “assess subjects’ knowledge of human biology” (p. 167). Next, participants completed the Analogic Reasoning test compiled of 20 “figural, matrix analogy problems” (p. 168) used to assess the participants’ strategic processing. Participants also completed an Interactive Knowledge test that assessed the “application of both domain knowledge and analogical reasoning” (p. 169). Lastly, participants read a randomly assigned passage about a human

biology topic and completed 17 multiple choice questions after reading. Two versions of both passages were created: “one without a supporting analogy (nonanalogic) and one with a supporting analogy (analogic)” (p. 169). Parametric statistics were used to produce results. Results show that “subjects’ level of performance is comparable whether they are reading nonanalogic or analogic versions of scientific exposition” (p. 172). The results of the domain knowledge test appeared to be a significant predictor for student performance on the nonanalogic passage, whereas the interactive knowledge test was “the most potent predictor” (p. 173) for the analogic passage. Overall, researchers conclude that both types of prior knowledge may impact a student’s comprehension of an expository passage that is science focused. One implication from this study is that “both forms of knowledge (content [domain-specific] knowledge and analogic knowledge) are necessary in the comprehension of exposition” (p. 186); therefore, researchers conclude that educators would likely benefit from creating instructional practices that allow students to see relationships in the content and the importance of activating both these types of knowledge.

Alexander, Kulikowich, and Schulze (1994) use an expository text about science to examine the “influence of subject-matter [domain-specific] knowledge on students’ recall of and interest in scientific exposition” (p. 313). Researchers define topic knowledge as the “specific subject-matter knowledge referenced in the text” (p. 313) and define domain knowledge as “knowledge pertinent to a particular field of study” (p. 313). Participants in this study included 209 students from two universities. Participants completed a topic knowledge test at the beginning of the experiment for researchers to assess what the participants knew about the specific science topic of physics. Participants were asked to “jot down words, phrases, or sentences” (p. 319) about what they knew about a particular term. Participants also completed a multiple choice domain topic test that assessed “students’ knowledge of key concepts and principles in the domain of physics” (p. 320). Next, participants rated their interest in the topic by using a scale from 1 to 10 for each paragraph of two physics-related texts. After reading, participants completed a recall text consisting of 13 fill in the blank questions. Researchers conducted a regressive analysis and descriptive statistics to determine the results of the study. Results of the comprehension recall test show that participants who had more prior knowledge on the topic scored higher “on the recall measures” (p. 325). Researchers also conclude that “higher paragraph ratings were produced by more knowledgeable students” (p. 327). The

findings of this study indicate that students with less experience or not “cognitively mature” (p. 325) on the topics of physics would most likely benefit from more instructional assistance. Results also allow researchers to position knowledge, recall, and interest “within a model that acknowledges three stages of domain learning: acclimation, competency, and proficiency” (p. 334). This model reiterates that a reader’s domain development cannot occur without continuous “skill (knowledge) and thrill (interest)” (p. 334). One limitation to the study was the decision to focus on mature students; this focus constrains the researcher’s ability to “examine the stages of domain learning developmentally or longitudinally” (p. 333).

In the first study published in the 2000s, McNamara (2001) uses an expository text about science to conduct a study examining “the source of the comprehension advantage produced by low-coherence text for high knowledge readers” (p. 52). Participants in this study were 80 undergraduate students. Participants were given one hour to read the text, answer “11 text based questions and 11 situation model questions” (p. 54) questions on the text, and answer “14 prior knowledge questions” (p. 54) assessing their level of domain-specific prior knowledge. The text was taken from a middle school level book about mitosis and then modified to “produce the low and high coherence texts” (p. 54). The researcher modified the text to increase coherence by replacing pronouns with nouns, adding descriptive language, adding sentence connectors, and “adding topic headers” (p. 54). Using the answers on the prior knowledge questions, McNamara determined whether participants were high knowledge readers or low knowledge readers. A “mixed 2 x 2 x 2 x 2 analysis of variance” (p. 57) determined the results of this study. Results indicate that there was a correlation between text coherence and participants’ domain-specific prior knowledge. High knowledge readers were better able to comprehend low coherence texts. Therefore, results show that participants with high domain-specific prior knowledge learn more from low coherence texts “because they are more likely to generate knowledge based inferences while reading the text” (p. 57). Readers with low knowledge are not able to recall and comprehend a low coherence text. McNamara suggests that in order to meet the needs of both learners, texts could be modified to produce different versions.

Four years later, Samuelstuen and Braten (2005) also use an expository text about science to address three questions on how domain-specific knowledge, decoding skills, and strategic processing influence a student’s comprehension. Participants consisted of 78 tenth grade students that attended “regular classes” (p. 109). Researchers hypothesize that participants’ prior

knowledge on the topic of socialization would vary because “participants had not studied the topic of the text” (p. 110) in their class yet. The text consisted of 891 words and “most words in the text were relatively easy in terms of both length and frequency” (p. 110). Participants completed a word decoding test first. Then, participants completed a multiple choice test to assess prior knowledge and an inventory for participants to monitor strategy use during reading. After reading the text, participants completed a multiple choice test to measure text comprehension. A multiple regression analysis produced results concerning “the relative contribution of decoding, knowledge and strategies to reading comprehension, and the interaction of knowledge and strategies” (p. 111). Results of this study show that domain-specific prior knowledge was the “single best predictor of reading comprehension” (p. 112). Participants that had more prior knowledge on the specific topic scored higher on the comprehension test. Results also show that participants with better decoding skills and “reportedly used organization and monitoring strategies” (p. 112) during reading scored higher on the comprehension test. Researchers conclude that their findings confirm that “no other factor exerts more influence on what students understand and remember than the knowledge they possess” (p. 113). The findings of this study suggest that educators may likely benefit from developing “rich world knowledge in students” (p. 114) through different texts, and media sources, and from encouraging students to use their prior knowledge to help comprehend a text.

In another study in which researchers use an expository text about science, Kendeou and VanDenBroek (2007) investigate “the effects of prior knowledge and text structure on cognitive processes during comprehension of scientific texts” (p. 1567). Kendeou and VanDenBroek conduct two experiments; however only Experiment 1 is relevant and discussed in this review. In Experiment 1, researchers investigate “the effects of prior knowledge and text structure online, using a think-aloud methodology” (p. 1568). Participants consisted of 41 female and 39 male undergraduate students from the University of Minnesota. Participants first completed the “Force Concept Inventory” (p. 1569) that consisted of 30 multiple choice questions to assess participants’ perceptions of Newtonian mechanics. Next, participants read two different texts and were asked to think aloud after reading each sentence in the text. If the students had trouble thinking aloud, the researcher was able to prompt the student by asking, “what are you thinking right now?” (p. 1569). After reading the texts, participants completed a “distractor task consisting of 10 math problems” (p. 1569). Lastly, participants were asked to recall everything

they could remember about the text and complete a “reading span test on the computer” (p. 1569). Researchers conducted separate ANOVAs with “prior knowledge (misconception, nonmisconception), text structure (refutation, nonrefutation), and text topic (Newton’s first law, Newton’s third law)” (p. 1570). Results indicate that “readers with misconceptions generate more incorrect inferences than do readers without misconceptions” (p. 1571). Results also indicate that a reader’s memory is affected by prior knowledge. Overall, participants recall and acquire more information from a text if they have domain-specific prior knowledge and prior structure knowledge.

In another study published in 2007, O’Reilly and McNamara (2007a) conduct a mixed methodology study to examine “whether students’ comprehension skill affects the interaction between text cohesion and their domain [domain-specific] knowledge” (p. 121). Researchers examine both characteristics of the reader and the text and how those characteristics impact reading comprehension. Participants included 143 college students. Participants were tested in small groups for 90 minutes. Participants either read a low coherence text about mitosis or a high coherence text about mitosis. The high coherence text consisted of 300 more words than the low coherence text and had fewer cohesion gaps. First, participants answered 54 multiple choice questions and 8 open ended questions that made up the prior knowledge test. Next, participants read a paper about mitosis then answered 10 open ended comprehension questions. Participants then answered 38 multiple choice questions “designed to assess comprehension on several short text passages” (p. 128) and 25 multiple choice questions designed to measure predicting, previewing, purpose setting, self-questioning, and summarizing. Data were analyzed using descriptive statistics, correlations and a mixed ANOVA. Results show that participants with low knowledge “benefited from text cohesion” according to their performance on the inference questions. Participants that were “skilled, high knowledge readers” (p. 139) performed better while reading the high cohesion text. Results also suggest that even low knowledge readers can understand the text by activating their prior knowledge and reading strategies. The findings of this study also suggest that “reading strategy training” (p. 141) helps both low knowledge and high knowledge readers comprehend the text.

In the last study published in 2007, O’Reilly and McNamara (2007b) conduct a mixed methodology study to examine “multiple measures of high school students’ science comprehension and achievement and their relation to knowledge, reading skill, and reading

strategies” (p. 166). Researchers chose the topic of science because “current trends in science education place an emphasis on learning science by engaging in the type of science” (p. 165) actual scientists conduct. Participants included 1,651 high school students. To assess participants’ prior knowledge, participants completed an 18 multiple choice “science knowledge” (p. 170) pretest. Next, participants read an 840 word passage on meteorology. After reading, participants completed the comprehension test consisting of 12 open ended questions and 8 multiple choice questions. Participants also completed the reading skill test which consisted of “48 multiple choice questions designed to assess student comprehension on several short passages” (p. 171). Lastly, participants completed a 25 question multiple choice reading strategy knowledge test. This test measured participants’ knowledge of “metacognitive reading strategies” (p. 171) such as self-questioning, accessing prior knowledge, predicting, and summarizing. Data were analyzed using ANOVAs. Results show that “both science knowledge and reading skill were significant predictors for all the science achievements measures” (p. 178). Results also show that participants with high prior knowledge and reading skill had “much higher” (p. 182) grades than low prior knowledge and low reading skill participants.

One year later, Gaddy, Bakken, and Fulk (2008) conduct a study to investigate whether “text structure strategies improved reading comprehension of expository text passages in science” (p. 102) for learning disabled college students. Participants included 40 college students with “self-identified LD” (p. 102). Participants were randomly grouped in either the “text structure strategy condition or a traditional instruction” (p. 102) group. On the first and second day of testing, participants were given “content specific individual instruction” (p. 105) and completed a pretest on everything they knew about the science topic of “life and physical sciences” (p. 102). In the text structure group, participants were instructed on the two text types of “main idea and compare-and-contrast” (p. 105). Participants in the traditional instruction group were instructed on reading and answering questions on text content. On the third day of testing, participants completed an immediate test which “employed four text passages with two main idea text structure passages and two compare-and-contrast text structure passages” (p. 105) and retold what they could remember from the passages. Lastly, participants recalled what they had read on the immediate test and answered open ended questions which made up the “delayed test” (p. 105). Data were analyzed using ANOVAs. Results show that the text-structure participants “outperformed” (p. 106) the traditional instruction participants on both the

“immediate and delayed tests” (p. 106). Strategies taught in the text strategy group “improved students’ reading comprehension, with significant improvement on delayed recall” (p. 115). Results of this study indicate that participants in the text strategy group had better “long term memory of science content” (p. 117) compared to participants in the traditional instruction group. Researchers conclude that text structure strategies are helpful for LD students in order to successfully comprehend expository texts.

In another study where researchers use an expository text about science, Kamalski, Sanders, and Lentz (2008) also conduct a study to examine the relationship between a readers’ prior knowledge of text content and comprehension of differing texts. Researchers investigate the “interaction between prior knowledge, coherence marking, and genre” (p. 328). Researchers conduct two experiments; however only Experiment 1 is relevant and discussed here. In Experiment 1, researchers assess the relationship of “linguistic coherence marking and prior knowledge” (p. 328) on comprehension of “informative texts and persuasive texts” (p. 328). Participants were 80 students from Utrecht University: 26 were History majors and 54 were Biology majors. Participants were grouped into two groups based on their results of the prior knowledge test: “low knowledge and high knowledge readers” (p. 330). Each participant read two texts, “one of which was implicit and the other explicit, one of which persuasive and the other informative, one of which on genetic manipulation and the other on organ donation” (p. 330). Coherence markings in the explicit text differed from coherence markings in the implicit text. After participants read the two texts, they answered comprehension questions based on the texts. ANOVAs were conducted to assess the effects of coherence marking and prior knowledge on text comprehension. Results from Experiment 1 show that readers with low prior knowledge performed better after “reading explicitly marked texts than after the implicit versions” (p. 331). Results also indicate that, on average, participants with high prior knowledge performed better on the comprehension test than participants with low prior knowledge. Overall, results also indicate that coherence markers do somewhat impact a reader’s comprehension processing during and after reading a text. Readers who do not have as much domain-specific prior knowledge about the text benefit from using certain coherence markings during comprehension processing.

In 2010, Braasch and Goldman (2010) examine “whether inconsistent effects of analogies in promoting new content learning from text are related to prior knowledge of the analogy *per*

se” (p. 447). Braasch and Goldman conduct two experiments; however only Experiment 1 is relevant and discussed in this review. In Experiment 1, researchers examine how participants learn from a text about El Nino and weather systems “as a function of the presence or absence of analogy in the text and level of prior knowledge of the analogy” (p. 451). Participants included 106 psychology college students with “low knowledge of weather systems” (p. 454). Participants completed the target domain-specific knowledge assessment which assessed their understanding of El Nino and weather patterns through a “26 true-false” (p. 454) test. Participants also completed a 10 question source domain test in which participants wrote a response to prompts. Participants were randomly sorted into two groups: the “analogy version” (p. 456) group and the “paraphrase version” (p. 456) group. In both groups, participants were given 40 minutes to read their assigned text about El Nino and had 30 minutes to write an essay about what they read. Lastly, participants completed a “sentence verification task” (p. 457) and demographic survey. Data were analyzed to produce results. Results show that “source domain [domain-specific] knowledge had a main effect on all measure of learning” (p. 462). Participants in the analogy group were “less likely” (p. 462) to “express misconception-based models” (p. 462) compared to participants in the paraphrase group. Overall, when participants had more prior knowledge of a “domain related to the target domain” (p. 462), participants provided stronger weather concepts in their essays and scored higher on the posttest compared to participants with lower prior knowledge.

In the study completed by Diakidoy, Mouskounti, and Ioannides (2011), researchers use an expository text about science to compare the “effects of a refutation text on comprehension and learning outcomes to those of a standard expository text” (p. 22). Specifically, researchers investigate the “effects of text structure” (p. 25) on students’ memory of the text, inferences, and “representation coherence” (p.25). Participants included 61 undergraduate psychology students. During the first session, participants completed the “energy knowledge pretest” (p. 29) comprised of 34 multiple choice questions to assess participants’ prior knowledge. A month later, participants met again and read their assigned text on energy. After reading, participants completed a “filler” questionnaire task and then the “cued recall task” (p. 29). Participants were asked to “write under each heading all they could remember from the information contained in the section” (p. 28) for the cued recall task. Three weeks later, participants completed the energy knowledge posttest consisting of two short answer questions and 26 multiple choice questions.

Preliminary analyses were conducted to determine the results of the pretest and posttest. The results indicate that the two groups “were compatible in terms of prior knowledge” (p. 29). A repeated-measures ANOVA and a MANCOVA were also conducted to produce the study findings. The results of the study show that the refutation text “increased over-all learning and the number of valid inferences generated in recall” (p. 32). Researchers also find that prior knowledge positively affected participant recall, learning, and inference making, while participants with low prior knowledge benefitted most from reading the refutation text.

In another study published in 2011, Kendeou, Muis, and Fulton (2011) conduct a mixed methodology study to investigate the “effects of epistemic beliefs and text structure using a think-aloud methodology” (p. 367). Researchers conduct two experiments; however only Experiment 1 is relevant and discussed in this review. Participants included 46 undergraduate students. Participants were tested individually for an hour and 40 minutes. To assess participants’ prior knowledge, participants answered 30 multiple choice questions about “kinematics, Newton’s first law, Newton’s second law, Newton’s third law, superposition, and kinds of force” (p. 368). Next, participants completed an “epistemic beliefs questionnaire” (p. 368) using a 5-point Likert scale that measured participants’ perceptions of “speed knowledge acquisition; the structure of knowledge; knowledge construction and modification; characteristics of successful students; and the attainability of truth” (p. 368). Participants read four texts; one text followed a “non-refutation structure” (p. 368), the other followed a “refutation structure” (p. 368), and the last two texts were experimental texts. Participants were instructed on how to think aloud and told to think aloud after reading each sentence. If participants had difficulty thinking aloud, the experimenter was permitted to prompt the participant. After reading each text, participants completed 10 math problems, which acted as the distractor task, and then recalled everything they could remember about the text. Mixed measure analyses of covariance (ANCOVA) were employed to produce results. The results show that participants “generated more text-based inferences in non-refutation than refutation texts” (p. 370). Participants with more “sophisticated epistemic beliefs” (p. 372), engaged in different processes, specifically “conceptual change processes” (p. 372) compared to participants with less sophisticated epistemic beliefs. Lastly, results suggest that participants’ knowledge and their beliefs about their own knowledge influence “various cognitive, meta-cognitive, motivational, and performance outcomes” (p. 378).

One year later, Cai and Lee (2012) conduct a qualitative study to investigate “strategies and knowledge sources that second language learners of English use to process unfamiliar words” (p. 122) and comprehend texts successfully. Participants included 20 Chinese college students majoring in English that were either “high proficiency” (p. 128) students or “low proficiency” (p. 128) students. While being individually tested, participants listened to nine science texts that were each 80 words in length. Researchers modified the texts by adding high frequency words and words to be inferred. After reading, participants were asked a set of questions about the words they may or may not have heard while listening to the text. Participants were asked if they knew the meaning of a particular word from the text and how they determined that meaning. Lastly, participants recalled everything they could remember from the text. A chi-square analysis was used to determine results. Results show that inferencing is the “primary strategy” (p. 134) that L2 participants used to process the unfamiliar words in the texts. Results also suggest that participants primarily use two knowledge sources: “semantics of words in the local text” (p. 137) and “semantics of the overall text” (p. 137). Participants use these knowledge sources to relate new science words and overall science meaning to their prior knowledge in order to comprehend the intended meaning of a science text.

In the most recently published study, Rydland, Aukrust, and Fulland (2012) conduct a mixed method study using an expository text about science to investigate the “contribution of word decoding, first-language (L1) and second-language (L2) vocabulary and domain-specific prior knowledge to L2 reading comprehension” (p. 465). Participants were 67 “bilingual fifth grade students” (p. 470) from two elementary classrooms in Norway. Participants first completed a prior knowledge test consisting of both multiple choice questions and open ended questions about Global Warming. Participants were “expected to have some degree of exposure to the subject” (p. 473) even though participants would not formally learn about Global Warming until sixth grade. Participants also completed formal assessments testing their word decoding skills and vocabulary knowledge. Next, participants read three different texts about Global Warming: “one narrative-based text, one peer letter to an editor, and one textbook extract gathered from two different science textbooks” (p. 473). Lastly, participants completed a comprehension reading test with text-based questions and inference-based questions. Researchers used multiple regression analyses to determine the results of the study. Results show that “prior knowledge seemed to play the most important role in the Global Warming test” (p. 478). Results also

indicate that “language-minority” (p. 479) participants may lack prior topic knowledge because of their “limited knowledge of the second language” (p. 479). In order for participants to have a high score on the prior knowledge test, participants needed to properly use their knowledge of key concepts. Overall, results show that prior knowledge appears to be the “strongest factor” (p. 479) that impacts successful text comprehension in the domain of science.

Expository Texts About Two or More Subject Domains

The following studies are sequenced below according to the year in which the study was published, from the earliest published year to the latest published year. The research studies discussed in this section used two or more expository texts from various subject domains. In the first study published in the 1980s, Marr and Gormley (1982) conduct a qualitative study to examine the “relationship between comprehension ability and prior knowledge in children’s recall” (p. 89). Participants included 33 fourth grade students varying in reading ability. Participants’ prior knowledge was assessed by examiners asking “test-based prequestions” (p. 93) that participants orally responded to. Next, participants orally read three familiar passages about “baseball, mosquitos, and apples” (p. 93) and three unfamiliar passages about “curling, aphid, and papaya” (p. 93). Participants orally recalled each passage immediately after reading. Lastly, examiners asked participants probe questions in order to “elicit responses to text segments omitted in retelling” (p. 93). Results were determined through a 3x2x3 factorial and analysis of variance. Results show that participants’ “topic familiarity has a significant effect on comprehension” (p. 101). Results also show that “comprehension ability and prior knowledge” (p. 101) impacted comprehension performance. Researchers conclude that there were three types of prior knowledge that impacted comprehension in this study: general knowledge, subtopic knowledge, and domain-specific knowledge. Overall, participants with high domain-specific prior knowledge comprehended the passage better than participants with low prior knowledge.

Three years later, Kuhara-Kojima and Hutano (1985) examine the “contributions of domain-specific content knowledge and general skills to the reading comprehension of texts” (p. 1) using a quantitative methodology. Researchers hypothesize that students with high domain-specific knowledge will comprehend texts better than students with low domain-specific knowledge. Participants included a total of 357 undergraduate students, 36 students majoring in

Engineering and 321 students majoring in Music. Participants were not given a prior knowledge test; however researchers predicted students in their specific major would possess prior knowledge of the specific content. First, participants read the music text silently for 10 minutes and then answered 15 multiple choice comprehension questions that assessed students' knowledge of the main idea of the story. Participants then answered four multiple choice questions that assessed students' knowledge of inferencing. Next, participants were given the engineering text to read and answer nine multiple choice comprehension questions and four multiple choice questions that assessed students' knowledge of inferencing. Lastly, participants completed the reading skills test in which they had to "judge plausibility" (p. 3) of discourses and statements. Data were analyzed using mean scores. Results show that it is more effective for participants to rely on domain-specific knowledge compared to relying on general reading skills when comprehending science texts. Results also suggest that "general reading skills made a significant contribution to reading comprehension for students who did not have content-specific [domain-specific] knowledge" (p. 7). Overall, participants with high domain-specific knowledge appeared to comprehend texts better than participants with low domain-specific knowledge.

In the first study published in the 1990s, Durham (1990) conducts a mixed methodology study to investigate whether altering the text structure of a passage and the "strength of readers' text schemas" (p. 2) impacts comprehension and recall. Participants included 104 undergraduate students majoring in various subjects. Researchers manipulated the structure of two passages: Story I was about breeding panthers and Story II about an uprising in Surinam. Participants were randomly assigned to "one of the six story conditions—story I news, story I narrative, story I expository, story II news, story II narrative, story II expository" (p. 18). Participants first completed a media-use survey and a demographics questionnaire. Next, participants read their corresponding group passage, recalled the passage after reading, and then answered comprehension questions. Lastly, participants completed the text schema test by unscrambling a text based on "three stories constructed according to prototypical narrative, news, and expository structures" (p. 19). Data were analyzed using one-way analyses of variance. Results support the researchers' hypothesis by showing that "story structure affects recall of story content" (p. 33). Results suggest that participants' "structural schemas" (p. 33) for narrative texts and expository texts were "significantly stronger" (p. 33) than their schemas for the news structure text. Results also show that participants' comprehension depended on participants' "connection with the

story's content" (p. 33) and schema strength. Successful inferencing was affected by participants' prior knowledge. Participants with high prior knowledge were better able to inference and comprehend the text than participants with low prior knowledge.

In the first study published in the 2000s, Tarchi (2010) uses an expository text about history and an expository text about science. Tarchi (2010) examines the "relationship between prior knowledge and reading comprehension of informative texts" (p. 416) using a mixed methodology. Participants consisted of 131 students in seventh grade from secondary schools in Florence, Italy. Participants "were assessed on different components of reading comprehension, with a main focus on prior knowledge" (p. 416). Tarchi closely examined the different types of prior knowledge that a reader has, such as "prior knowledge of domain [domain-specific], prior knowledge of topic: facts, and prior knowledge of topic: meaning" (p. 416-7). Participants' metacognition, semantic inferences, and lexical inferences were also assessed. Participants read two passages, one on Science and one on History. After reading, they answered 14 multiple choice questions and responded to open ended questions. Results of the study were produced through a "multiple linear regression analysis" (p. 417) of reading comprehension and prior knowledge components. The results indicate that "prior knowledge of meanings explained 50% of variance of the comprehension of a science text" (p. 418) and "prior knowledge of meanings explained 26% of the variance of the comprehension of a history text" (p. 418). Participants' prior knowledge and inference skills played an important role in the comprehension of both science and history texts. Results also indicate that participants' domain-specific knowledge impacts the "the comprehension of both texts" (p. 419). Tarchi finds that "the more facts the reader knows about a topic, the better he/she will understand a text concerning the topic" (p. 419). Therefore, results show that domain-specific prior knowledge has a direct effect on reading comprehension. Tarchi suggests that future researchers would benefit from examining how text structure, decoding skills, and motivation might also impact reading comprehension in conjunction with domain prior knowledge.

One year later, Chou (2011) conducts a qualitative a study to examine the "effects of vocabulary knowledge and background [prior] knowledge in an EFL reading comprehension test" (p. 108). Chou examines the factors of prior knowledge and vocabulary knowledge and how those factors affect certain students. Participants included 159 college students from Taiwan. A random generator was used to group participants into one of three groups: "Group A, the control

group; Group B, the background [prior] knowledge group; and Group C, the vocabulary knowledge group” (p. 111). Participants in the prior knowledge treatment group were given “background information about the topics” (p. 111) of “blood donating, the Forbidden City, and the Kodak Company” (p. 350) one week prior to taking the reading comprehension test. The vocabulary knowledge treatment group participants were given a worksheet “consisting of 30 vocabulary words chosen from the three selected passages in the reading comprehension test” (p. 111). On the day of the experiment, participants were given 45 minutes to complete the reading comprehension test which contained three reading passages and open ended questions. A one-way factorial ANOVA was used to determine results for this study. Results show that “vocabulary was significant in helping students understand the reading passages” (p. 113). Participants in the vocabulary treatment groups scored higher on their reading comprehension test when compared to other participants in the control group and prior knowledge group. Therefore, second language students with more vocabulary knowledge will likely be better “at decoding and guessing the meaning of the texts” (p. 113). When comparing results of the groups, researchers conclude that participants in the prior knowledge group might have been “only familiar with the topic but did not actually process any background [prior] knowledge such as terminologies and information” (p. 114) that would help participants make inferences. Therefore, researchers conclude that topic familiarity differs from prior knowledge and that prior knowledge should include vocabulary terms and other important information pertaining to the topic in order for a second language student to comprehend the text.

Expository Texts About Sports

The following studies are sequenced below according to the year in which the study was published, from the earliest published year to the latest published year. While some readers are able to recall many facts about science and history, the studies discussed in this section analyze how well readers can recall facts about sports. In the first study published in the 1970s, Spilich, Vesonder, Chiesi, and Voss (1979) also use an expository text about sports to investigate how a reader’s “previously acquired knowledge affects the processing of new domain related information” (p. 275). Researchers specifically investigate participants’ acquired knowledge on the setting of the game, the goals, and the actions that take place in the game of baseball.

Participants included 23 subjects with high knowledge of baseball and 23 subjects with low knowledge of baseball. Participants listened to “an account of a part of a fictional baseball game which they would be tested on later” (p. 279); then they were asked to summarize what they heard in a “one or two sentence summary” (p. 279). Next, participants were given 15 minutes to write down as much as they could remember about the account. Lastly, participants answered “40 completion questions” (p. 279) based on the spoken account. Results show that participants with low knowledge were able to attain a “reasonable knowledge of the goal structure” (p. 281). However, results also indicate that participants with high domain-specific knowledge recalled more about the account than those with low knowledge. High knowledge individuals also made fewer errors when recalling a particular player from the account. Therefore Spilich, Vesonder, Chiesi, and Voss are able to conclude that participants with higher knowledge about the specific domain of a text appear able to recall more on the account than those participants with low knowledge.

In the first study published in the 1980s, Levine and Haus (1985) conduct a quantitative study to investigate the effect of “background [prior] knowledge on reading comprehension of high school students of Spanish as a Foreign Language” (p.391). Participants were 203 high school Spanish students from three public schools located in Southern California. Participants were first instructed to read an “authentic text” (p. 392) which was a “450-word report of a Major League baseball game taken from the sports sections of *La Opinion*” (p. 392). After reading, participants completed a 12 question, multiple choice comprehension test consisting of explicit and implicit questions in Spanish. To assess the participants’ prior knowledge, participants also answered nine multiple choice questions that were written in English. Results of the nine item questionnaire determined whether students should be placed in the “high knowledge” (p. 393) group or the “limited knowledge” (p. 393) group. Results indicate that “high background [prior] knowledge will significantly affect students’ performance across both explicit and implicit questions types” (p. 396). Participants with high prior knowledge on baseball appear to answer both question types better than students with limited prior knowledge on the subject domain of baseball. Researchers suggest “that an important step teachers could take for improving reading” (p. 396) for students learning a second language is “to improve or use the students’ background [prior] knowledge of the topic to be read” (p. 396). Therefore, results indicate how prior knowledge is an important factor that affects reading comprehension.

In the first study published in the 1990s Stahl, Hare, Sinatra, and Gregory (1991) conduct a mixed methodology study that also uses an expository text about sports. Researchers investigate the specific interactions between factors of prior knowledge, vocabulary knowledge and comprehension ability of high school students. The researchers examine “the differential effects of prior knowledge and vocabulary difficulty on text comprehension” (p. 492). Participants consisted of 159 tenth graders from different areas in Long Island, New York. The target passage used was a “1,100 word column written about the retiring of Tom Seaver’s jersey number” (p. 493) taken from *The Sporting News*. To assess the participants’ vocabulary knowledge, participants completed the “Nelson Denny vocabulary subtest” (p. 493) and a checklist adapted from “Anderson and Freebody” (p. 494) to measure their knowledge of baseball terms. Researchers assessed participants’ interest in baseball by administering a questionnaire. Participants’ comprehension of this passage about baseball player Tom Seaver’s #41 jersey was evaluated using a “written free recall” (p. 494). In order to test the validity of the study, researchers performed a “confirmatory factor analysis” (p. 496). Results of the experiment indicate that vocabulary difficulty has a major effect on “microstructure tasks, in this case the recall of individual propositions” (p. 501). The results also indicate that participants with high prior knowledge are “better able” (p. 502) than participants with low prior knowledge about baseball “to infer an organization to those facts” (p. 502). As a result of this study, researchers suggest a “need to reconceptualize comprehension in terms of at least two separable subjects” (p. 504) on subject “involved with the processing of individual propositions and coordinating them into a coherent microstructure” (p. 504) and the other “involved with getting an overall idea or gist of the passage” (p. 504). Researchers further suggest these aspects may be helpful in “relating reader knowledge to different comprehension outcomes” (p. 504). Overall, results show that prior knowledge and vocabulary knowledge affect what and how much participants can comprehend from an expository text.

Four years later, Adams, Bell, and Perfetti (1995) examine “how reading skill and domain [domain-specific] knowledge effect comprehension” (p. 310). The participants in this study consisted of 32 boys in “grades 4 and 7” (p. 310). Two groups were formed based on results from the prior knowledge pretest: high knowledge group and low knowledge group. Participants completed the “word naming task” (p. 312) independently by reading 89 words one by one into a microphone. The words consisted of “one-syllable words” (p. 312), “two-syllable

words” (p. 312), and “football terms” (p. 312). Next, participants each read a “domain-general (control) text and a domain-specific (experimental) text” (p. 312). Participants read the texts from a computer screen and were able to advance through the text at their own speed. This procedure was done for researchers to “assess reading speed for each reader” (p. 314). Lastly, participants orally recalled what they could about each story as an examiner recorded the account. Analyses of variance were conducted to determine results for “comprehension measures, reading speed, and word naming” (p. 314). The results of this study show that “comprehending a domain-specific text is influenced by both specific knowledge and general reading skill” (p. 317). Thus, results indicate that level of domain-specific prior knowledge impacts how well a student is able to comprehend a domain-specific story. Results also show that students with high reading skills are better able to read the words from the word-naming test.

In the last study under review where researchers use an expository text about sports published in the 1990s; Recht and Leslie (1998) examine whether prior knowledge or reading expertise “had more effect on recall” (p. 16) and comprehension of expository texts about sports. The researchers investigated qualitative and quantitative differences of children’s memory and prior knowledge with “high versus low knowledge in a domain” (p. 16), specifically the domain of baseball. Participants included 32 seventh and 32 eighth grade students. Each participant completed a 42 multiple question pretest on baseball knowledge, read a passage that consisted of 625 words and answered questions based on the passage. Participants were given a five part practice test before silently reading the story about baseball. After silently reading, the participants were asked to move baseball figures around a “replica of a baseball field” (p. 17) to show that participants were able to reenact the actions described in the text. Participants also verbally summarized what happened in the text and were asked to sort “22 sentences on the basis of importance of ideas to the text” (p. 17). Recht and Leslie analyzed results using “equal-Ns multivariate analyses of variance (MANOVAS)” (p. 18). Verbal retelling results show that students with greater prior knowledge on the specific domain were able to “recall more information after reading” (p. 18). Participants with greater prior knowledge about baseball were able to summarize the text using correct information compared to readers with less knowledge. Overall, results indicate that level of domain-specific background knowledge does appear to impact how well readers can recall and summarize information after reading a domain-specific expository text.

Expository Texts About Animals

The following studies are sequenced below according to the year in which the study was published, from the earliest published year to the latest published year. The studies in this section focus on the effects of readers' prior knowledge related to comprehension of expository texts about animals. In the first spider-focused expository text study published in the 1970s, researchers Gordon, Hansen, and Pearson (1978) conduct a qualitative study to investigate the "influence of prior knowledge on comprehension" (p. 2). Researchers also assess the impact of implicit and explicit questions on a student's reading comprehension. Participants included 20 second grade students "who were reading approximately at or within one year above grade level" (p. 3). Participants were sorted into two groups based on scores from the prior knowledge test about spiders: 10 participants were placed in weak prior knowledge group, 10 participants were placed in the strong prior knowledge group. Next, participants individually read a "basal reader selection on spider" (p. 4). After reading, the examiners orally read the "12 posttest questions (6 textually explicit and 6 textually implicit)" (p. 4) to each participant. Participants orally responded to the questions and their responses were later scored. Researchers analyzed the data to find the results of the study. Results show that the "background experiences readers bring to a selection affect the depth to which they can understand it" (p. 6) that selection. Results also show that students with high prior knowledge were able to answer implicit questions more successfully compared to participants with weak prior knowledge.

In the second study where researchers use an expository text about animals published in the 1970s, Pearson, Hansen, and Gordon (1979) investigate "the role that background [prior] knowledge plays in determining young children's ability" (p. 201) to comprehend facts that are explicitly stated in the text "in comparison to those that are only partially specified by the same text" (p. 201). In the first experiment, the participants were 20 second grade students that had the highest and lowest scores from "a test on knowledge about spiders" (p. 203). Over a one week period, participants completed eight pretest questions that examined the participants' background knowledge on spiders before they read a "basal reader selection on spiders" (p. 203) that had been modified by the researchers. At the end of the next week, participants answered six implicit questions about the text and six explicit questions. The participants in the "strong schema group performed significantly better than the weak schema group" (p. 205). Results also indicate that

implicit questions were “tougher” (p. 205) to answer than explicit questions. In the second experiment, the participants were 20 second grade students that were reading at grade level. The same passage from experiment one was used and “rewritten in two forms” (p. 206). Ten questions were developed “such that the five that were textually explicit in Form 1 would be scriptually implicit in Form 2 and vice-versa” (p. 206). Results from experiment two indicate that question type “had a main effect” (p. 206) on participant responses. Results also indicate that “comprehension of textually explicit information is easier than comprehension requiring textual information and prior knowledge” (p. 207). Overall, participants with a well-developed background knowledge on the topic were able to answer more questions correctly than the other group.

In the first study published in the 1980s, Lipson (1982) examines the “relationship between prior knowledge and children’s comprehension of expository text” (p. 246) in this qualitative study. Lipson examines whether the “type” of comprehension item (attribute inference, goal inference, event inference, and casual inference) has a significant impact on post reading recall and if prior knowledge influences the number of items recalled. There were 28 elementary students who participated in this study. To determine the participants’ prior knowledge on the topic of spiders, the first session consisted of researchers reading sentences about which the participant was asked to determine if the sentence were true or not. One week later, participants were given eight expository passages to read orally. After reading each passage, participants sequenced pictures based on the text, selected the “best answer” (p. 249) to six paired sentences, and answered question cards presented by the researcher. Participants were also asked to “tell everything that he or she could remember about the passage” (p. 249) just read. Post-reading recognition, question type difficulty, and the effects of prior knowledge on acquisition of new information were analyzed to determine the results of the study. Results find that “the type of comprehension item was a significant factor in post-reading accuracy” (p. 256) and inference questions were more difficult for subjects to answer than explicit questions. Results also indicate that if a reader “does not generate inferences from text while reading, inference statements will not be effective retrieval cues at post testing” (p. 256). Lipson’s study also finds that recognition and recall are affected by the participants’ domain-specific prior knowledge. Overall, this study has found that a correct response on the post test was affected by a participant’s prior knowledge and familiarity of the topic.

One year later, Smith, Readence, and Alvermann (1983) investigate the relationship of activating a reader's prior knowledge with textual consistency. Researchers examine the following question: "what differences exist in students' ability to comprehend text information when faced with either consistent or inconsistent text under activation or non-activation conditions?" (p. 3). For researchers to assess participants' prior knowledge, participants were grouped into an "activating group" (p. 4) and a "non-activating group" (p. 4). Participants in the activating group wrote on a "dual sided activation protocol" (p. 4) card about what they knew about the topic of the text, "*How Insects and Birds Adjust to Their Environment*" (p. 4). Participants in the non-activating group wrote on a "dual sided activation protocol" (p. 4) card what they knew about volcanoes, a topic that did not relate to the text. Participants were then given four minutes to read the 205 word passage that was either "consistent or inconsistent" (p. 4). After reading, participants were instructed to accurately recall what they remembered about the passage. Lastly, participants "were allotted six minutes to complete" (p. 5) the multiple choice comprehension test. A two-way analysis of simple effects shows that participants in the activating group reading the consistent text type "recalled significantly more information" (p. 6). Results also indicate that participants who activated their domain-specific prior knowledge "let that knowledge enter into their textual procession and did allow that knowledge to take precedence over textual information that was inconsistent with it" (p. 8). Results show that students who activate their prior knowledge and read the consistent type of text comprehended more of that text than participants in the other groups.

Multiple Factors that Impact Expository Comprehension

While the previous sections of this review have examined studies according to text domain and the impact of the individual factor of prior knowledge on the comprehension of domain-specific texts, the studies in this section focus on the impacts of multiple factors during the reading comprehension process. The following group of researchers examine multiple factors that may impact text comprehension; these include a variety of types of prior knowledge such as linguistic knowledge and word knowledge, and structural components of a text itself. Some of these researchers also conduct studies that compare the comprehension process in different age

groups and gender groups. The following studies are sequenced below according to the year in which the study was published, from the earliest published year to the latest published year.

In the first study published in the 1980s, Stevens (1980) conducts a quantitative study to examine the effect of prior knowledge “on the reading comprehension of 108 ninth graders of varying reading ability levels” (p. 151). To begin this study, a researcher read the knowledge assessment containing a topic passage and four multiple choice questions to the students. While the students listened to the passage and questions, the students marked on their own copy of the text what they felt were the correct answers to the questions. If participants answered all of the multiple choice questions correctly, they were grouped into the high knowledge group, and if they did not answer the questions correctly, participants were placed in the low knowledge group. Next, each participant read two passages silently and answered multiple choice questions based on the text. Data were analyzed using a “repeated measures, split-plot ANOVA” (p. 152). Results indicate that prior “knowledge was a significant factor for all ability groups” (p. 152). Participants with high domain-specific prior knowledge were able to comprehend the story better than students with low domain-specific prior knowledge. Stevens also concludes that the results of the experiment “provide support for the notion of previously possessed schemata as a crucial component in the comprehension process” (p. 152). Results indicate that “one major step in improving reading is to improve prior knowledge of the topics being read” (p. 153). Overall, students may likely benefit from teachers who help students activate their prior knowledge before reading and help the students build their schema.

Four years later, Englert and Hiebert (1984) conduct a study to examine “the effects of four major types of expository text on the comprehension performance of children” (p. 65). Participants included 76 third grade students and 70 sixth grade students ordered “into three ability groups of high-, medium-, and low- ability” (p. 67). Researchers first went over the test sample and item choices with participants. For the third grade participants, researchers read aloud the items while the students followed along on their own copy, but the sixth grade participants read the items silently. Participants were then presented with the four text structure measures: “comparison/contrast, description, enumeration, and sequence” (p. 67). Each item also contained a “target and distractor statement” (p. 68). Participants rated the statements on their “degree of fit” (p. 68) using a scale from 1 to 4. A multivariate analysis of variance (MANOVA) was used to produce results. Results show that students “who were more in tune to the various

text structures performed significantly better” (p. 71) on reading comprehension components compared to students “who were not attuned to these structure” (p. 71). Results also show that sixth grade students were better able to detect text structure “mismatches” (p. 71) than third grade students. Third grade students were not able to distinguish the relevance of the targets or distractors and rated these as “belonging in the paragraph” (p. 71). All participants struggled with the “description and comparison/contrast” (p. 71) tasks. These findings suggest that “from third grade to sixth grade, children made the greatest gains in their acquisitions of the description text structure” (p. 71). Lastly, researchers conclude that prior knowledge and interest appeared to play an important role in performance, “particularly those of younger or low-ability children” (p. 72). Overall, these results suggest that text structure knowledge “aids” (p. 72) comprehension.

One year later, Baldwin, Peleg-Bruckner, and McClintock (1985) also determine whether boys and girls differ when comprehending texts they already have an interest in. Participants included 41 seventh and eighth grade students. On the first day of the study, participants “completed the interest inventory” (p. 500) and on day two participants completed their prior knowledge test. The results of the interest inventory and prior knowledge test “were standardized within each subject in order to identify for each subject the passages and comprehension test” (p. 500) which fit under four conditions of HH (high prior knowledge/high topic interest), LL (low prior knowledge/low topic interest), HL (high prior knowledge/low topic interest), and LH (low prior knowledge/high topic interest). Next, participants read four different passages: first reading a passage and then completing a comprehension test “corresponding to the four experimental conditions” (p. 501). On the final testing day, participants were given three different comprehension tests without first reading the corresponding passage. Researchers did this to show that “comprehension tests were largely passage dependent” (p. 501). An analysis of variance (ANOVA) was conducted to produce results. Results show that “comprehension was significantly better for passages with high prior knowledge” (p. 501) and high topic interest compared to those with low prior knowledge and low topic interest. Results also show that boys scored higher on comprehension than girls. Overall, “prior knowledge and topic interest are autonomous factors in reading comprehension” (p. 502); however researchers found one limitation to the study. Baldwin, Peleg-Bruckner, and McClintock only examined participants who read above average; therefore, the study does not show the “effects of topic interest and prior knowledge on comprehension for below average readers” (p. 503). Although this study is

from 1985, no further studies by these researchers with “below average readers” have been found.

One year later, Lee (1986) examines the relationship between “three components of background [prior] knowledge” (p. 350) and L2 (second language) readers. The 32 third-year undergraduate participants studying Spanish grammar were assigned to “one of the four treatment conditions: 1) context-transparent; 2) context-opaque; 3) no context-transparent; and 4) no context-opaque” (p. 350). Instructions were read in the students’ native language of English. Participants were then told they would have to read two passages in Spanish and then recall what they read. Some participants were presented with the title of their passage and a picture; others were not. After reading, participants wrote down in English what they could recall about the Spanish texts. Participants’ written recalls were scored to either correspond to “individual (simple) sentences, basic semantic propositions, or phrases” (p. 351). A “three way ANOVA” (p. 351) was conducted to show the results of this study. Results indicate that the “only significant main effect was for context (presence or absence of a title and picture page)” (p. 351-52). However, Lee also concludes that the three components of prior knowledge (context, transparency, and familiarity) play some role in the way Spanish learners “read, comprehend, and recall passages” (p. 352). Participants’ recall appears to be enhanced when they receive the title of the passage and pictures, which indicates that students may have used their prior semantic knowledge and semantic context knowledge to comprehend the passage.

In the first study published in the 1990s, Moravcsik and Kintsch (1993) examine the relationship between students’ domain-specific knowledge, reading skills, the structure of the text and comprehension of a text. Researchers manipulated the texts to create a “good and a poor version” (p. 364). Participants were 103 students from the University of Colorado. Participants listened to three different texts; one text was “presented in the poor version, the others were in the good version” (p. 365). After listening to the texts, participants completed a comprehension test consisting of “eight passages with comprehension questions following each passage” (p. 365). Lastly, participants were asked to recall everything they could about each passage they listened to. Data were analyzed to determine the results of the study. Researchers found that “high-knowledge subjects recalled the experimental passages better than low-knowledge subjects” (p. 369). Researchers also found that domain-specific knowledge helped participants reach a “deeper level of understanding” (p. 369) when comprehending the texts. The texts

versions also impacted how well participants comprehended the text. Participants with low domain-specific knowledge and a poor version of the text did not comprehend as well as participants with high domain-specific knowledge and a good version of the text.

Two years later, Rupley and Willson (1995) examined using a mixed methodology, the “contributions of phonemic knowledge, prior knowledge, and listening comprehension to the reading comprehension” (p. 3) of students in an age range of six to 12 years. Researchers also investigate how word features, prior knowledge and listening comprehension affect a reader’s comprehension at “various stages of learning” (p. 7). To determine the differences in reading development and instructional strategies, 1200 participants were grouped into three age groups: “6 and 7 year olds, 8 and 9 year olds, and 10 through 12 ½ year olds” (p.7). Researchers measured participants’ phonemic knowledge and used the “Faces and Places subtest” (p. 9) to measure each participants’ prior knowledge (domain specific). To determine the participants’ listening comprehension skills, the participants named the person, object, or concept being described by the examiner. Reading comprehension was assessed by using a comprehension subtest in which the participants gave a “gestural response to comprehension questions” (p. 10). A planned regression was conducted to show results of the study. Results for the 6-7 year age group show that phonemic knowledge (40%) and prior knowledge (35%) were the largest contributors of “approximately 81% of the reading comprehension variance” (p. 12). The 8-9 year age group results show that prior knowledge “assumed a much larger role” (p. 12) than phonemic knowledge and listening comprehension. Results for the 10-12 year age group indicate that listening comprehension was the most important variable for reading comprehension at this age. Results of this study show that both phonemic knowledge and prior knowledge play an important role in helping younger readers comprehend a text; however, as children get older, listening comprehension appears to play a role of “increasing importance“ (p. 13) in expository text comprehension.

One year later, Rupley and Willson (1996) examine “background [prior] knowledge and strategy knowledge from a broad view to better understand how they contribute to elementary age students’ reading comprehension of both narrative and expository texts” (p. 419). Researchers examine what may contribute to prior knowledge that might impact a reader’s comprehension. These contributors include content knowledge, domain-specific knowledge, word knowledge, and strategy knowledge. The researchers proposed that “background [prior]

knowledge and strategy knowledge operate differently” (p. 421) at varying elementary levels, and that in upper elementary grades, students’ prior knowledge for comprehension would be replaced by strategy knowledge for the reading process. Participants included 590 elementary students. Participants completed diagnostic tests that assessed “background content, domain [domain-specific], vocabulary, and strategy knowledge of how to read the text and what to read from the selected text” (p. 421-22). After participants read “both narrative and expository passages of 1000 to 2000 words (2-4 pages) in length” (p. 423), participants completed a 25-item comprehension test. Researchers used a factor analysis to determine the results of the study. Results show “only literal comprehension levels at both sentence/paragraph and text levels” (p. 429) were present in all grades, while inferential comprehension for expository texts was present only in fifth grade. The analyses show that domain-specific prior knowledge appears to diminish around the fourth grade level. These results indicate that prior knowledge may not always play an important role at every level of reading development. However, results do show that in some elementary grades, comprehension knowledge was a result of the readers’ domain-specific prior knowledge as well as the readers’ strategies they bring to the text.

In the first study published in the 2000s, Meneghetti, Carretti, and De Beni (2007) conduct a mixed method study to investigate “whether the reading comprehension process is better explained by a single or by multiple factors” (p. 291). Researchers examine the multiple components of reading comprehension by analyzing the “unity or distinctiveness of reading comprehension and the relationship between different components of reading comprehension and scholastic achievement” (p. 293). Participants numbered 184 children between the ages of nine and 13. Participants were given “a battery of 10 tasks” (p. 293) that measured the different aspects of reading comprehension. Each task consisted of “one or two passages and 15 questions requiring both a multiple choice answer and a short open answer” (p. 294). The ten tasks included analysis of Characters, Time and Events (CTE), Events and Sequences (ES), Syntactic Structure (SS), Connections between parts of the text (CON), Inferences (INF), Text Sensitivity (TS), Text Hierarchy (TH), Mental Model (MM), Text Flexibility (TF), and Errors and Inconsistencies (EI). Each participant was told to read the texts silently and answer the questions. A Kurtosis Index was calculated to identify the results of the study. The results indicate a distinction between “basic components” (p. 296) of reading comprehension and “more complex and demanding components (p. 296). A regression analysis was also conducted to analyze

scholastic achievement. Scholastic achievement is “better predicted by the latent factor referring to the more complex aspects than by measuring the basic aspects of reading comprehension” (p. 299). Results of this study also indicate that “text sensitivity” (p. 299) (*i.e.* identification of title and text genre), and “text flexibility” (p. 299) (*i.e.* students reflect on strategy use during reading) were the best predictors of scholastic achievement. These results highlight the “fundamental role of metacognition in facilitating learning” (p. 299). According to these researchers, reading comprehension instruction should focus on both the “basic and complex aspects, since these aspects result in specific consequences to scholastic performance” (p. 299). These results also suggest that students would benefit from educators who incorporate activities on text sensitivity and text flexibility into their lessons.

One year later, Best, Floyd, and McNamara (2008) investigate the “influences of reading decoding skills and world knowledge on third graders’ comprehension” (p. 137) of both expository and narrative texts. The researchers define world knowledge for expository texts as “the integration of the textbase with the reader’s knowledge about the text’s subject matter” (p. 139). Participants included 61 third grade students from two metropolitan elementary schools. First, participants silently read a text “within a 5-minute period” (p. 145). Half of the participants read a narrative text and the other half read an expository text. For each text, text complexity was determined by the number of words and sentences that made up the text. Next, participants completed the free recall task in which students orally discussed what they remembered from the text. Participants also completed the cued recall task “which assessed major themes in the text” (p. 143) and answered 12 multiple choice questions about the text. Lastly, participants completed the Woodcock Johnson III ACH “battery of reading competency tasks” (p. 145). A “proposition-based analysis” (p. 146) and “within-subjects ANOVAs” were conducted to produce results from the study. Results indicate participants are able to comprehend narrative texts “more successfully than expository texts” (p. 152). Also, world knowledge and decoding skills have “differential importance during the comprehension” (p. 152) of narrative and expository texts. The most significant results indicate that successful comprehension of expository texts appears to be influenced by “the level of readers’ prior knowledge” (p. 153). Therefore, researchers conclude that students with “less prior knowledge will struggle” (p. 153) with the comprehension of expository texts. Researchers suggest that students would likely benefit from learning strategies that help them “integrate information in a text with their prior knowledge” (p. 154).

In another study published in the 2000s, McNeil (2011) investigates the “contributions of background [prior] knowledge and reading comprehension strategies to reading comprehension” (p. 883) of L2 (second language) students. McNeil examines which factors contribute to L2 reading comprehension. Participants included 20 college English Language Learners randomly sorted into two groups. The study took place over ten days and “included three stages” (p. 893). During the first stage, participants completed a prior knowledge pretest consisting of “six questions about one topic” (p. 890). During the second stage, participants read about marriage, family, and the home in the “preliminary text” (p. 893) and answered questions after reading. In the third stage, participants were presented with 90 minutes of instruction on self-questioning. After instruction, participants created “six self-questions” (p. 894) while reading the second text. Lastly, participants completed six comprehension questions and a follow up questionnaire. Results were found through multiple regression analyses. Results show that “background [prior] knowledge and self-questioning combined to account for 56.7% of L2 reading comprehension variance” (p. 897). Researchers conclude that self-questioning “accounted for most of the explained variance in comprehension” (p. 898) because of the 90 minute instructional session. Results show the “potential of reading comprehension strategies in improving the explanatory power of current L2 reading models” (p. 899). Overall, researchers found that self-questioning strategies and background information help L2 learners comprehend a text.

The above studies examine the combination of multiple factors that may impact expository comprehension, particularly the factors of prior knowledge, text coherence structure, and text written quality. Another factor to impact text comprehension is prior knowledge of hypertext structure. Muller-Kalthoff and Moller (2006) “test how domain-specific prior knowledge affects learning outcomes and perceived disorientation when a two-part hypertext learning environment is presented” (p. 186). Participants were 36 students from the University of Bielefeld, Germany. Participants were randomly assigned to one of the two experimental groups: the “free browsing condition” (p. 189) group and the “reduced browsing condition” (p. 189) group. Participants in the free browsing group had access to the entire hyperlink, whereas participants in the reduced browsing group were only given access to one part of the hyperlink. Participants first completed a prior knowledge pretest consisting of 12 multiple choice questions. Next, participants completed a questionnaire using a scale to determine their “computer experience, self-concept of computer related ability, subject-related interest, and learning

strategies” (p. 190). Participants then had 30 minutes to navigate “through the hypertext” (p. 190). All navigation through the hypertext was “recorded by the computer” (p. 190) to help researchers determine the results of the study. Lastly, participants answered 12 multiple choice questions that made up the comprehension posttest. Correlation analyses, means, and standard deviations were used to determine the results of this study. Researchers found that there is a “strong positive” (p. 191) correlation between “prior knowledge and the variables of factual and structural knowledge” (p. 191). Participants with high prior knowledge scored significantly “better” (p. 194) on “retaining facts and understanding content than participants with low prior knowledge” (p. 194). Results also indicate that participants’ “deeper-level comprehension” (p. 194) was “affected by browsing conditions and prior knowledge” (p. 194). Based on the results of this study, researchers suggest teachers give more support to students who have low prior knowledge with the use of hyperlinks and hypertexts.

Summary of the Review

This literature review examines the topic of the relationship between readers’ prior knowledge and comprehension of expository texts. The categories resulting from an initial review of the data are expository texts about social studies, expository texts about science, expository texts about two or more subject domains, expository texts about sports, expository texts about animals, and multiple factors that impact expository comprehension. A total of 50 studies were found that address this research question. These studies serve as the data for this research study and are analyzed in the next chapter.

Chapter 3: Methodology

Data Collection

The problem addressed by this research study is the increasing demand for better comprehension of expository texts. One reading skill which increases comprehension is activation of prior knowledge (Harvey & Goudvis, 2007). Having a greater understanding of how prior knowledge is important for students' comprehension of expository texts, of how to help students "activate" their own prior knowledge, and how to help build prior knowledge when theirs is lacking will add to a teacher's collection of "tools" for assisting students to develop their skill for reading challenging and complex expository texts. This problem can be addressed by asking the question, what is the relationship between readers' prior knowledge and comprehension of expository texts? An extensive literature review was used to synthesize information and answer the research question. The data for this study are published research studies that have ties to the topic and question. The most relevant studies were found using various online databases, and then sorted into categories relevant to the question. Once data were collected, the analysis began, and is described in detail in the next section.

Data Analysis

To begin, all collected studies were analyzed and coded to determine categories, codes, and themes for the data. Studies within each category were then analyzed and synthesized to produce new findings. Findings from each category were then further synthesized to produce results related to the research question for this study. The remainder of this section details the analysis process and the results.

The first category reviewed is research studies that use social studies expository texts in their methodology. Of the nine studies found, the majority were published in the 2000s (Priebe, Keenan, & Miller, 2012; Miller & Keenan, 2009; Jeong & Kim, 2009; Garth-McCullough, 2008; Shapiro, 2004); however, a few articles were published in the 1980s (Stahl & Jacobson, 1986; Carr, Dewitz, & Patberg, 1983). The fact that only two studies (McKeown, Beck, Sinatra, and

Loxterman, 1992; Carr, 1991) were found for research in the 1990s indicates a possible movement away from a focus on expository texts about social studies but a return to them a decade later. One study (Jeong & Kim, 2009) using participants that were in college or beyond is included in this research review because it aimed to determine how age and its developed prior knowledge impact comprehension of social studies focused expository texts. Results show that information recall performance “declined with age” (Jeong & Kim, 2009, p. 923). Findings from the other eight studies that used elementary-aged participants show that comprehension is impacted by reader domain-specific prior knowledge (Priebe, Keenan, & Miller, 2012; Garth-McCullough, 2008; Carr, 1991), by reader reading skills and strategies (Miller & Keenan, 2009; Stahl & Jacobson, 1986; Carr, Dewitz, & Patberg, 1983), and by the structure of the text itself (Shapiro, 2004; McKeown, Beck, Sinatra, & Loxterman, 1992). One study (Carr, Dewitz, & Patberg, 1983) using sixth grade students specifically shows that readers’ prior knowledge and inference strategies are essential to improving readers’ comprehension of expository texts in the domain of social studies. Prior knowledge and inference strategies also assist learning disabled middle school students (Carr, 1991). Results also show that participants who were familiar with the passage topic were able to answer more comprehension questions correctly compared to participants who were less familiar with the passage topic (Carr, 1991).

The second category reviewed is research studies that use science expository texts in their methodology. Of the 16 studies found, 12 studies were published in the year 2000 and later (Cai & Lee, 2012; Rydland, Aukrust, & Fulland, 2012; Diakidoy, Mouskounti, & Ioannides, 2011; Kendeou, Muis, and Fulton, 2011; Chou, 2011; Braasch & Goldman, 2010; Tarchi, 2010; Kamalski, Sanders, & Lentz, 2008; Gaddy, Bakken, & Fulk, 2008; Kendeou & VanDenBroek, 2007; O’Reilly & McNamara, 2007a; O’Reilly & McNamara, 2007b; Samuelstuen & Braten, 2005; McNamara, 2001); however, a few articles were published in the 1990s (Alexander, Kulikowich, & Schulze, 1994; Alexander & Kulikowich, 1991; Schiefele, 1990; Durham, 1990). The fact that only three studies (Kuhara-Kojima & Hutano, 1985; Taft & Leslie, 1985; Marr & Gormley, 1982) were found for research in the 1980s indicates a possible movement away from a focus on expository texts about science but a return to them a decade later and then continued in the 2000s. Data indicate the current trends in science education in the year 2000 and above placed an emphasis on learning science by engaging in the type of science “real” scientists conduct (O’Reilly & McNamara, 2007b). Findings from the majority of studies that used high

school-aged or college-aged participants show that comprehension is impacted by reader domain-specific prior knowledge (O'Reilly & McNamara, 2007a; Samuelstuen & Braten, 2005; McNamara, 2001; Alexander, Kulikowich, & Schulze, 1994; Schiefele, 1990), and by reader reading skills and strategies (Cai & Lee, 2012; Braasch & Goldman, 2010; O'Reilly & McNamara, 2007b; Samuelstuen & Braten, 2005). The level of prior knowledge a reader has positively impacts the comprehension of science expository texts (Taft & Leslie, 1985). One study (Kendeou & Broek, 2007) specifically found that participants recall and acquire more information from a text when they have and use both domain-specific prior knowledge and prior structural (text structure) knowledge. Findings from studies that used different text types, including high and low coherence texts, show that reader text structure knowledge impacts comprehension (Kendeou, Muis, & Fulton, 2011; Kamalski, Sanders, & Lentz, 2008; Gaddy, Bakken, & Fulk, 2008; Kendeou & VanDenBroek, 2007). These results indicate, as one study (McNamara, 2001) specifically found, that participants with high text structure knowledge learn more from low coherence texts because participants are more likely to generate knowledge based on inference while reading that type of text. Specifically, text structure strategies are helpful for LD college students in order to successfully comprehend expository science texts (Gaddy, Bakken, & Fulk, 2008). Results also indicate that interest in the topic combined with domain-specific prior knowledge positively impacts comprehension of science expository texts (Alexander, Kulikowich, & Schulze, 1994; Schiefele, 1990). One study (Alexander & Kulikowich, 1991) using sixth grade students specifically shows that both forms of knowledge, domain-specific knowledge and analogic knowledge or interactive knowledge, are necessary in the comprehension of science texts. Data also indicate that inferencing is the "primary strategy" that L2 college students used to process the unfamiliar words in the texts (Cai & Lee, 2012). Two knowledge sources "semantics of words in the local text" and "semantics of the overall text," are used by L2 students to relate new science words and overall science meaning to their prior knowledge in order to comprehend the intended meaning of a science text (Cai & Lee, 2012).

Five studies that use two or more subject domain expository texts in their methodologies were reviewed in the third category. The years in which these studies were published varied and do not seem relevant to the findings. The fact that there were only five studies that used two or more subject domain expository texts indicates the lack of published research that use multiple

expository texts in their methodology. Within these studies, instructional methods used with participants varied to assess how instruction impacts participants' comprehension of a text. Vocabulary instruction was significant in one study (Chou, 2011) for helping students understand the reading passage. Findings from four studies that used college-aged participants show that comprehension is impacted by domain-specific prior knowledge and general knowledge (Kuhara-Kojima & Hutano 1985; Marr & Gormley, 1982), by prior vocabulary knowledge (Chou, 2011), and by the structure of the text itself (Durham, 1990). Findings from the one study (Tarchi, 2010) that used seventh grade participants show that the more facts the reader knows about a topic, the better he/she will understand a text concerning the topic. Results also indicate that comprehension of expository texts with two or more subject domains is impacted by the combinations of three types of prior knowledge: general knowledge, subtopic knowledge, and domain-specific knowledge (Marr & Gormley, 1982). The combination of domain-specific prior knowledge and inferencing strategies also positively impacts the comprehension of expository texts with two or more subject domains (Durham, 1990).

The fourth category reviewed is research studies that use sports expository texts in their methodology. Of the five studies found, two studies were published in the 1980s and earlier (Levine & Haus, 1985; Spilich, Vesonder, Chiesi, & Voss, 1979); however, three studies were published in the 1990s (Adams, Bell, & Perfetti, 1995; Stahl, Hare, Sinatra, & Gregory, 1991; Recht & Leslie, 1998). The fact that no studies were found for research in the 2000s indicates a possible movement away from a focus on expository texts about sports. One study (Adams, Bell, & Perfetti, 1995) using only male participants is included in this research review because it aimed to determine whether gender-specific prior knowledge and reading skill impact comprehension of sports focused expository texts. Results show that domain-specific prior knowledge and reading skill impacts how well a student is able to comprehend a domain-specific story (Adams, Bell, & Perfetti, 1995). One study (Spilich, Vesonder, Chiesi, & Voss, 1979) where participant gender is not considered is included in this research review because the results appear to be significant to research studies that use sports expository texts. Results show that participants with low domain-specific prior knowledge were still able to attain "reasonable knowledge of the goal structure" (Spilich, Vesonder, Chiesi, & Voss, 1979, p. 281) for the domain of baseball. Findings from the other three studies that used middle school-aged and high school-aged participants show that comprehension is impacted by reader domain-specific prior

knowledge (Recht & Leslie, 1998; Levine & Haus, 1985), and by reader domain-specific prior vocabulary knowledge (Stahl, Hare, Sinatra, & Gregory, 1991). One study (Stahl, Hare, Sinatra, & Gregory, 1991) using high school participants specifically found that the combination of sports related domain-specific prior knowledge and vocabulary knowledge positively impacts the comprehension of sports expository texts. Results also show that specific knowledge combined with general reading skill and the level of domain-specific prior knowledge impacts how well an elementary student is able to comprehend a domain-specific story (Adams, Bell, & Perfetti, 1995).

The fifth category reviewed is research studies that use animal-topic expository texts in their methodology. Of the four studies found, two studies were published in the 1970s (Pearson, Hansen, & Gordon, 1979; Gordon, Hansen, & Pearson, 1978) and two studies were published in the 1980s (Smith, Readence, & Alvermann, 1983; Lipson, 1982). The fact that no studies were found for research in the 1990s and 2000s indicates a possible movement away from a focus on expository texts about animals. One study (Smith, Readence, & Alvermann, 1983) using participants that were not discussed is included in this research review because it aimed to determine how activating reader domain-specific prior knowledge and text type impacts comprehension of animal focused expository texts. Results show participants in the activating group reading the consistent text type “recalled significantly more information” (Smith, Readence, & Alvermann, 1983, p. 6). Findings from the other three studies that used elementary-aged participants show that comprehension is impacted by reader domain-specific prior knowledge (Lipson, 1982; Gordon, Hansen, & Pearson, 1978) and by the type of comprehension question asked (Hansen & Gordon, 1979). Results indicate that question type “had a main effect” on participant responses (Hansen & Gordon, 1979, p. 206). Implicit questions were “tougher” to answer than explicit questions (Hansen & Gordon, 1979, p. 205; Gordon, Hansen, & Pearson, 1978). Results indicate that the combination of elementary students’ inferencing strategies, domain-specific prior knowledge, and topic familiarity positively impacts the comprehension of animal expository texts (Lipson, 1982).

Eleven studies that examine multiple factors at once that may impact text comprehension explored prior knowledge in combination with phonemic knowledge (Rupley & Willson, 1995) and with student interest (Englert & Hiebert, 1984). Of the 11 studies found, the majority of studies were published in the 1990s and 2000s (McNeil, 2011; Best, Floyd, & McNamara, 2008;

Meneghetti, Carretti, & De Beni, 2007; Muller-Kalthoff & Moller, 2006; Rupley & Willson, 1996; Rupley & Willson, 1995; Moravcsik & Kintsch, 1993); however, a few articles were published in the 1980s (Lee, 1986; Baldwin, Peleg-Bruckner, & McClintock, 1985; Englert & Hiebert, 1984; Stevens, 1980). The fact that only a few studies were found for research in the 1980s may indicate that the concept of prior knowledge and its impact on comprehension was not considered as a research area until the mid 1990s. One study (Muller-Kalthoff & Moller, 2006) using a hypertext is included in this research review because it intended to determine how college-aged participants' prior structural knowledge of a hypertext impacts comprehension. Results show there is a "strong positive" correlation between prior knowledge and the variables of factual and structural knowledge and comprehension of a hypertext (Muller-Kalthoff & Moller, 2006, p. 191). Findings from the other three studies that used college-aged participants show that comprehension is impacted by reader domain-specific prior knowledge including context components, transparency components, and familiarity components (Moravcsik & Kintsch, 1993; Lee, 1986), by reader self-questioning strategies (McNeil, 2011), and by the structure of the text itself (Moravcsik & Kintsch, 1993). One study (McNeil, 2011) using L2 college aged participants found that the combination of self-questioning strategies and domain-specific prior knowledge help L2 learners comprehend an expository text. Results from the studies that used middle school-aged and high school-aged participants show that comprehension is impacted by reader domain-specific prior knowledge and interest (Baldwin, Peleg-Bruckner, & McClintock, 1985; Stevens, 1980), and by text sensitivity (*i.e.* identification of title and text genre); and text flexibility (*i.e.* students reflect on strategy use during reading) (Meneghetti, Carretti, & De Beni, 2007, p. 299). One study (Rupley & Willson, 1995) using various elementary-aged participants is included in this research review because it aimed to determine how age and its developed prior knowledge impact comprehension of expository texts. Results show that both phonemic knowledge and prior knowledge play an important role in helping younger readers comprehend a text; however, as children get older, listening comprehension appears to play a role of increasing importance in expository text comprehension. One study (Englert & Hiebert, 1984) using elementary participants found that the combination of prior knowledge and interest appeared to play an important role in comprehension, particularly those of younger or low-ability children. Findings from the other three studies that used elementary-aged participants show that comprehension is impacted by reader domain-specific prior

knowledge (Best, Floyd, & McNamara, 2008; Rupley & Willson, 1996) and by the structure of the text itself (Englert & Hiebert, 1984).

Findings from studies that determined how text complexity impacted comprehension of expository texts varied among subject domains. Two studies that used social studies focused expository texts found text complexity involves degree of detail in the text (sparse or detailed) and text coherence, and that the greater the detail and the coherence, the more readily the text is comprehended (Shapiro, 2004; Mckeown, Beck, Sinatra, & Loxeterman, 1992). One study (Alexander & Kulikowich, 1991) with science expository texts found that text complexity involving analogy found that both content knowledge and analogic knowledge are necessary in the comprehension of expository texts about science. Another study (Gaddy, Bakken, & Fulk, 2008) that used science expository texts with a main idea text structure and a compare-and-contrast text structure found that prior knowledge of these text structure assisted comprehension. Findings also indicate that sports and animal focused expository texts tend to be low in complexity compared to the science and social studies expository texts. Texts used in both groups were low in quantitative complexity (word count) but were comprised of different text types including consistent text types or inconsistent text types (Readence, & Alvermann, 1983). Therefore, the concept of text complexity appears to include structural complexity, text types (explicit and implicit), and text coherence. Findings show that the greater the detail and the coherence, the more readily the text is comprehended (Kamalski, Sanders, & Lentz, 2008; Kendeou & Broek, 2007).

While text complexity does appear to have a role in comprehension of expository texts, the above analysis indicates that prior knowledge appears to have a more significant role in text comprehension than does text complexity. Analysis results show that prior knowledge has multiple facets, each form of which plays a role in text comprehension. The most common type is content knowledge, also called domain knowledge, domain-specific knowledge, and subject knowledge. Other forms identified by the research are vocabulary knowledge, reading strategy knowledge, and structural knowledge. Each of these forms appears to have a specific impact on reader comprehension of expository texts in several subject domains. Analysis also shows that combination of forms of prior knowledge can produce an even more positive impact. For example, successful comprehension is impacted by the combination of prior knowledge and inferencing for social studies, science, animal-topic, and multiple subject domain expository

texts for learning disabilities students, second language students, college aged students, and elementary aged students. One study using sixth grade students specifically shows that both forms of knowledge, domain-specific knowledge and analogic knowledge or interactive knowledge, are necessary in the comprehension of science texts. The analysis above also shows when elementary aged students have an interest in the text topic and use domain-specific prior knowledge they are better able to comprehend animal-topic texts, science texts, and texts examining multiple factors. Successful comprehension for middle school aged students is also impacted by the combination of domain-specific prior knowledge and prior vocabulary knowledge for sports expository texts, multiple subject domain texts, and social studies texts. Lastly, results show that the combination of students' knowledge of the text structure and domain-specific prior knowledge positively impact comprehension of science texts, animal-topic texts, social studies texts, and texts examining multiple comprehension factors.

The analysis above also shows that participant age impacts successful comprehension of expository texts. For example results show that both phonemic knowledge and prior knowledge play an important role in helping younger readers comprehend an expository text; however, as children get older, listening comprehension appears to play a role of increasing importance in expository text comprehension. One study using participants that were in college or beyond is included because it aimed to determine how age and its developed prior knowledge impact comprehension of social studies focused expository texts. Results show that information recall performance declined with age.

Lastly, the year in which each study was published is significant to the findings. The fact that the majority of studies using social studies, science, and multiple subject domain texts were published in the 1990s and 2000s shows that there appears to be a focus on using these texts to determine how prior knowledge impacts comprehension. The majority of studies using sports domain and animal-topic expository texts were published in the 1980s or earlier. This shows that in recent years, researchers are not focused with the findings involving the relationship between readers' prior knowledge and comprehension of sports and animal domain texts.

Chapter 4: Results and Application

The problem addressed by this research study is the increasing demand for better comprehension of expository texts. One reading skill which increase comprehension is activation of prior knowledge (Harvey & Goudvis, 2007). Having a greater understanding of how prior knowledge is important for students' comprehension of expository texts, of how to help students "activate" their own prior knowledge, and how to help build prior knowledge when theirs is lacking will add to a teacher's collection of "tools" for assisting students to develop their skill for reading challenging and complex expository texts. This problem has been addressed by asking the question, what is the relationship between readers' prior knowledge and comprehension of expository texts? An extensive literature review was used to synthesize information and answer the research question. The analysis produced major findings which are summarized below.

Results of the Review

Overall, results show that the several forms of prior knowledge, combinations of the different forms of prior knowledge, interest, and text complexity impact the comprehension of expository texts. While text complexity does seem to have a role in comprehension of expository texts, the above analysis indicates that prior knowledge appears to have a more significant role in text comprehension than does text complexity. Analysis results show that prior knowledge has four distinct forms each form of which plays a role in text comprehension. The most common form is content knowledge, also called domain knowledge, domain-specific knowledge and subject knowledge. Other forms identified by the research are vocabulary knowledge, reading strategy knowledge, and structural knowledge. Each of these forms appears to have a specific impact on reader comprehension of expository texts in several subject domains. Analysis also shows that combination of forms of prior knowledge can produce an even greater positive impact. For example, successful comprehension is impacted by the combination of prior knowledge and inferencing for social studies, science, animal-topic, and multiple subject domain expository texts for learning disabilities students, second language students, college aged students, and elementary aged students. Results also show that when elementary aged students have an interest in the text topic and use domain-specific prior knowledge, they are better able to

comprehend expository texts with animal topics, science topics, and multi-topic texts. Successful comprehension for middle school aged students is also impacted by the combination of domain-specific prior knowledge and prior vocabulary knowledge for expository texts with sports topics, social studies topics, and multi-topic texts. Overall, results show that for most readers, the combination of readers' prior knowledge of the text structure and domain specific knowledge positively impacts comprehension of science texts, animal-topic texts, social studies texts, and general topic texts.

In addition to the four forms of prior knowledge (content, vocabulary, reading strategy, and structural) and their impact individually or in combination, results also show that reader ages appears to play a role in successful comprehension of expository texts. For examples, findings indicate, that both phonemic knowledge and prior knowledge play an important role in helping younger readers comprehend an expository text; however, as children get older, listening comprehension appears to play a role of increasing importance in expository text comprehension. For college age readers, findings indicate that the comprehension ability to recall has declined with age. Another result of this research synthesis is the research into prior knowledge itself appears to have focused on sports and animal expository texts, but has shifted to science, social studies, and multi-topic expository texts since the 1990s.

Application of Results to a Professional Development Project

Findings of this research synthesis suggest that prior knowledge appears to have a more significant role in text comprehension than does text complexity. They also determine that prior knowledge has four distinct forms (content, vocabulary, reading strategy, and structural), each of which plays a role in expository text comprehension, along with reader age, and the subject domain of the expository text. These findings have a strong application to the professional development of Kindergarten to grade 12 teachers because of the heavy emphasis by the Common Core Standards on the reading of expository texts. Teachers teaching topic-specific expository texts of social studies, science, and animals would benefit from knowing that successful comprehension is impacted by the combination of prior knowledge and inferencing for learning disabilities students, second language students, and most elementary aged students. Elementary teachers would benefit from knowing that when elementary aged students have an

interest in the text topic and use domain-specific prior knowledge, they are better able to comprehend expository texts of many topics. Middle and high school teachers would benefit from knowing that combinations of domain-specific prior knowledge, prior vocabulary knowledge, and knowledge of text structure help to increase comprehension by adolescent readers. Teachers would benefit from knowing these significant findings so they can apply them in their classrooms with various students across different subject domains. Therefore the direct application of these results to teacher classroom practice findings evidences the value of presenting these results through a professional development project.

Design of Professional Development Project

The professional development project that is most appropriate for delivering the findings of this research synthesis is through a professional development DVD. The advantages of a professional development DVD is that it can be viewed at any time that is convenient to the teacher, it can be re-viewed at any time, and the teacher may view only selected relevant parts at any time. This DVD is intended for K-12 teachers and administrators. This DVD will consist of an hour's worth of material that will show teachers and administrators the major findings of this thesis. These findings will include how readers' domain specific prior knowledge, readers' domain-specific vocabulary knowledge, readers' reading skills and strategies, and the structure of the text impact how well a student is able to comprehend a domain specific expository text. Teachers and administrators will be presented with the various types of prior knowledge and show the importance of helping students activate their own prior knowledge. This DVD will also contain strategies that teachers can use to help their students activate their prior knowledge.

Literacy coaching DVD goals and objectives.

The goal of this professional development DVD is to increase the knowledge of K-12 teachers and administrators on the relationship between readers' prior knowledge and comprehension of expository texts and the strategies that increase the activation of prior knowledge. The focus of this DVD will be to emphasize the importance of teaching students, especially younger students, how to activate their prior knowledge. The goal is to discuss how

prior knowledge and the combinations of different forms of prior knowledge impact comprehension. This DVD will also help teachers understand how the domain specific expository text impacts readers' comprehension. There will also be an emphasis on the findings of text complexity such that more advanced prior knowledge is required to comprehend social studies and science expository texts. This professional development DVD will provide teachers with new knowledge about the relationship of readers' prior knowledge and comprehension of various expository texts.

Proposed audience.

The intended audience for this professional development DVD includes K-12 teachers and administrators. Teacher candidates would also benefit from watching this DVD. All viewers will learn how readers' domain specific prior knowledge, readers' domain-specific vocabulary knowledge, readers' reading skills and strategies, knowledge of text structure, and the combination of different forms of prior knowledge impact the comprehension of a domain specific expository text by a variety of readers. For example, Special Education and ESL teachers would specifically benefit from knowing that the combination of prior knowledge and inferencing for social studies, science, animal-topic, and multiple subject domain expository texts positively impacts comprehension by students with learning disabilities and second language. Viewers will also learn specific strategies to help students activate their prior knowledge for successful comprehension of expository texts.

Proposed format and activities.

The format of this professional development project consists of a user friendly DVD and an instructional guide. Teachers and administrators will be able to view this DVD using a DVD player, computer, or laptop. The DVD's main menu helps viewers make selections to work through the content of the DVD at their own pace. The content is in three main sections: *Forms*, *Impact*, *Strategies*. The Forms section includes information on the various types of prior knowledge and an explanation of terms. Many of the terms included are modified from Rumelhart's (2004) theory of the reading process and his four types of prior knowledge:

“syntactical” knowledge (grammar/structural knowledge), “semantic” knowledge (meaning/context/domain-specific), “orthographic” knowledge (spelling), and “lexical” knowledge (words themselves/meaning/vocabulary) (p. 1163). The Impact section presents the research synthesis findings that explain how readers’ prior knowledge, reading skills, and structure of the text impact comprehension of expository texts, including subject specific texts in science and social studies. The Strategies section provides instructional strategies for teachers and activities for students to activate and apply their various forms of prior knowledge. Some strategies include prompting students to think about the topic before reading a text and encouraging students to examine the title and cover of a text before reading it in order to form personal connections to the content. A fourth section of the DVD offers evidence and general methods on the importance of prior knowledge and how teachers and administrators could help students activate their prior knowledge.

Proposed resources for the professional development.

Resources will include the DVD with a protective cover, an instructional guide on how to use the DVD, and a guide that shows the content of the DVD. Teachers and administrators will be able to rent this DVD from their school library or public library. Copies of the DVD will be distributed free of charge to local school districts and public libraries. Teachers and administrators will also have the opportunity to obtain their own free copy by writing directly to the distributor.

Proposed evaluation of the professional development.

To determine the effectiveness of the content on the DVD evaluation questions will be included on the DVD at the end of major sections and on the main menu screen. Evaluation questions will include open ended questions and Likert scale questions. Viewers will be asked to either email their responses or email their completed Google form (see Appendix). This more extensive evaluation form asks viewers about their own content prior knowledge before watching the DVD.

Professional Development Ties to Professional Standards

Teachers and administrators who watch this professional development DVD will be meeting several *Standards for Reading Professionals—Revised 2010* by the International Reading Association (IRA). Teachers and administrators will meet IRA Standard 2 for Curriculum and Instruction: “*candidates use instructional approaches, materials, and an integrated, comprehensive, balanced curriculum to support student learning in reading and writing.*” Participating teachers and administrators will meet this standard by learning about the various forms of prior knowledge and how helping students activate their prior knowledge will increase the students’ comprehension. Teachers will learn about how combinations of forms of prior knowledge impact comprehension depending on the domain subject expository text. They will also learn how to integrate that knowledge into their curriculum. Teachers and administrators will also meet IRA Standard 1: Knowledge and IRA Standard 5 Environment: “*candidates create a literate environment that fosters reading and writing by integrating foundational knowledge, instructional practices, approaches and methods, curriculum materials, and the appropriate use of assessments.*” Participating teachers and administrators will meet these standard by learning the foundational knowledge about the reading process involving prior knowledge and comprehension of expository texts and by applying this knowledge to the environment of their classrooms or schools. The knowledge they learn from the DVD will help teachers “create an environment that fosters and supports reading and writing achievement” (International Reading Association, 2010).

Chapter 5: Discussion and Conclusion

Overview of Study and Findings

The Common Core Standards (CCSS) (Common, 2012) require students to read complex texts. One skill for increasing comprehension is activation of prior knowledge (Harvey & Goudvis, 2007). However, “sometimes students don’t access their background [prior] knowledge because they never think that it's important” (Clewell, 2013, para. 1); other students may lack prior knowledge in certain subject areas. Having a greater understanding of how important prior knowledge is for readers’ comprehension of expository texts, of how to help students “activate” their own prior knowledge, and of how to help students build prior knowledge when theirs is lacking will add to a teacher’s collection of “tools” for assisting students to develop their skills for reading challenging and complex expository texts. This problem of teacher understanding and the role of prior knowledge for comprehension of complex texts has been addressed by asking the question, what is the relationship between readers’ prior knowledge and comprehension of expository texts? The most appropriate way to address the question of this relationship has been to conduct an extensive literature review, synthesize the findings, and disseminate the results to teachers through some form of professional development. This research synthesis has determined that prior knowledge appears to have a more significant role in text comprehension than does text complexity. Further results are that prior knowledge appears to have four distinct forms: the most common form being content knowledge (also called domain knowledge, domain-specific knowledge and subject knowledge), followed by vocabulary knowledge, reading strategy knowledge, and structural (or text-structure) knowledge. Each form has its specific impact on reader comprehension and an impact when used in combination with other forms. Results also indicate that students’ age and topic interest play a role in use of prior knowledge for comprehension. Overall, results show that for most readers, the combination of readers’ content prior knowledge and text structure knowledge positively impacts comprehension of science, animal-topic, social studies, and general topic expository texts.

Significance of the Findings

These findings are significant because they offer knowledge and insights to classroom teachers who must teach their students to read complex expository texts in many subject areas. These findings show that helping students recognize their prior knowledge and apply it to their task of comprehending a text is in fact important and positively impact their text comprehension. Therefore teachers would benefit from knowing and applying this knowledge when selecting and teaching various expository texts in their classes. These findings are also significant to the field of literacy as a whole. They provide a succinct statement on the nature and impact of prior knowledge on the reading process.

Limitations of the Findings

These findings do have limitations. One is that they are based only on published studies that are accessible. Further studies related to discipline-specific texts, such as science texts, appear to be limited in number. Thus there were limitations on what studies could be found and accessed. For example, I was unable to find more than four studies that used an animal-topic expository text and more than five studies that used a sports-topic expository text. This suggests that research studying readers' prior knowledge and comprehension of animal and sports expository texts is limited. The nine studies that did examine animal or sports expository texts were published in 1980 or earlier. This might suggest that there is no longer a focus on these expository topics.

Conclusion: Answer to Research Question

The research question for this study is, what is the relationship between readers' prior knowledge and comprehension of expository texts? This research synthesis shows that there is a positive relationship between readers' prior knowledge and comprehension of expository texts. Results indicate that prior knowledge appears to have a more significant role in text comprehension than does text complexity. Further results are that prior knowledge has four distinct forms: content knowledge, vocabulary knowledge, reading strategy knowledge, and

structural (or text-structure) knowledge. Each form has its specific impact on reader comprehension and an impact when used in combination with other forms. Overall, results show that there appears to be a strong relationship between prior knowledge and comprehension of expository texts. An implication of this answer is the importance of teaching readers how to activate their own prior knowledge in order to increase their successful comprehension of expository texts.

Recommendations for Future Research

Results of this extensive literature review and research synthesis show significant findings that contribute to both classroom practice and the field of literacy. However, some limitations of the findings help identify areas for possible future research. Therefore, I recommend that future research might focus on one age group and how prior knowledge impacts the comprehension of that age group. I also recommend that future research investigate how the activation of prior knowledge impacts specific learners such as second language learners and students with learning disabilities. The findings of this study touched on how prior knowledge impacts comprehension of various learners, but they also identify areas where research could be done to add to the answer to the question of the role of prior knowledge.

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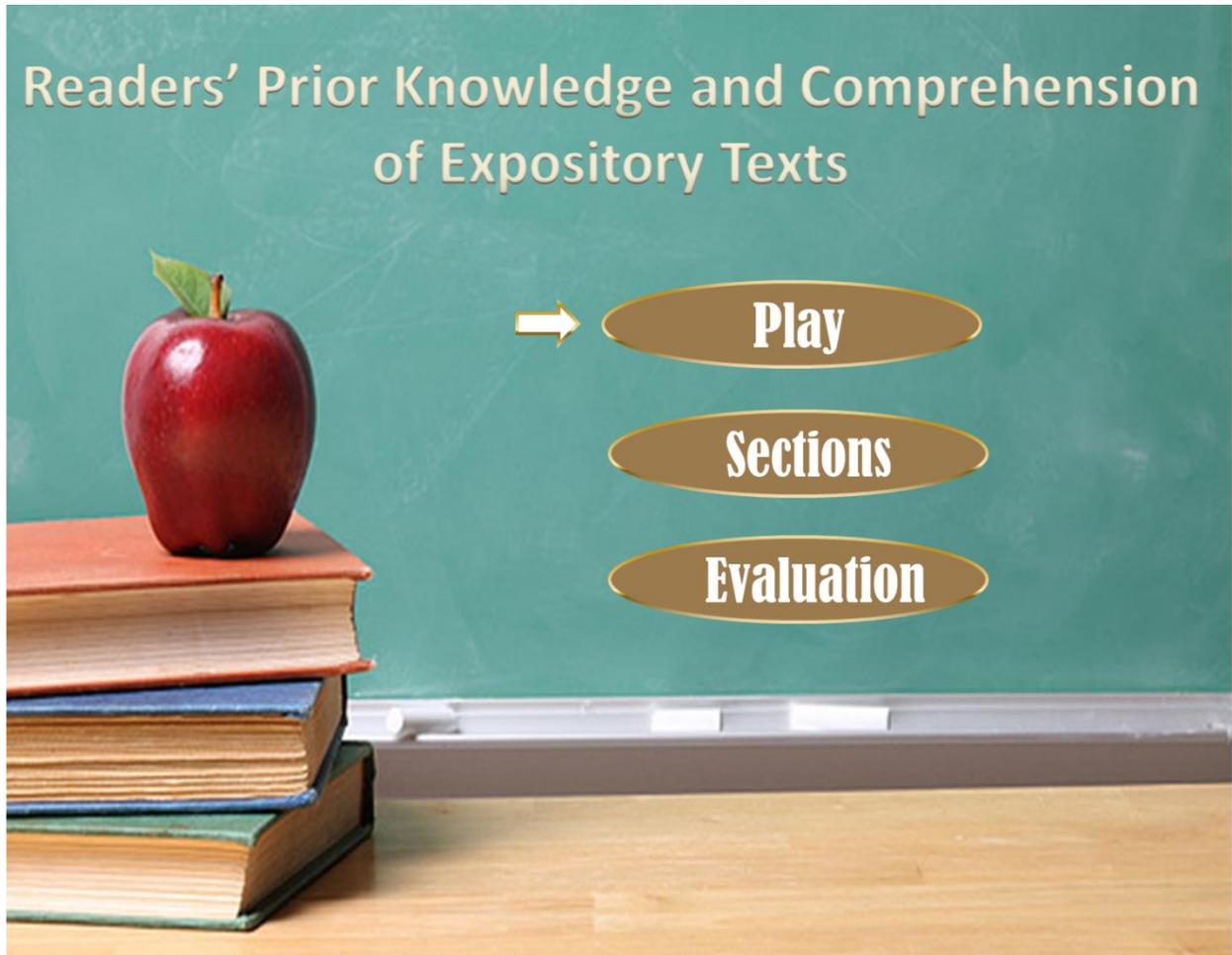
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Appendix A: Contents of DVD



Appendix B: Evaluation of Prior Knowledge and Comprehension DVD

Prior knowledge and Comprehension DVD Evaluation Questions

Email responses to: EKelly@fredonia.edu

1. On a scale of 1 (not familiar) to 5 (very familiar), rate your knowledge of “the relationship between readers’ prior knowledge and comprehension of expository texts” *before* watching this DVD.

Comments:

2. On a scale of 1 (not familiar) to 5 (very familiar), rate your knowledge of “the relationship between readers’ prior knowledge and comprehension of expository texts” *after* watching this DVD.

Comments:

3. In your opinion, what is the most important thing you will take away from watching this DVD?

4. On a scale of 1 (not effective) to 5 (extremely effective), rate your opinion of whether this type of professional development activity was suitable and effective for this topic?

Comments:

5. What would you have liked to see in this DVD presentation which was not there?

