

ABSTRACT

LIEBFREUND, MEGHAN DAUGHERTY. Success with Informational Text Comprehension: An Examination of Underlying Factors. (Under the direction of Kristin Conradi and Hiller Spires).

This purpose of this study was to develop a clearer understanding of the complex, interrelated factors that lead to successful informational text comprehension and to determine if or how these factors vary for higher and lower comprehenders. Participants (N = 177) were in grades three through five and were predominately African American (61%) and female (51%). Hierarchical linear regressions were used to investigate how decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation influenced informational text comprehension. For the whole sample, the complete model with all predictors explained 62.5% of the variance in informational text comprehension. Each reading component explained unique variance, with vocabulary knowledge explaining the most variance. For lower comprehenders, decoding efficiency accounted for a significant amount of variance in reading comprehension beyond age and grade, but was not a significant predictor when all variables were included in the model. For higher comprehenders, vocabulary was a consistent predictor of informational text comprehension. The results reveal the importance of investigating informational text comprehension for different groups of readers and the value of multiple factors, especially vocabulary knowledge, for success with informational texts.

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Success with Informational Text Comprehension: An Examination of Underlying Factors

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BIOGRAPHY

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Some people are always grumbling because roses have thorns;

I am thankful that thorns have roses.

Alphonse Karr

The success of an endeavor this large depends fundamentally on the encouragement and guidance of many others. I would like to express my appreciation to those who have been instrumental in the successful completion of this project, and have enabled the benefits of this process to shine through me and this final project.

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CHAPTER 1

INTRODUCTION

Background

Many challenges confront researchers who study reading comprehension. Since reading comprehension is an internal process that is limited to indirect observation, assessments only reveal its “residue” (Pearson & Hamm, 2005, p. 14). In addition, reading comprehension is hardly a unitary construct (Duke, 2005) and involves many processes that vary based on the individual reader’s skills, the text types, the reading purposes, and the topic (National Assessment Governing Board, & U. S. Department of Education, 2012; RAND Reading Study Group, 2002). Reading researchers have long acknowledged that reading comprehension and its assessment are complicated (Paris & Stahl, 2005; RAND Reading Study Group, 2002). The intricacy of comprehension is further underscored by the numerous different models of reading comprehension (e.g., Gough & Tunmer, 1986; Kintsch, 1998, 2004; Stanovich, 1980).

Given its complexity, reading comprehension research focuses on many areas. In one important area, researchers create profiles demonstrating how various components (e.g., decoding skills, vocabulary knowledge, fluency) contribute to achievement in comprehension and vary for different readers (e.g., Dennis, 2013; Riddle Buly & Valencia, 2002; Stanovich, 1988). Profile research suggests that some readers rely more on decoding, fluency, vocabulary, or a combination of these factors than others. Overall, this research indicates

readers are heterogeneous with diverse instructional needs. Although profile research provides essential information about how these components contribute to reading comprehension and vary for different readers, much of the research fails to consider how comprehension might also vary as readers encounter different types of texts.

Studies often reveal differences in readers' comprehension of narrative and informational texts, with readers tending to perform better on measures of narrative rather than informational text comprehension (e.g., Zabrocky & Ratner, 1992). For example, according to the Progress in International Reading Literacy Study (PIRLS), fourth grade students in the United States performed better in the *literary experience* domain than the *acquire and use information* domain with average scores of 563 and 553, respectively (Thompson et al., 2012). The United States was also outperformed by more countries and educational systems in the informational than the literary domain. In addition to international assessments, researchers have consistently demonstrated the gap between narrative and informational text comprehension (Best, Floyd, & McNamara, 2008; Dennis, 2013; McNamara, Ozuru, & Floyd, 2011). In one such study, readers exhibited higher comprehension of narrative than expository text with grade equivalents of 3.8 and 3.4, respectively (Dennis, 2013).

The gap between readers' comprehension with narrative and informational texts is likely attributable to a number of factors. First, differences exist between informational and narrative text structures, with informational texts often presenting less familiar and more complex structures than narratives (Graesser, Golding, & Long, 1991; Meyer & Freedle,

1984). For example, “inconsiderate” content area textbooks can impede comprehension with poor organization, implicit text structures, and facts that are merely mentioned (Armbruster, 1988; Baumann, 1986; Tyson-Bernstein, 1988). In addition, informational texts often contain less familiar, more complex, and more content-specific vocabulary than narrative texts (Hiebert & Cervetti, 2011). Also, students may require more background knowledge to comprehend informational texts (Best et al., 2008).

Another reason often cited for the differences in students’ comprehension of narrative and informational texts is that classroom instruction and texts, particularly in elementary grades, tend to privilege narrative formats (Duke, 2000; Moss & Newton, 2002; Yopp & Yopp, 2006). In fact, in a seminal article, Duke (2000) highlighted the scarcity of instruction with informational texts, noting that on average, they were only used for 3.6 minutes a day. A more recent study found similar results: instructional time involving informational text averaged only one minute per day in second grade and 16 minutes in third- and fourth-grades (Jeong, Gaffney, & Choi, 2010).

An increase in exposure to, and instruction with, informational texts is necessary in order for students to acquire the essential skills and familiarity to comprehend informational texts successfully. Since the majority of texts read by adults for work and recreation are nonfiction and often informational or functional, the ability to read and comprehend informational text is crucial (National Governors Association Center for Best Practices [NGACBP] & Council of Chief State School Officers [CCSO], 2010; Smith, 2000). Recognizing the importance of informational texts, the Common Core State Standards

(CCSS; NGACBP & CCSO, 2010), which have been adopted in 45 states, call for students to spend significantly more time engaging with informational texts. By fourth grade, narrative and informational texts should make up equal parts of the curriculum (i.e., 50% = narrative and 50% = informational) and then informational texts should surpass levels of narrative texts, accounting for 55% and 70% of texts in grades eight and twelve, respectively.

Although there is a significant research base that highlights the factors that contribute to successful comprehension, more research is clearly needed. Comprehension is complex and the component skills that lead to success with narrative texts might not be the same for success with informational texts. As a result, a need may exist for instruction that differs based on text type. For example, because informational texts inherently contain more complex and varying text structures, explicit instruction related to text structures is often necessary for successful comprehension (Armbruster, Anderson, & Ostertag, 1987; Williams, Stafford, Lauer, Hall, & Pollini, 2009). Inquiry focused on gaining a better understanding of informational text comprehension, with a specific focus on how this comprehension might vary for different types of readers, would add to the field and inform classroom instruction. Importantly, it has not yet been determined what types of skills contribute to success with informational texts specifically. It is essential for researchers to investigate the components of reading that affect informational text comprehension and how these interact and function for both higher and lower comprehenders.

Statement of the Problem

Successful reading comprehension relies on the effective coordination of many components (i.e., decoding skills, vocabulary knowledge, working memory). Due to the numerous components that affect comprehension, readers are diverse and require instruction in different areas in order to be successful. Reading comprehension is further complicated by reader performance varying by text type. Given differences in readers' scores on measures of narrative and informational text comprehension, one cannot assume that the same factors that lead to success with one type leads to success with the other. Consequently, it becomes important to understand the component skills essential for informational text comprehension, and how these skills may vary for students with high and low informational text comprehension.

Factors Influencing Comprehension Vary for Readers

Readers, including their knowledge, skills, and abilities, are diverse. Specifically, high and low comprehenders demonstrate different abilities and characteristics. For example, Logan, Medford, and Hughes (2011) found that verbal ability explained the variation in reading comprehension of high-ability readers while decoding skills and intrinsic motivation explained variation among low-ability readers. From this study, motivation and decoding skills appear to be important factors for low comprehenders, whereas high comprehenders rely on their verbal abilities instead of decoding skills or motivation to read. These findings are consistent with other research that has confirmed the differences between high and low

readers (e.g., Ehrlich, Kurtz-Costes, & Loidant, 1993; Floyd, Bergeron, & Alfonso, 2006; Pierce, Katzir, Wolf, & Noam, 2007).

Other studies focused solely on readers with low comprehension and determined that these readers are also heterogeneous with diverse instructional needs (e.g., Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011; Dennis, 2013; Riddle Buly & Valencia, 2002). For example, using cluster analysis, Dennis established four diverse groups of students, noting that for the majority of poor comprehenders, more instruction and support with fluency, vocabulary, and comprehension was needed.

Notably—and surprisingly, given the renewed focus on informational texts—studies examining the diverse skills and abilities of readers have yet to examine differences based on text type. To date, studies in this area have investigated narrative and informational text comprehension together without differentiating the results across the two text types. This is unsettling given the overwhelming research base indicating students consistently comprehend narrative texts better than informational texts and student reading abilities vary by text type. By combining students' results when reading narrative and informational texts, one fails to adequately account for possible differences.

Factors Influencing Comprehension Vary Based on Text Type

Student component reading skills such as prior knowledge, decoding ability, and vocabulary may influence comprehension differently based on text type. Background knowledge may be more important for the comprehension of informational than narrative text. For example, in a seminal study exploring the effects of background knowledge, high-

knowledge readers reenacted, recalled, and summarized an informational text more completely and with fewer errors than low-knowledge readers, independent of reading ability (Recht & Leslie, 1988). More recently, Best and colleagues (2008) examined the effects of text genre (narrative or informational), decoding skills, and world knowledge on comprehension and found reader competencies depended on text genre. Whereas students' narrative text comprehension was most influenced by decoding skills, their informational text comprehension was most influenced by world knowledge. McNamara and colleagues (2011) also found that students' world knowledge mattered. In their study, fourth-grade high-knowledge readers were more successful comprehenders of informational science texts than low-knowledge readers regardless of the difficulty of the text. Taken together, these results indicate that students with less prior knowledge will have lower levels of comprehension of informational texts. Furthermore, in Best and colleagues' study, decoding and world knowledge accounted for less than 25% of the variance in comprehension between narrative and informational texts. This indicates that other reader competencies may vary by text genre and should be investigated.

The results of research studies regarding the importance of decoding skills by text type have been mixed. In one study, decoding skills were more important for the reading of narrative text than informational text (Best et al., 2008), and in another, accuracy scores were comparable across narrative and informational text genres (Cervetti, Bravo, Hiebert, Pearson, & Jaynes, 2009).

Currently, the differential effects of vocabulary by text type remain relatively unexplored. Research suggests that vocabulary operates differently based on text type. Hiebert and Cervetti (2011) discovered key differences in vocabulary between fourth grade informational science texts and narrative texts. Typically, content-based informational texts contain complex, unique vocabulary while narrative texts contain unique words that represent familiar, less complex concepts. These vocabulary differences may affect student comprehension, as comprehension of informational texts may depend on a more complex vocabulary than comprehension of narrative texts.

Research addressing the variation in reading comprehension performance across different text types is necessary. Based on the findings of one study in this area, Eason and colleagues concluded that a need exists “to consider measures of genre in order to fully understand the cognitive skills required for reading comprehension” (Eason, Goldberg, Young, Geist, & Cutting, 2012, p. 523).

Problem

Although the diverse reader factors and instructional needs of students comprehending informational and narrative texts have been acknowledged, research often fails to report results that investigate how the heterogeneous needs of students vary by text type. Currently, not enough is known about the reading components that are essential for the comprehension of informational text and how they vary for different types of readers.

Purpose of the Study

Given the importance of informational text comprehension and the failure of prior research to investigate the necessary component skills for informational text comprehension, the purpose of this study was to examine the factors related to successful comprehension of informational texts separately from those related to narrative text comprehension. In addition, profile research has neglected to investigate how component skills for diverse readers vary by text type. As a result, this study investigated how component skills varied for successful and unsuccessful comprehenders of informational text.

To address the purpose of this study, I investigated how various components of reading related to comprehension for third, fourth, and fifth grade students reading informational texts. Then, because readers are heterogeneous and in order to determine the factors that different readers rely on, I examined the components of reading for students who were more successful and less successful with informational text. The results of this study provide information about the reading components most essential for the comprehension of informational text and how these differ based on the ability level of the reader (e.g., successful or unsuccessful).

Significance of the Study

The present study was designed to make noteworthy contributions in at least three ways. First, it contributes to the growing knowledge base in the field of informational text comprehension research. By determining the influence of different reading components on the comprehension of informational text, this study adds to existing research that has

indicated reader abilities vary by text type. The study extends the level of analysis in previous studies, by examining reading comprehension of informational text separately from that of narrative text.

Second, this study provides nuanced information about reading comprehension that can assist teachers with classroom instruction. As instruction shifts towards a focus on informational text reading, the results provide teachers with information about the knowledge and skills students most need to be successful reading these texts. This may lead to improved teaching and learning in the classroom, as teachers focus on the most important component skills for informational text comprehension. By determining the variation in the abilities of successful and unsuccessful readers of informational text, the results can also support teachers as they differentiate instruction.

Finally, the results of this study have implications for policy, particularly given the renewed focus on informational texts in the CCSS. Although assessments frequently contain both narrative and informational text passages, reports of their results often fail to differentiate between students' performance on the two types of text. The results of the present study provide support for the importance of delineating students' scores by text type.

Research Questions

This research study addressed the following research questions using data from multiple measures examined with hierarchical regression analysis: (a) how are specific reading components (decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation) related to third, fourth, and fifth grade students' comprehension of

informational text; and (b) to what extent are these relationships different for students with higher and lower comprehension of informational text.

Definition of Terms

The following terms are utilized throughout this dissertation and are defined to provide a clear understanding of the components.

Informational text: Informational text conveys “information about the natural or social world” (Duke, 2004). It may be of three types: (a) exposition that communicates information; (b) argumentation or persuasive text that provides evidence to convince the reader to take the author’s stance; and (c) procedural text that provide specific steps for achieving a goal (National Assessment Governing Board, & U. S. Department of Education, 2008).

Reading comprehension: The RAND Reading Study Group (2002) defined *reading comprehension* as “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language” (p. xiii).

Prior knowledge: Knowledge readers bring with them when engaging with a text. For the purposes of this study, prior knowledge refers to a read’s general knowledge about the world and is not related to the specific text read.

Vocabulary knowledge: Knowledge of the meanings of words.

Decoding: The ability to use print-to-sound correspondences to read words (Samuels, 1988).

Lower comprehender: For the purposes of this study, a lower comprehender is one who scored equal to or below the median on informational text passage comprehension questions selected from the NAEP.

Higher comprehender: For the purposes of this study, a higher comprehender is one who scored above the median on informational text passage comprehension questions selected from the NAEP.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction to the Chapter

This study aimed to advance the field towards a clearer understanding of the complex, interrelated factors that lead to informational text comprehension and determine if or how these factors varied for successful and unsuccessful comprehenders. Specifically, it addressed the following research questions: (a) how are specific reading components (decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation) related to third, fourth, and fifth grade students' comprehension of informational text; and (b) to what extent are these relationships different for students with higher and lower comprehension of informational text.

The purpose of this chapter is to examine the current and historical context for informational text comprehension, including the component cognitive and motivational factors that influence comprehension of this text type. This investigation reviews not only the research that focused on informational text, but also studies that compared readers' comprehension of informational text to narrative text. I begin with an explanation of the two theoretical models guiding the current study: the construction-integration model (Kintsch, 1988, 1998, 2004) and the interactive-compensatory model (Stanovich, 1980). I then summarize the historical context, including the definition of informational text and the importance of narrative and informational texts in instruction and assessment. After that, I

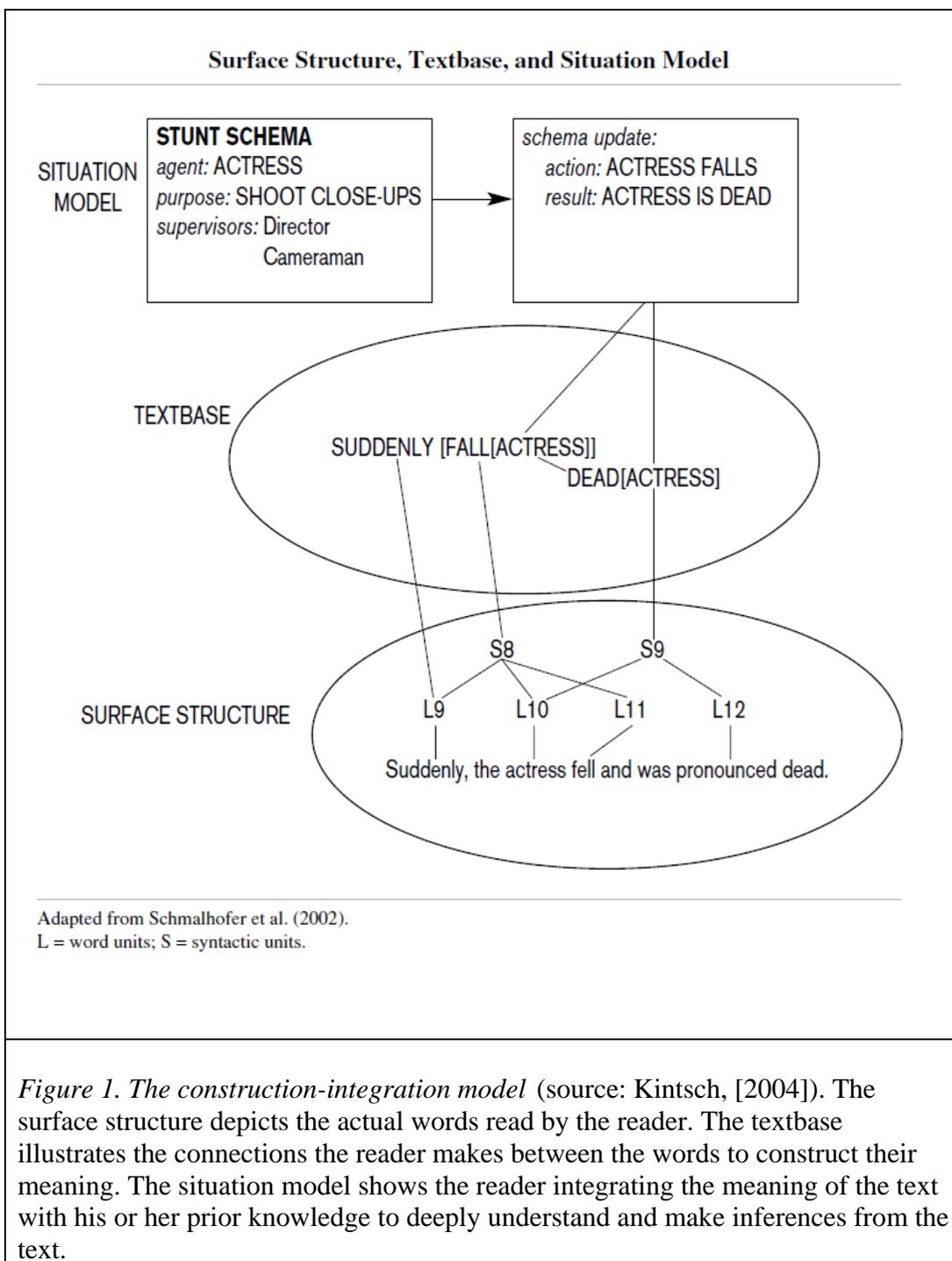
review the literature examining how specific cognitive and motivational components relate to reading comprehension for both narrative and informational texts. Next, I examine research on student profiles or patterns of reading abilities. I end with a summary of the chapter and the research questions for the current study.

Theoretical Framework

Two theoretical models undergird the ideas and applications in this study. Specifically, one model addresses the complexity of reading comprehension and one assists with understanding readers' individual differences. The first model informing this study, the Construction-Integration Model (Kintsch, 1988, 1998, 2004), highlights the complexity of comprehension by noting that reading is a resource-demanding cognitive process in which readers must purposely direct their attention and effort to problem solving as they construct meaning from the text. In order to make sense of a text, a reader must read the actual words, understand their meaning within the context of sentences, paragraphs and the text's global structure, and integrate the text with prior knowledge to make inferences and think critically about the text.

This model focuses on three levels of text representation: surface structure, textbase, and situation model. The first level of text processing, the surface structure, consists of the actual words in the text and is usually quickly forgotten. This level assumes the reader can accurately decode and recognize the words in the text. To form the second level, the textbase, a reader translates the actual words of the text into their meaning within the context of sentences, paragraphs, and the global structure of the text. The third and deepest level of text

processing, the situation model, involves the reader integrating the meaning of the text with prior knowledge. By constructing a situation model, a reader can store information in long-term memory with better retrieval cues and engage in higher-level processing of the text (e.g., inferencing). Readers predominately form a similar textbase; however, situation models vary across readers depending on their prior knowledge, interests, and motivations for reading. This complex process is depicted in Figure 1 from Kintsch (2004).



Whereas the Construction-Integration model addresses the complex processes the reader uses to build meaning from the text, the Interactive-Compensatory Model (Stanovich, 1980) explains how readers may depend on different processes or strategies to construct meaning from text. Specifically, readers can use different knowledge and processors to help them when they encounter a problem while reading. For example, if a reader cannot identify a word, he or she can use the syntax of the sentence, the meaning of the sentence, or knowledge of letter sounds to determine the unknown word.

Stanovich based this model on the Interactive Model by Rumelhart (1977). In the Interactive Model, different processors (sensory, syntactic, semantic, orthographic, and lexical) cooperate during reading to construct the most probable interpretation of the text. In contrast to bottom-up (text-driven) and top-down (meaning-driven) processing theories, this model allows both higher and lower level processors to work together to create meaning from the text. Building on this, Stanovich advanced the notion that a deficit, weakness, or lack of information for one processor will be compensated for by other processors without following a top-down or bottom-up hierarchy. In short, readers use their areas of strength to assist them when they encounter difficulties reading. For example, less skilled readers often use context to decode words while more successful readers possess context-free decoding skills.

Both of these models relate closely to the research questions and variables of interest in this study. The Construction-Integration Model addresses the complexity of reading comprehension and the need for assessments to consider multiple knowledge sources and skills, including prior knowledge and motivation. The Interactive-Compensatory Model

provides a lens for studying individual differences within and across readers supporting this study as it addressed research questions focused on the component cognitive and motivational factors influencing informational text comprehension and how these components differed for successful and unsuccessful comprehenders. Taken together, reading comprehension requires the coordination and integration of multiple processes and knowledge sources including decoding skills, prior knowledge (of words, syntax, text structure, and the world), and motivation that constrain or assist text representation at various levels.

Historical Context

As instruction shifts towards a focus on informational text, it is critical that researchers and teachers understand the skills, knowledge, and abilities readers utilize to comprehend these texts. Despite the current emphasis on informational text, prior research and instruction focused primarily on narrative texts in elementary classrooms. In this section, I trace the history of informational text in the classroom and then highlight how the conceptualization of informational text has changed over time.

Emphasis on Informational Text

Elementary classrooms have historically favored narrative texts with numerous studies documenting the scarcity of these texts in basal readers. For example, a study in the 1980s reviewed eight basal programs from preprimer to grade six and found 65% of selections and 72% of pages were either narratives or poems (Flood & Lapp, 1987). Only 18% of selections and 11% of the pages in these basals were informational texts. In a much

earlier review, Nila Banton Smith studied the content of six fourth-grade readers published between 1925 and 1931 (2002). Although she found most of the content was informational, this material was presented in narrative form. These findings in basal readers are consistent with studies of classroom texts. In 2000, Duke found only 10% of the books in first grade classroom libraries were informational.

Some suggest that narrative texts dominated the curriculum because teachers and researchers viewed stories as “cultural universals,” that engaged young students and assisted with learning (Egan, 1988, p. 65). Others suggested the use of narratives made content more accessible and meaningful for young readers (e.g., Egan, 1988; Wells, 1986). This notion was reinforced by the widely cited report, *Becoming a Nation of Readers* (1985), which stated reading instruction should begin with simple stories because children “readily acquire an understanding of the whole structure of stories and, therefore, stories are especially comprehensible to children” (Anderson, Hiebert, Scott, & Wilkinson, p. 65).

Over a decade ago, in a landmark study, Duke (2000) highlighted students’ lack of exposure to informational text. Instruction favored narrative text (Duke, 2000; Jeong et al., 2010; Ness, 2011) and students experienced significantly less contact with informational text than narrative text at both school and home (Yopp & Yopp, 2006). Researchers found students benefited from these texts (e.g., Duke & Kays, 1998; Pappas, 1993; Williams, 2004) and determined “inattention to expository texts in early childhood settings cannot be justified on the basis that children are unable to interact productively with these texts” (Duke & Kays, 1998, p. 314). Consequently, there has been a push to shift the focus of instruction and texts

away from narrative to focus on informational text. Teachers generally exhibit a positive attitude towards informational text (Ness, 2011); however, the lack of quality resources and curriculum materials, such as basal readers with few informational text selections, limit teachers' ability to include these texts more frequently in their instruction (Baumann, 2000; Ness, 2011).

More recently, studies are showing an increase in access to informational text in classrooms. Moss (2008) evaluated two basal readers adopted by the state of California and found basals included more informational texts than in the past with 40% of reading passages categorized as nonfiction. Likewise, another study found that, on average, 20% of texts available in second, third, and fourth grade classrooms were informational (Jeong et al., 2010).

Standards now require increased levels of informational text. The CCSS necessitate the inclusion of more informational texts in lower grade levels and place them on equal footing with narrative texts. For example, the CCSS requires informational texts to make up 50% of texts utilized in fourth grade classrooms, and then informational texts should surpass levels of narrative texts accounting for 55% and 70% of texts in grades eight and twelve, respectively.

Importance of Informational Text

Interest in the lack of informational text in curricular materials and instruction stemmed from the acknowledgement that exposure to, and interactions with, informational texts are critical for school success. Calls for the inclusion of more informational texts

acknowledged the need for a balance of text types so students could have full access to the diverse array of available literature (e.g., Pappas, 1991). Three main reasons grounded the argument to include more informational text: (a) building knowledge, (b) assisting with later reading success, and (c) motivating readers (Caswell & Duke, 1998).

The first reason for the inclusion of informational texts is that they build and extend prior knowledge (Caswell & Duke, 1998). As students engage with these texts, they build knowledge about unfamiliar topics and extend their understanding of things they already know. In addition, when young students read these test they quickly learn the organizational structures and features that assist with comprehension (Pappas, 1993). Informational texts may also prepare students for future school and life success. Early exposure to these texts may assist students as they encounter the increased demands of more complex text in the fourth grade (Chall, Jacobs, & Baldwin, 1990) and better match the textual diet of adults (Smith, 2000). In addition, informational texts may appeal to the interests of certain students and motivate them to read. Although the results of research investigating student preferences for narrative or informational text are mixed (Mohr, 2006; Moss & McDonald, 2004), the inclusion of informational texts in the curriculum can motivate young readers by appealing to their interests (Caswell & Duke, 1998). Students often choose books for recreational reading based on the topic in which they are most interested (Mohr, 2006) and providing texts on topics that appeal to readers can motivate them and increase their breadth of reading (Wigfield & Guthrie, 1997).

Definition of Informational Text

Confusion exists around the definition of informational text. Definitions of informational text range from broad definitions, such as “nonfiction,” used to encompass all books that are true, to very narrow and explicit definitions (Duke, Caughlan, Juzwik, & Martin, 2012; Freeman & Person, 1992; Kristo & Bamford, 2004). A popular and narrow definition describes informational text as transmitting information about the social or natural world (Duke et al., 2012). This definition excludes texts written to persuade, procedural texts, and biographies because informational texts possess distinct content characteristics (e.g., providing true information and focusing on one topic), navigational features (e.g., headings, index, table of contents, glossary), and text structures (e.g., compare/contrast, cause/effect) not commonly found in other types of nonfiction (Duke & Bennett-Armistead, 2003; Duke et al., 2012).

The CCSS takes a broader approach by using the term informational text as only one of two text classification categories (with literature as the second) and this term replaced what was once referred to as nonfiction (see Table 1 for examples of these literary and informational text types). Of note, the CCSS based their definition on the 2009 National Assessment of Educational Progress’s (National Assessment Governing Board, & U. S. Department of Education, 2008) definition of informational text that included exposition, argumentation and persuasive text, and procedural text and documents; however, the CCSS’ definition is broader.

Table 1

Examples of Text Types in CCSS

Literature			Informational Text
Stories	Dramas	Poetry	Literary Nonfiction and Historical, Scientific, and Technical Texts
Includes children’s adventure stories, folktales, legends, fables, fantasy, realistic fiction, and myth	Includes staged dialogue and brief familiar scenes	Includes nursery rhymes and the subgenres of the narrative poem, limerick, and free verse poem	Includes biographies and autobiographies; books about history, social studies, science, and the arts; technical texts, including directions, forms, and information displayed in graphs, charts, or maps; and digital sources on a range of topics

Note: Reprinted from NGACBP & CCSS (2010).

Text Types in Instruction and Assessment

Given the widespread acknowledgement of informational text’s significance and a greater understanding of the definition of this text type, it is important to consider how these texts are handled in instruction and assessments. Underscoring this point, the *National Reading Panel Report* reviewed research and found “text, as a variable, has been sorely neglected” in reading comprehension research when reviewing studies to determine the best foci for comprehension instruction (U.S. Department of Health and Human Services, 2000, p.

4-50). As a result, they recommended future comprehension research place emphasis on the type of text used because this may influence the results and generalizability of findings.

In line with the National Reading Panel's suggestions, the CCSS recently recognized the need for the instruction and assessment of both narrative and informational texts. In accordance with the 2009 NAEP Reading Framework (National Assessment Governing Board, & U. S. Department of Education, 2008), the CCSS require an equal balance of narrative and informational text reading by fourth grade with informational text dominating instruction as students move towards twelfth grade to ensure students are college and career ready. Students are required to not only comprehend informational texts at high levels, but to also critique the author and build background knowledge from these texts (NGACBP & CCSO, 2010).

Because assessments are usually closely aligned with instructional standards, assessments of reading comprehension often include both narrative and informational reading passages. For example, the NAEP national reading comprehension assessment includes both informational and narrative texts alignment with the CCSS, and they acknowledge "reading behaviors vary with the type of text encountered by a reader" (National Assessment Governing Board, & U. S. Department of Education, 2012). In addition to the NAEP addressing both text types, the national assessments currently under development by the Partnership for Assessment of Readiness for College and Careers (PARCC, 2013) will include both narrative and informational text passages in accordance with the CCSS.

Similar to nationwide assessments, assessments used in research predominately utilize both narrative and informational text passages. These include (a) standardized norm-referenced assessments such as the Gates MacGinitie Reading Tests (MacGinitie, MacGinitie, Maria, & Dreyer, 2000), Stanford Diagnostic Reading Test (Karlsen & Gardner, 1995), and Gray Silent Reading Tests (Wiederholt & Blalock, 2000); (b) informal reading inventories (e.g., Qualitative Reading Inventory—5 [Leslie & Caldwell, 2011]); and (c) state reading assessments (e.g., Tennessee Comprehensive Assessment [cited in Dennis, 2013]; Washington Assessment of Student Learning [cited in Riddle Buly & Valencia, 2002]).

Unfortunately, although assessments include both informational and narrative texts, they often do not analyze and report results separately for each text type. Often standardized norm-referenced tests (e.g., Gates MacGinitie Reading Tests [MacGinitie, et al., 2000], Gray Silent Reading Tests [Wiederholt & Blalock, 2000]) include both narrative and informational text passages that are interwoven together as readers progress to higher levels, making the separation of comprehension by text type impossible. Other assessments, including many state reading tests, neglect to report results for each type separately (Tennessee Comprehensive Assessment [cited in Dennis, 2013]; Washington Assessment of Student Learning [cited in Riddle Buly & Valencia, 2002]). This leads to comprehension measures that continue to lack attention to how students' performance varies by text type. Clearly, this is a concern for reading comprehension instruction and intervention, especially given that readers usually comprehend narrative text better than informational text (Best et al., 2008; Dennis, 2013; McNamara, et al., 2011; Thompson et al., 2012; Zabrocky & Ratner, 1992).

The failure to tease apart reading comprehension assessment results based on the two text types measured leaves researchers and teachers unable to understand whether individuals' instructional needs in informational text are similar to or different from those in narrative text (Martin & Duke, 2011). An examination of the potential reasons for individual differences in comprehension levels by text type is required.

Component Skills Related to Reading Comprehension

In addition to the importance of disentangling students' scores when reading different types of texts, it becomes important that we also consider the different components students rely on to comprehend texts. The assessment of reading comprehension is complex not only due to text type differences, but also because comprehension relies on many component skills for the construction of meaning (Paris & Hamilton, 2009). When these component skills are lacking, comprehension breaks down. Comprehension development is best understood as an interaction between different cognitive and language abilities rather than a focus on either higher level or lower level reading skills (Cain & Oakhill, 2006).

In a seminal article, Paris (2005) introduced Constrained Skills Theory (CST) and highlighted the different types of skills underlying reading development and achievement. He suggested that these skills can be considered on a continuum, with some skills being more constrained than others. Constrained skills are quickly learned, completely mastered by a certain age, and have a definite ceiling (e.g., alphabetic knowledge and phonemic awareness). In contrast, unconstrained skills develop over the lifespan of an individual (e.g., vocabulary and comprehension). Notably, both types of skills are essential; however,

differences between readers' constrained skills are short-lived while unconstrained skills reveal enduring differences between individuals. Furthermore, it is important to understand that reading skills vary in their degree of constraint, when considering research that measures reading components and predicts reading achievement. Relying on constrained skills alone to predict an unconstrained skill proves problematic (Paris, 2005).

In concert with this notion, some suggest assessing the components of reading comprehension separately (Kintsch & Kintsch, 2005). Although constrained skills such as alphabet awareness and decoding do predict reading achievement in early elementary grades, the focus of assessment should be predominately on unconstrained skills that reveal individual differences that endure across time. Overall, researchers note the heterogeneity of component skills of readers, especially in their unconstrained skills (e.g., Dennis, 2013; Riddle Buly & Valencia, 2002).

In addition to issues illuminated by CST, the study of reading comprehension by text type is further complicated by the failure of most studies to examine how the components affecting reading comprehension vary by text type. As described earlier, researchers often utilize comprehension assessments that fail to differentiate results by text type (e.g., Gates-MacGinitie Reading Tests). In this section I focus on component skills that affect reading comprehension, both at a general level and when considering specific text types.

Word Reading

The ability to identify words accurately contributes to reading comprehension (Adams, 1990; Perfetti, 1985). In fact, reading comprehension and word reading are closely

related with strong correlations (Juel, Griffith, & Gough, 1986; Ouellette, 2006) and students with low word reading skills tend to experience significant difficulty comprehending text (Dennis, 2013; Torgesen, 2000). The identification of words (both familiar and unfamiliar) requires individuals to apply strategies including: (a) decoding or the use of letter-sound correspondence to sound out and blend words; (b) analogy or the use of known words to read unknown words (e.g., knowing log can help one read frog); (c) prediction or the use of context and letter clues to guess the word; and (d) memory or reading by sight (Ehri, 1991). An individual's knowledge and use of graphophonic units (e.g., syllables) and morphemes in decoding may predict reading comprehension (Nunes, Bryant, & Barros, 2012), indicating that decoding extends beyond simple letter-sound combinations and involves the reliance on larger units within words.

One area of study related to word reading has considered how accurately students read words. Importantly, word reading accuracy decreases in its ability to predict reading comprehension. For example, the contribution of word reading to reading comprehension decreased as students progressed from grade one to six (Ouellette & Beers, 2010), and word reading accounted for less than 1% of the variation in adult reading comprehension (Landi, 2010). Word identification is a constrained skill usually mastered by ages 8 or 9; however, it is included as an important component of reading comprehension because poor comprehenders may still struggle with decoding (Riddle Buly & Valencia, 2002; Dennis, 2013). Unfortunately, word reading enables but does not ensure comprehension. Instead, it

sets a threshold that makes comprehension more likely because readers must, at minimum, be able to read the words in the text for comprehension to occur.

Another area of study has involved how automatic students are in reading words. Automaticity is the ability to read words “easily, with little effort and little conscious thought” (Logan, 1997). Individuals must process print at minimum levels to facilitate comprehension (Morris et al., 2013). Fluent reading enables students to perform multiple tasks at one time (LaBerge & Samuels, 1974; U.S. Department of Health and Human Services, 2000). According to automaticity theory (LaBerge & Samuels, 1974), slow and effortful reading makes reading comprehension problematic and results in a bottleneck in which higher level and lower level processes compete for cognitive space (Shankweiler et al., 1999). Therefore, automaticity, either in isolation or in context, is measured to determine if comprehension difficulties are a result of this bottleneck or if students have fast and efficient word reading and decoding skills (i.e., fluency) and comprehension difficulty is the result of something else. Research has demonstrated that students may demonstrate difficulty reading automatically and for meaning but possess developed word identification skills (e.g., Riddle Buly & Valencia, 2002).

Vocabulary Knowledge

The effect of vocabulary on reading comprehension is less apparent than the effect of word reading. According to the National Reading Panel Report (U.S. Department of Health and Human Services, 2000), separating vocabulary and reading comprehension is “difficult, if not impossible” (p. 4-15). Indeed, disentangling the two proves difficult. Anderson and

Freebody (1981) hypothesized three potential reasons for this relationship: (a) vocabulary knowledge is *instrumental*, with knowledge of word meanings enabling comprehension of text; (b) vocabulary knowledge is an indication of general *aptitude* and more able readers possess vocabulary knowledge and comprehend text successfully; and (c) vocabulary and reading comprehension indicate a person's *knowledge* or schema about a topic. Perhaps because the relationship is so entangled, studies examining the correlation between word knowledge and reading comprehension suggest quite a wide range (between .3 and .8; Ouellette, 2006; Tannenbaum, Torgesen, & Wagner, 2006).

Another reason for this wide range in correlations is because vocabulary knowledge becomes increasingly important and correlated with reading comprehension as individuals age (Ouellette & Beers, 2010; RAND Reading Study Group, 2002). For example, Torgesen, Wagner, Rashotte, Burgess, and Hecht (1997) found vocabulary knowledge in second grade explained 24% of the variance in fourth grade reading comprehension and the variance in third grade vocabulary knowledge explained 43% of the variance in fifth grade reading comprehension. In addition, Ouellette (2006) used regression analysis and found both the breadth and depth of vocabulary knowledge in fourth grade students accounted for 28.5% of the variance in reading comprehension.

Vocabulary knowledge is vital for comprehension to occur and for the development of other factors important for comprehension. For example, vocabulary knowledge and word recognition skills are highly correlated in poor readers (Hagtvet, 2003). Cain and Oakhill (2006) studied 23 poor and 23 good comprehenders with adequate word reading accuracy

and found vocabulary impaired the growth of word reading ability in students between the ages of eight and eleven. In addition, Lesaux and Kieffer (2010) developed three distinct profiles of struggling readers in sixth grade, and the majority of struggling readers possessed low vocabulary knowledge in addition to other deficits.

Prior Knowledge

Another important factor that contributes to reading comprehension is prior knowledge. Reading comprehension is positively correlated with prior knowledge and prior knowledge explains variation in comprehension ability beyond reading skills (Ozuru et al., 2009). Due to the acknowledged influence of prior knowledge on reading comprehension, researchers suggested reading comprehension assessments include evaluations of prior knowledge so this information could be taken into account when judging reading comprehension (Johnston, 1984; Pearson & Hamm, 2005).

Prior knowledge assists with and enhances text comprehension. Readers with higher levels of prior knowledge comprehend texts better than readers with little prior knowledge (McNamara et al., 2011) and are more likely to make inferences across the text in order to construct meaning (Ozuru et al., 2009; Pearson, Hansen, & Gordon, 1979). Furthermore, prior knowledge can actually compensate for a lack of reading ability. In an influential study, high-knowledge readers with poor word reading skills outperformed low-knowledge readers with good word reading skills on measures of reading comprehension (Recht & Leslie, 1988).

Theoretically, background knowledge plays an important role in a reader forming a coherent mental representation of a text which is essential for comprehension (e.g., Anderson, 1983; Kintsch, 1998). For example, in the Construction-Integration Model (Kintsch, 1998) a reader integrates his or her prior knowledge with the information from the text to construct a situation model. The integration of the text and prior knowledge enables the reader to attain deeper levels of comprehension, make inferences, and retain the meaning of the information presented in the text.

Motivation

In addition to the contributions of cognitive factors, motivation also influences students' reading comprehension. Reading motivation is complex and includes several constructs such as curiosity, competition, involvement, grades, recognition, compliance, work avoidance, and interest (Schiefele, Schaffner, Moller, & Wigfield, 2012; Guthrie & Wigfield, 2000).

Because of the influence of motivation on reading, researchers have called for integrated models of motivation and cognitive processes that develop relationships between motivation and these cognitive processes (Guthrie & Wigfield, 1999; Pintrich, 2003). Reading motivation is significantly correlated with reading comprehension (Wang & Guthrie, 2004), and predicts both reading achievement (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006) and growth in reading comprehension over time (Guthrie et al., 2007). Reading comprehension and motivation may be linked because motivation can predict

reading amount (Guthrie, Wigfield, Metsala, & Cox, 1999; Wang & Guthrie, 2004) and motivation is positively related to strategy use (Schiefele et al., 2012).

The specific motivational variable investigated in the present study is intrinsic motivation. Intrinsic motivation accounts for significant variation in narrative reading comprehension (Wang & Guthrie, 2004), and predicts report card grades and teacher ratings of student achievement (Gottfried, 1990). Intrinsic motivation may also predict growth in reading comprehension. In lower ability readers ages nine to eleven, intrinsic motivation explained variance in reading comprehension achievement and growth over one school year (Logan et al., 2011). A positive relationship between intrinsic motivation at age seven and reading achievement at ages 8 and 9 was found (Gottfried, Fleming, & Gottfried, 2001). Of note, the relationship between intrinsic motivation and reading comprehension may be mediated by reading amount (Becker, McElvany, & Kortenbruck, 2010; Guthrie et al., 1999).

Component Skills Related to Reading Comprehension of Informational Text

In addition to the component skill differences in general studies of reading comprehension, it is also important to consider differences across text types. Students usually comprehend narrative texts at higher levels than informational texts (Best et al., 2008; Dennis, 2013; McNamara et al., 2011; Thompson et al., 2012; Zabucky & Ratner, 1992). Given this difference, it is important to consider how cognitive and motivational factors might have different levels of influence for the comprehension of these text types. In this section, the contributions of component skills will be examined again, but specifically in light of their contributions to informational text comprehension.

Decoding

The results of research studies have been mixed regarding the importance of decoding skills by text type. In one study that used hierarchical regression, decoding skills were more important for the reading of narrative text than informational text (Best et al., 2008). For narrative text, decoding skills explained variance in comprehension over and above world knowledge. In contrast, for informational text, decoding skills explained no variation beyond world knowledge. In another study, accuracy and rate were comparable across narrative and informational text types with the same topic and content (Cervetti et al., 2009). More research is needed on how decoding skills influence reading comprehension for narrative and informational texts.

Vocabulary

Investigations of vocabulary have focused more on the vocabulary in the text and how this may influence readers than on the importance of the vocabulary knowledge of readers. Vocabulary operates differently based on text type. Hiebert and Cervetti (2011) discovered differences in vocabulary between informational science texts and narrative texts. Content-based informational texts contain complex, unique vocabulary that requires instruction focused on discussion and demonstration. In contrast, narrative texts contain unique words that represent familiar, less complex concepts that necessitates instruction focused on language variation. These vocabulary differences may influence student comprehension and the comprehension of informational texts may require students to understand more complex, conceptual vocabulary than narrative texts. At this time, no

empirical studies have investigated differences in readers' general vocabulary and how they fare on narrative versus informational text, but what we know about the vocabulary contained in informational and narrative texts would suggest this is a possibility.

Prior Knowledge

Prior knowledge may be more important for the comprehension of informational text than narrative text. In a seminal study exploring the effects of background knowledge, high-knowledge readers reenacted, recalled, and summarized an informational text more completely and with fewer errors than low-knowledge readers independent of reading ability (Recht & Leslie, 1988). More recently, Best and colleagues (2008) examined the effects of text type (narrative or informational), decoding skills, and world knowledge on comprehension and found reader competencies depended on text type. Whereas students' narrative text comprehension was most influenced by decoding skills, their informational text comprehension was most influenced by world knowledge. These findings indicate that students with less prior knowledge may have lower levels of comprehension in informational text than narrative text. McNamara et al. (2011) also found that students' world knowledge mattered. In their study, fourth-grade high-knowledge readers were more successful comprehenders of informational science texts than low-knowledge readers regardless of the difficulty of the text. Taken together, these results suggest that students with less prior knowledge may have lower levels of comprehension of informational texts.

Prior knowledge may be more important in informational texts because it assists readers with forming relationships between important concepts (Coté & Goldman, 1999) and

generating the inferences necessary to construct an accurate understanding of the concepts discussed in the text (Best et al., 2005; Kintsch, 1998). Saenz and Fuchs (2002) studied 111 adolescents as they read two narrative and two expository texts. Across text types, students responded equally well to explicit questions; however, they experienced more difficulty answering implicit questions about informational than narrative texts. This indicates that a lack of background knowledge prevents readers from making the necessary inferences to comprehend informational text at a deep level. Furthermore, Eason et al. (2012) found that comprehension of expository texts when compared to narrative texts required higher level skills including inferencing and planning.

Prior knowledge can sometimes have negative effects on comprehension. For example, readers might hold misconceptions from their personal experience that interfere with the information presented in an informational text, and this may result in further misunderstandings about the text (Best et al., 2005). Readers need to not only activate relevant background knowledge when reading informational texts, but also change prior knowledge that is refuted by the text. Readers with misconceptions about a science topic generated fewer accurate inferences and more inaccurate inferences than readers without misconceptions (Kendeau & van den Broek, 2007).

Motivation

Text genre may influence motivation towards reading, with research indicating that the motivations for reading informational and narrative text are distinct (Guthrie et al., 2007). Unfortunately, the study of motivation in reading is plagued by the misuse of terminology

(Conradi, Jang, & McKenna, 2014; Schiefele et al., 2012), and few studies have focused on motivation to read informational texts, specifically. As a result, this section reviews research that includes any type of motivation that relates to the reading of informational texts.

One aspect of motivation is interest. Comprehension varies based on students' interest in reading the text. Certain students may prefer informational texts (Caswell & Duke, 1998; Mohr, 2006) and ratings of interestingness may be based on text features that are associated with specific genres (Hidi & Baird, 1986). In one study, for example, 84% of first grade students selected nonfiction texts for recreational reading because they were interested in the topic (Mohr, 2006). Notably, reading comprehension test scores and teacher ratings of student motivation correlated with narrative text motivation, but not informational text motivation (Guthrie et al., 2007).

Implications for Research

Research investigating the component skills required for comprehension by text type suggests the comprehension of narrative and informational texts necessitates that readers rely on different abilities. Most studies of informational text comprehension analyzed reader abilities in comparison to narrative text. This is problematic due to the inherent differences in the texts. Specifically, narrative and informational texts are read for different purposes, contain different text structures and features, and readers respond with different levels of success to the same question types in these different texts (Eason et al., 2012). Therefore, future research must examine the components influencing informational text comprehension for different readers without attempting a direct comparison to narrative text.

In addition, studies comparing the comprehension of narrative and informational text focused predominately on decoding and prior knowledge. In Best and colleagues' (2008) study, decoding and world knowledge accounted for less than 25% of the variance in the comprehension of narrative and informational texts. This indicates that other competencies should be investigated and these competencies may vary by text type. According to the findings of Eason and colleagues (2012), "the differences between the cognitive skill requirements for narrative versus expository texts suggest the need to consider measures of type in order to fully understand the cognitive skills required for reading comprehension" (p. 523). Because the skill sets needed for the comprehension of each text type appear to be different based on a limited number of studies in the field, more research is needed that investigates reader differences by text type.

Patterns of Reading Abilities/Research on Student Profiles

The study of reading comprehension is complex not only because various components affect reading comprehension and these components vary by text type, but also because readers differ considerably in the component skills they bring to a text. Therefore, one important challenge for reading comprehension research and instruction involves identifying patterns of strengths and weaknesses for individual children (RAND Reading Study Group, 2002). Readers, especially those struggling with comprehension, are not homogenous (Allington & McGill-Franzen, 2009). Research that develops profiles of students to determine where they experience comprehension difficulties is essential for designing instruction that meets these diverse educational needs (Leseaux & Kieffer, 2010;

Valencia, 2011). In this research, a *profile* refers to the “variability in reading-related skills and strategies within an individual student that characterize patterns of strengths and weaknesses” (Valencia, 2011).

Historically, research on student profiles have been influenced by two main areas (Valencia, 2011): (a) the examination of reading processes and sub-processes based on the simple view of reading (e.g., Gough & Tunmer, 1986); and (b) those investigating the identification and characteristics of learning disability (e.g., Stanovich, 1988). Researchers influenced by the simple view created three main profiles for low readers: readers with word identification difficulty only; readers with listening comprehension difficulty only and; readers with both word identification and listening comprehension difficulty (Valencia, 2011). In contrast, researchers interested in learning disabilities focused on identifying homogenous groups of disabled readers for more accurate classification and focused on understanding the cognitive processes involved in learning disabilities.

Current profile research has broadened considerably to investigate students who do not pass state mandated reading comprehension assessments, both high and low comprehenders, and those who have special education identification. Recently, one area of profile research focused on low comprehenders who did not pass state assessments of reading comprehension (Valencia, 2011). These studies demonstrate that readers who score low on comprehension measures possess different strengths and needs that require individualized instruction. Riddle Buly and Valencia (2002) investigated the patterns of reading abilities of fourth grade students who were not proficient on the Washington Assessment of Student

Learning (WASL). Based on a factor analysis of group scores, fluency (rate and expression) and problems constructing meaning influenced low performance on the WASL. In this analysis decoding ability did not contribute to failing scores because students could decode at higher levels than they could comprehend. Cluster analysis revealed the individual patterns of students within the group of failing students that were not apparent in the factor analysis. Clusters profiled students who were strong in decoding and fluency but low in meaning; students who experienced mostly decoding difficulty; students who experienced mostly a fluency difficulty with or without a comprehension problem; and students who were low in all areas (word identification, fluency, and meaning).

Basing her study on Riddle Buly and Valencia (2002), Dennis (2013) assessed 94 middle school students (ages 11-14) who failed the Tennessee state assessments in reading. Four groups of students emerged through cluster analysis. The first cluster represented “slow and steady comprehenders” who exhibited high comprehension and strong decoding skills; however, these students had slow reading rates and difficulty decoding nonsense words. Fluency was the main concern with this group. The second cluster labeled “slow word callers” consisted of students with strong spelling skills but weak meaning scores and slow reading rates. They possessed strong orthographic knowledge, but slow reading rates and low vocabulary knowledge that hindered comprehension. The third cluster regarded as “automatic word callers” had strong decoding skills and fast reading rates, but low levels of comprehension. The fourth cluster called “struggling word callers” read quickly but inaccurately and had overall lower levels of automaticity than their peers. The majority of

poor comprehenders in this study had mastery of constrained skills (i.e., decoding), but needed more instruction and support with fluency, vocabulary, and comprehension.

Lesaux and Kieffer (2010) explored the comprehension difficulties of 262 sixth grade language minority and native English speakers. Three profiles emerged: “slow word callers” (60.3% of sample) with above-average word reading skills and low vocabulary and fluency skills; “globally impaired readers” (21.4% of sample) with below average performance on all measures; and “automatic word callers” (18.3% of sample) with above-average word reading and average fluency but below-average vocabulary. Reading accuracy and efficiency distinguished the groups and all groups exhibited low vocabulary skills, indicating underdeveloped language skills. Children with language minority status were equally distributed across the three profiles and this did not predict membership in any of the groups.

Other studies investigated readers with both low and high comprehension and included more variables beyond cognitive abilities (Floyd et al., 2006; Logan et al., 2011; Pierce et al., 2007). For example, Logan and colleagues studied 111 children ages nine to eleven to determine which cognitive and motivational factors contributed to high- and low-ability readers’ comprehension. The variation in reading comprehension of high-ability readers was explained by IQ while decoding skills and intrinsic motivation explained variation among low-ability readers. From this study, motivation and decoding skills emerge as important factors for low-ability readers. In contrast, high-ability readers rely on their verbal abilities instead of decoding skills or motivation for reading. Intrinsic motivation also explained significant but small variation in reading growth over one school year. This study

indicates that motivation may be an important variable influencing the differences in comprehension between high and low readers.

Still other lines of profile research have focused on the developmental aspects of reading and how this may influence special education identification. Leach, Scarborough, and Rescorla (2003) studied 161 fourth and fifth graders with early- and late-identified reading disabilities and normal achieving students. Based on students' results on multiple measures, they were grouped as having no reading difficulties, word-level processing difficulties, reading comprehension difficulties, or both word-level and comprehension difficulties. Although great variation existed in the skills of early- and late-identified students, those identified early had fewer comprehension only deficits and those identified late had more, indicating word level difficulties are often identified earlier than comprehension difficulties. Sixty-one percent of students with word level or both deficits were identified by third grade. These results indicate that students who are identified late (in third grade or later) are more likely to have comprehension only deficits while students identified earlier are more likely to have word level or both deficits. Lipka, Lesaux, and Siegel (2006) also noted the heterogeneous nature of reading development in children and part of their sample did not indicate reading difficulties until third or fourth grade.

Implications for Research

Through research on student profiles, researchers have consistently revealed the within-reader variability and the corresponding diverse individual strengths and weaknesses of readers who exhibit comprehension difficulties. Readers who struggle with comprehension

require instruction in one or more areas of reading such as decoding, vocabulary, meaning construction, fluency, and motivation. Although these profiles provide essential information about how these components contribute to reading comprehension and how this varies for different readers, much of the research fails to consider how comprehension might also vary as readers encounter different types of texts.

The measures and data analysis methods utilized by researchers did not allow for the creation of student profiles that revealed comprehension difficulties by text type. One study used a reading assessment that employed both narrative and informational text passages (Lesaux & Kieffer, 2010). Two studies utilized informal reading inventories that measured both narrative and informational text comprehension and found narrative comprehension exceeded informational text comprehension (Riddle Buly & Valencia, 2002; Dennis, 2013). Unfortunately, these studies used cluster analysis which combined all comprehension measures into a “meaning” factor. As a result, text type was not directly explored in their analyses, even though it differed for readers. Furthermore, Riddle Buly and Valencia (2002) found that readers performed differently on not only reading comprehension but also the component skills related to narrative and informational text passage comprehension. In narrative texts, students were more proficient in word identification, comprehension, and reading rate, and scored equally or slightly higher on measures of expressive fluency. This research indicates that when readers engage with different text types, differences exist in text comprehension and the usage of component skills.

Profile research has not yet considered text type as a within-reader variable influencing reading comprehension. Although we know there is great diversity in high and low comprehenders, discovering if there is a difference in the reading components they depend on while reading different text types is a necessary first step. Factors including text type, background knowledge, motivation, and vocabulary knowledge are “rarely considered in research on reader profiles” (Valencia, 2011, p. 33). Reader profile research could be strengthened by including more variables of interest and differentiating between narrative and informational text comprehension because there is reason to believe readers will exhibit comprehension differences based on text type (Riddle Buly and Valencia, 2002).

Summary

The CCSS emphasize the importance of informational text comprehension to prepare students for college and careers. As instruction shifts towards a focus on informational text, an immediate need exists to understand the skills, knowledge, and abilities readers utilize to comprehend these texts. Comprehension is a complex process and readers are heterogeneous. Consequently, readers rely on different skills to comprehend narrative and informational texts. Most studies of informational text comprehension view reader abilities in comparison to narrative text. This is problematic due to the differences in the texts’ structures, purposes, and content. Therefore, informational text comprehension and differences between the cognitive and motivational skills of high and low comprehenders of this text type must be studied separately from narrative text. This study examined individual variables that may drive informational text comprehension. It also investigated the heterogeneity of readers by

examining the reader abilities that influence informational text comprehension for higher and lower readers.

The Present Study

The current study aimed to build on prior research by investigating the components shown to vary by text type and included those that may help to explain some of the variance in reading comprehension by text type that remains unexplained. This study intended to advance the field toward a clearer understanding of the complex, interrelated factors that lead to comprehension of informational text and determine if or how these factors varied for successful or unsuccessful comprehenders.

Research Questions

The current study addressed the following research questions: (a) how are specific reading components (decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation) related to third, fourth, and fifth grade students' comprehension of informational text; and (b) to what extent are these relationships different for students with higher and lower comprehension of informational text.

CHAPTER 3

METHODS

Introduction to the Chapter

This study addressed the following research questions: (a) how are specific reading components related to third, fourth, and fifth grade students' comprehension of informational text; and (b) to what extent are these relationships different for students who demonstrate higher and lower comprehension of informational text. The independent variables of interest included (a) decoding efficiency, (b) vocabulary knowledge, (c) prior knowledge, and (d) intrinsic motivation. Informational text reading comprehension was the dependent variable of interest. Multiple regression analyses were used to examine the cognitive and motivational factors that influence informational text comprehension in general and for more successful and less successful comprehenders. I begin this chapter by describing the student participants and their school context. I then provide information about the procedures and measures used in the study. Finally, I discuss how data was collected and analyzed to address each research question.

Participants

Participants included 192 students from one public elementary school in a medium, southeastern school district. In the 2012-2013 school year, the K-5 school served 442 students who were 63.8% African American, 25.6% Caucasian, 5% Hispanic, 4.8% more than one race/ethnicity, and 1.6% Asian. This elementary school was a Title 1 school with

over half of the students receiving free or reduced price lunch. Overall, 57% of students performed at or above grade level in reading during the 2011-2012 school year as measured by a statewide-standardized assessment. Students in regular education classrooms in third, fourth, and fifth grade were eligible to participate in the study. Students with disabilities that required instruction in self-contained classrooms and students who could not speak conversational English were excluded from the study.

Of the 192 students eligible to participate, 15 were excluded from data analysis because of missing data (N = 2), parental request (N = 1), movement from the school (N = 1), and noncompliance during testing administration¹ (N = 11). The final sample included 177 students that were predominately African American (61%) and female (51%). Ages ranged from 7 years to 12 years, 7 months (see Table 2 for complete demographic information). The number of books in the home is often used as a proxy for SES (Koretz, 2008). In this study, 26% of students reported 0-10 books at home, 28% reported 11-25 books at home, 24% reported 26-100 books at home, and 22% reported more than 100 books at home indicating the sample includes students from diverse economic backgrounds. This sample included students with fewer books in the home than the nationally representative sample that responded to the NAEP (U. S. Department of Education, Institute of Education Sciences, & National Center for Education Statistics, 2014). On the NAEP, 12% of students reported 0-10 books at home, 22% reported 11-25 books at home, 35% reported 26-100 books at home, and 30% reported more than 100 books at home.

¹ Noncompliance was defined as the student's refusal to complete the assessment or the student answering questions without reading the passages and questions.

Table 2

Participant Information

	Grade 3	Grade 4	Grade 5	All
N	56	62	59	177
Age	8.4 (.49)	9.3 (.42)	10.4 (.54)	9.4 (.96)
Sex				
Male	23	34	30	87
Female	33	28	29	90
Special Education	2	8	9	19
AIG	---	3	12	15
Race/Ethnicity				
Caucasian	16	18	20	54
Black/African Am.	36	40	32	108
Asian	1	0	0	1
Hispanic/Latino	3	2	2	7
Other	0	2	5	7

Note: AIG = Academically and Intellectually Gifted; Standard deviations in parentheses.

Third, fourth, and fifth grades were chosen for this study because of the importance of understanding how students in these grade levels comprehend informational texts. These students are most influenced by the CCSS requirement that instruction utilize equal amounts of informational and narrative text by fourth grade. Also, the increase in informational text in

the upper elementary grades has been blamed for the “fourth grade slump” (Chall et al., 1990) in which students often exhibit a decline in reading after third grade.

Procedures

After the North Carolina State University Institutional Review Board and the school district approved the study, all students brought home a letter informing their parents about the study (see Appendix A). Parents who wished to have their children exempted from the research project were asked to contact me (N=1). The remaining students completed tests on three separate occasions over the course of six weeks. I administered all assessments.

In the first phase, each class was group-administered two assessments in their classroom. These assessments spanned two 30-minute sessions. These whole-group measures included a reading comprehension assessment, which contained four informational and two narrative text passages with multiple choice questions, followed by three subscales of the Motivations for Reading Questionnaire (MRQ; Wigfield & Guthrie, 1995) to measure students’ intrinsic motivation. Students absent during the whole-group administration or who did not complete the assessment within the allotted time were tested within three weeks of the missed testing session, and the test administrator followed the same procedures.

In the second phase, individual students were pulled from their classrooms for 35- to 50-minute assessment sessions. Individual assessment sessions occurred in an empty classroom or office space. The duration for this individual assessment session varied based on the level of the student.

During these sessions, students completed three assessments. These assessments included the Test of Word Reading Efficiency (TOWRE-2; Torgesen, Wagner, & Rashotte, 2012), the Test of Oral Language Development (TOLD I:4; Hammill & Newcomer, 2008), and the Woodcock Johnson Academic Knowledge Test (WJ AKT; Woodcock, McGrew, & Mather, 2001).

Measures

In all, students completed five assessments that addressed six different reading components. Table 2 provides a list of the assessments, the cognitive and motivational component they addressed, whether they were administered at the individual or group level, and the approximate time for administration.

Table 3

Assessment and Component

Assessment	Component	Administration	Time
Reading Comprehension Passages	Informational and Narrative Text Comprehension	Group	45-50 min
Motivations for Reading Questionnaire (MRQ; Wigfield & Guthrie, 1995)	Intrinsic Motivation	Group	10 min
Test of Word Reading Efficiency (TOWRE-2; Torgesen, Wagner, & Rashotte, 2012)	Decoding Efficiency	Individual	3-5 min
Test of Oral Language Development (TOLD I:4; Hammill & Newcomer, 2008)	Vocabulary Knowledge	Individual	20-30 min
Woodcock Johnson Academic Knowledge Test (WJ AKT; Woodcock, McGrew, & Mather, 2001)	Prior Knowledge	Individual	15-20 min

Reading Comprehension Passages

To assess students' reading comprehension, I compiled a group of passages, with their corresponding multiple-choice questions, from the National Assessment of Educational Progress (NAEP) fourth-grade tests in reading. The NAEP is the only nationally representative assessment in the United States, and it has measured student achievement since 1969 (see Vinovskis [1989] for a historical overview of NAEP). Over the years, the

assessment has continually undergone considerable development and evaluation. Items are reviewed by external reading committees and state-level testing and reading experts for bias, sensitivity, and technical qualities. The National Assessment Governing Board also evaluates the NAEP before and after field testing to ensure items are appropriate and unbiased (National Assessment Governing Board, 2011).

Reading Passages. The reading comprehension assessment included four informational and two narrative passages that were operationalized as *informational text comprehension* and *narrative text comprehension*, respectively. These passages have been administered to fourth graders across the nation to evaluate reading progress (see Appendix B for passages and corresponding questions). See Table 4 for the title, text type, and number of words for each passage. During administration, the presentation of the informational text passages were counterbalanced and presented in two different orders. Preliminary data analysis examined if there were differences in student scores based on passage order, and these results are presented in Chapter 4.

Table 4
Reading Comprehension Passages

Title	Text Type	Number of Each Question Type			Total Questions	Word Count
		Easy	Medium	Hard		
<i>Daddy Daycare</i>	Informational	4	2	0	6	767
<i>Marian's Revolution</i>	Informational	4	1	1	6	738
<i>What's the Buzz?</i>	Informational	5	0	0	5	528
<i>Ellis Island: Doorway to America</i>	Informational	3	1	0	4	1100
<i>The Box in the Barn</i>	Narrative	4	1	0	5	1029
<i>Tough as Daisy</i>	Narrative	3	3	0	6	796

Comprehension Questions. Each NAEP passage included corresponding questions that addressed students' literal and inferential understanding. Questioning is the most common form of comprehension assessment (U.S. Department of Health and Human Services, 2000). In all, the informational and narrative text comprehension measures contained 21 and 11 questions, respectively. The NAEP rates questions as easy, medium, or hard based on the percentage of students who responded correctly to the questions the year the passage was administered to the national sample of students. Easy questions were

answered correctly by over 60% of the students who took the test. Medium questions were answered correctly by 40% to 60% of the students who took the test. Hard questions were answered correctly by fewer than 40% of the students who took the test. See Table 4 for the number of each type of question for each passage.

Score. All correct items were totaled by text type to create two raw scores (one for informational text comprehension and one for narrative text comprehension) that were converted to z scores for analyses (mean = 0; SD = 1). Data for both narrative and informational text comprehension were examined because the comprehension of one text type should be highly correlated with the comprehension of the other.

Motivations for reading Questionnaire (MRQ)

The Motivations for Reading Questionnaire (MRQ; Wigfield & Guthrie, 1995) contains 54 items that measure 11 dimensions of reading motivation. Each item is read aloud and students respond on a scale from 1 to 4 (1-very different from me, 2-a little different from me, 3-a little like me, 4-a lot like me). Watkins and Coffey (2004) noted the shortcomings of the MRQ when they examined its structural validity with two samples of students and found an eight factor structure was supported over the original 11 factor structure. Nevertheless, the MRQ is a viable measure and certain subscales or adapted versions are commonly used in research (e.g., Bråten, Ferguson, Anmarkrud, & Strømsø, 2013; Logan et al., 2011). Like Wang and Guthrie (2004), I was interested in intrinsic motivation, which can be measured with three subscales from the MRQ. Intrinsic motivation

is “choosing to do and then doing an activity for its own sake, rather than for ‘extrinsic’ reasons such as receiving recognition or grades” (Wigfield & Guthrie, 1997, p. 421)

The first subscale, Curiosity, measures a student’s desire to learn more or about new things. It contains seven items including, “I like to read about new things” and “If the teacher discusses something interesting I might read more about it.” Reliability (Cronbach’s alpha) is .67 (Wang & Guthrie, 2004). The second subscale, Involvement, measures a student’s level of engagement with text. It contains seven items including, “If I am reading about an interesting topic I sometimes lose track of time” and “I enjoy a long, involved story or fiction book.” Reliability (Cronbach’s alpha) is .71 (Wang & Guthrie, 2004). The third subscale, Challenge, measures a student’s desire to master or work with complex materials. It contains five items including, “If a book is interesting I don’t care how hard it is to read” and “I like it when the questions in books make me think.” Reliability (Cronbach’s alpha) is .64 (Wang & Guthrie, 2004). The 19 items for all three subscales were summed and divided by 19. This calculation maintained the natural 1-4 metric of the assessment and ensured the regression coefficients would be interpretable. This score was operationalized as *intrinsic motivation*.

Test of Word Reading Efficiency (TOWRE-2)

The TOWRE-2 (Torgesen et al., 2012) is a standardized, norm-referenced assessment of automatic word recognition and was operationalized as *decoding efficiency*. This assessment consists of two subtests: Sight Word Reading Efficiency and Phonemic Decoding Efficiency. Both subtests are administered and scored the same way; however, students read real words in the first subtest and “nonsense” words (phonetically correct words without

meaning) in the second subtest. In each subtest, students have 45 seconds to read as many words from a list as possible. If a student hesitates for three seconds, the administrator marks the word incorrect and tells the student to go on to the next word. All words read correctly in the allotted time were counted as one point to determine the raw score. The raw scores for each subtest were then converted to scaled scores. These scaled scores were added together and converted into a norm-referenced age-based standard score (mean = 100, SD = 15), Total Word Reading Efficiency, which provides a picture of a student's word decoding efficiency and automaticity. Reliability for both subtests combined is .95 (Torgesen et al., 2012).

Test of Oral Language Development (TOLD I:4)

The TOLD I:4 (Hammill & Newcomer, 2008) is a standardized, norm-referenced test designed to measure a child's language competencies and was operationalized as *vocabulary knowledge*. Three subtests were administered: (a) Picture Vocabulary, (b) Relational Vocabulary, and (c) Multiple Meanings. For all subtests, each correct item or response received one point. Points were totaled to determine the raw score, and then all three subtest scores were converted to one norm-referenced age-based standard score (mean = 100, SD = 15) called Semantics.

Picture Vocabulary. The Picture Vocabulary subtest measures a reader's receptive vocabulary. A reader is directed to look at a page with eight pictures on it. The administrator says two words (for example, "playful primate") and the student is directed to point to the picture that matches those words. After a student misses two questions on a given page, they move on to the next page. In all, there are ten pages and 80 possible items. Internal

consistency reliability for students ages eight to eleven is .94 to .96 (Hammill & Newcomer, 2008).

Relational Vocabulary. The Relational Vocabulary subtest is an organizing task in which the student must state how three spoken words are similar. For example, the administrator says the words “dog, horse, cat” and the student could respond “animals.” In a more difficult item, the administrator says “miniscule, petite, diminutive” and the student could respond “small.” This subtest contains 30 items and administration continues until the student misses three items in a row. Internal consistency reliability for students ages eight to eleven is .91 to .92 (Hammill & Newcomer, 2008).

Multiple Meanings. The Multiple Meanings subtest measures a student’s knowledge of homophones. It contains 15 items with multiple answers each worth one point. Students are administered all items. The administrator says a word and the student gives all the meanings they know for the word. For example, the administrator could say the word “cent” and the student would respond with all of the definitions or meanings they know (e.g., “a penny,” “a smell,” “when something is delivered in the mail”). Internal consistency reliability for students ages eight to eleven is .94 to .97 (Hammill & Newcomer, 2008).

Woodcock Johnson Academic Knowledge Test (WJ AKT)

The WJ AKT (Woodcock et al., 2001) is a standardized, norm-referenced assessment of a child’s knowledge. The WJ AKT was operationalized as *prior knowledge* because it assesses a student’s general understanding of science, culture, and social studies. This test is part of the *Woodcock-Johnson III Normative Update Tests of Academic Achievement* and

consists of three subtests: (a) Science, (b) Social Studies, and (c) Humanities (see Table 5 for information about each subtest). For correct scoring, each student must reach his/her basal level where the three lowest-numbered items are scored correct and his/her ceiling level where the three highest-numbered items are scored incorrect. All students began each subtest on the numbered item at the starting point recommended by the administration guided for their grade level. If this was the student's basal level, all items before the suggested starting point were scored correct. If this was not the student's basal level, the student was tested on the items before the suggested starting point to determine the basal level. Each correct item received one point and these points were summed to compute the raw score. The raw scores across all three subtests were summed and converted to an age-based standard score (mean = 100, SD = 15) for analysis. Reliability ranges from .82 to .85 for students ages eight to eleven.

Table 5

Woodcock Johnson Academic Knowledge Test

Subtest	Number of Items	Suggested Starting Point	Sample Item
Science	28	Item 10	Item 16: “What is it called when a bear sleeps through the winter?”
Social Studies	28	Item 11	Item 19: “What is it called when a group of employees refuses to work in order to gain higher pay?”
Humanities	22	Item 8	Item 11: “What is a large group of singers called?”

Data Entry and Analysis

Data on all variables of interest were entered into and analyzed with STATA 12 (StataCorp, 2011). Before analysis, descriptive data for all variables, including means, standard deviations, and correlations were examined and reported. Then, three hierarchical multiple regressions were performed to determine which specific reading skills uniquely predicted informational text comprehension for all readers and then for those with higher and lower comprehension. A bottom-up approach was selected for the entry of component skills into the hierarchical regressions. This choice was made because the Construction-Integration Model is considered a bottom-up model of comprehension (Graesser, 2007; Kintsch, 1988) in which textual input activates prior knowledge. The final regression models were also

examined because the Interactive-Compensatory Model permits both higher- and lower-level processors to work simultaneously to construct meaning from a text.

Reading Components and Informational Text Comprehension

To address the first research question and examine the unique relationship between informational text comprehension and specific reading components, a hierarchical regression was performed with informational text comprehension as the dependent variable. The variables predicted to explain informational text comprehension were entered in five steps using a bottom-up approach. In step 1, age and grade were the independent control variables. In steps 2-5, the following independent variables were entered as separate steps in this order: decoding efficiency (TOWRE-2), vocabulary (TOLD), prior knowledge (WJ AKT), and intrinsic motivation (MRQ). After conducting the hierarchical regression, the final model that included all predictors was examined to determine the overall influence of each variable on informational text comprehension. Based on previous research, I hypothesized that prior knowledge and vocabulary knowledge would exhibit the greatest influence on informational text comprehension for the whole sample.

Reading Components for Higher and Lower Comprehenders

Then, to address the second research question concerning the extent to which these relationships differed for students with higher and lower comprehension of informational text, two multiple regressions were performed. The same variables were entered into the regressions for the split sample in the same order as for the whole sample. Students were split into two groups based on their informational text comprehension scores (higher and lower

comprehenders) and each of these new variables became the dependent variables in these two models. For the first analysis, informational reading comprehension for lower comprehenders (equal to and below the median) was the outcome measure, and informational reading comprehension for higher comprehenders (above the median) was the outcome measure in the second analysis. This method was selected because it preserves the sample size and increases the power to detect significant effects; however, there are limitations to this approach. Unfortunately, students very close to the median on both sides of the split could easily fall into either group. The same steps were used to address this second research questions as the first. The final model that included all predictors was again examined to determine the overall influence of each variable on informational text comprehension for higher and lower comprehenders separately.

Summary

In summary, three hierarchical multiple regression analyses were conducted to address the research questions. The first regression included the whole sample to determine which component skills influenced informational text comprehension in general. The remaining two regressions were conducted on the split sample to investigate if and how those components differed for higher and lower comprehenders. In all analyses, informational text comprehension was the dependent variable. Age and grade were entered in Step 1 as control variables. The independent variables were entered one at a time in Steps 2-5 in the following order: decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation.

CHAPTER 4

RESULTS

Introduction to the Chapter

I begin this chapter by reporting preliminary analyses, including descriptive statistics and correlations for all study variables. I then provide the results of the hierarchical regression analyses that addressed each research question. The first question investigated which component reading skills (decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation) influenced reading comprehension for the whole sample. The second question investigated how the contributions of these reading components varied for lower and higher comprehenders.

Preliminary Analyses

Descriptive Statistics

The descriptive statistics and correlation coefficients among variables are reported in Table 6 for the entire sample. Moderate to strong correlations existed among all measures except for intrinsic motivation, which was only significantly and weakly correlated with informational comprehension ($r = .18$) and narrative comprehension ($r = .16$). The correlations between prior knowledge and vocabulary knowledge ($r = .82$) and informational comprehension and narrative comprehension ($r = .75$) were particularly strong. Of note, decoding efficiency was more strongly correlated with narrative comprehension than

informational comprehension, while the reverse was true for vocabulary knowledge, prior knowledge, and intrinsic motivation.

Overall, on age-based standardized measures of decoding efficiency, vocabulary knowledge, and prior knowledge, students performed within the average range with scores slightly below the mean. There was a large range in scores in the sample, indicating a variety of ability levels ranging from very low to very high.

Table 6

Descriptive Statistics and Correlation Coefficients (whole sample; N = 177)

Variable	1	2	3	4	5	6
1. Informational Comp.	----					
2. Narrative Comp.	.75**	----				
3. Decoding Efficiency	.49**	.56**	----			
4. Vocabulary Knowledge	.65**	.58**	.59**	----		
5. Prior Knowledge	.56**	.53**	.56**	.82**	----	
6. Intrinsic Motivation	.18*	.16*	.07	.13	.08	----
Mean	0	0	93.0	93.2	91.1	2.9
SD	1	1	14.7	16.2	14.9	.5
Min	-1.8	-2.3	56.0	57.0	50.0	1.6
Max	1.9	1.6	127.0	132.0	130.0	4.0

* $p < .05$; ** $p < .01$

Counterbalancing Passages

Informational text passages were counterbalanced to ensure there were no effects of passage order. Results from independent samples t -tests indicated no difference in informational text comprehension scores based on the order of passages in the test book for

the whole sample ($t[1, 175] = 1.95, p > .05$) and for each grade (grade 3: $t[1, 54] = .80, p > .42$; grade 4: $t[1, 60] = .82, p > .41$; grade 5: $t[1, 57] = 1.38, p > .17$).

Predicting Informational Text Comprehension

To examine the unique relationship between each of the reading components and informational text comprehension, I conducted a five-step hierarchical regression analysis for the entire sample ($N = 177$). Because of differences in informational text comprehension and component skill scores by grade and age, these variables were entered as controls in the first step. In the second through fifth steps, the reading components of decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation were entered one at a time using a bottom-up approach. The model is presented in Table 7.

In the first step, age and grade accounted for 15.5% of the variance in informational text comprehension. The addition of decoding efficiency in the second step and vocabulary knowledge in the third step explained an additional 23% and 21.6% of the variance in informational text comprehension, respectively. Prior knowledge and intrinsic motivation explained additional variance in reading comprehension; however, their contributions were small (1.2% and 1.1%, respectively). The high correlation between vocabulary knowledge and prior knowledge may explain why prior knowledge accounted for so little additional variance in the model.

Overall, the complete model with all predictors (step 5) explained 62.5% of the variance in informational text comprehension, and all reading components were unique predictors. A one standard deviation increase in vocabulary, prior knowledge, and decoding

efficiency increased informational text comprehension by .39, .21, and .18 standard deviations, respectively. A one point increase in intrinsic motivation (e.g., from “a little like me” to “a lot like me”) increased informational text comprehension by .23 standard deviations (note: a one point change in intrinsic motivation is a two standard deviation increase).

Table 7

*Hierarchical Regression Analyses for Informational Text Comprehension
(whole sample; N = 177)*

	β	SE β	R^2	ΔR^2
Step 1			.155	
Age	-.190**	.145		
Grade 4	.584***	.215		
Grade 5	1.334	.344		
Step 2			.385	.230***
Age	.165	.132		
Grade 4	.328	.186		
Grade 5	.588	.309		
Decoding Efficiency	.035	.004***		
Step 3			.601	.216***
Age	.330**	.108		
Grade 4	.146	.152		
Grade 5	.240	.252		
Decoding Efficiency	.013**	.004		
Vocabulary Knowledge	.036***	.004		
Step 4			.613	.012*
Age	.383**	.109		
Grade 4	.076	.153		
Grade 5	.163	.251		
Decoding Efficiency	.012**	.004		
Vocabulary Knowledge	.027***	.005		
Prior Knowledge	.014*	.006		
Step 5			.625	.011*
Age	.332**	.110		
Grade 4	.147	.154		
Grade 5	.294	.255		
Decoding Efficiency	.012**	.004		
Vocabulary Knowledge	.026***	.005		
Prior Knowledge	.014*	.006		
Intrinsic Motivation	.233*	.103		

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Higher and Lower Comprehenders

Descriptives

To preserve the sample size and maintain enough power for analysis, the sample was split at the median for informational text comprehension (median score = -.02). Z-scores for informational text comprehension ranged from -1.77 to -.02 for lower comprehenders and .17 to 1.91 for higher comprehenders. Lower comprehenders attained scores equal to and below the mean while higher comprehenders attained scores above the mean. Table 8 includes descriptive data for the split sample on all study variables. Overall, lower comprehenders were below average on reading component skills compared to age-based norms while higher comprehenders were average. The lower comprehenders' sub-sample included all of the special education students from the whole sample and was 53% male and 87% minority. Sixty-four percent reported 0-25 books at home and 36% reported 26 or more books at home. The higher comprehenders sub-sample included all of the AIG students from the whole sample and was 45% male and 50% minority. Forty-four percent reported 0-25 books at home and 56% reported 26 or more books at home.

Table 8

Performance on Measures by Lower and Higher Informational Text Comprehension Groups

Measure	<u>Lower Comprehenders (N = 93)</u>			<u>Higher Comprehenders (N = 84)</u>		
	Mean (SD)	Min	Max	Mean (SD)	Min	Max
Informational Comprehension	-.8 (.5)	-1.8	.0	.9 (.5)	.2	1.9
Narrative Comprehension	-.7 (.8)	-2.3	1.2	.8 (.6)	-.5	1.6
Decoding Efficiency	86.1 (13.9)	56.0	118.0	100.6 (11.6)	74.0	127.0
Vocabulary Knowledge	83.3 (12.8)	57.0	116.0	104.1 (12.1)	73.0	132.0
Prior Knowledge	83.6 (13.2)	50.0	117.0	99.4 (12.1)	73.0	132.0
Intrinsic Motivation	2.8 (.5)	1.6	4.0	3.0 (.5)	1.7	3.8

Hierarchical Regressions

The second set of hierarchical regression analyses examined how the same reading components predicted reading comprehension for lower and higher comprehenders. The variables were entered in the same stepwise manner for the split sample as they were in the previous analysis with the whole sample. Table 8 shows the results of the regression models for lower and higher comprehenders.

Lower comprehenders. In step 1, age and grade accounted for an insignificant 2.2% of variance in informational text comprehension. In step 2, decoding efficiency accounted for a significant 4.2% of the variance in reading comprehension beyond age and grade. In steps 3 and 4, vocabulary knowledge and prior knowledge did not account for any additional variance. In step 5, intrinsic motivation was marginally significant ($p = .06$) and accounted for 3.7% of the variance in informational text comprehension beyond the other variables.

Overall, the final model that included all predictors (step 5) accounted for only 12.7% of the variance in reading comprehension for lower comprehenders, and none of the component skills explained unique variance.

Higher comprehenders. In step 1, age and grade accounted for an insignificant 13.4% of the variance in informational text comprehension. In step 2, decoding efficiency did not explain any unique variance above age and grade (16.2%). In step 4, vocabulary was a unique predictor of informational text comprehension above age, grade, and decoding efficiency, explaining an additional 1.1% of variance. In step 5, intrinsic motivation did not explain any significant variance beyond any other reading components in the model.

Overall, the final model explained 43.4% of the variance in reading comprehension for higher comprehenders, and vocabulary knowledge was the only unique predictor of reading comprehension. A one standard deviation increase in vocabulary knowledge increased informational text comprehension by .26 standard deviations.

Comparing lower and higher comprehenders. For lower comprehenders, decoding efficiency explained unique variance in step 2, and intrinsic motivation was marginally significant in step 5. For higher comprehenders, vocabulary knowledge explained unique variation in step 4. Overall, the final models (step 5) for lower and higher comprehenders explained different amounts of variance (12.7% and 43.4%, respectively). When comparing the relative weights of the coefficients, decoding efficiency and intrinsic motivation were more important for low comprehenders. The coefficient for the lower comprehenders compared to the higher comprehenders in decoding was five times larger and the coefficient for intrinsic motivation was double. In contrast, vocabulary knowledge was a better predictor for higher comprehenders than lower comprehenders.

Table 8

Hierarchical Regression Analyses for Informational Text Comprehension (median split)

	Lower Comprehenders (N = 93)				Higher Comprehenders (N = 84)			
	β	SE β	R^2	ΔR^2	β	SE β	R^2	ΔR^2
Step 1			.022				.134	
Age	-.041	.096			.025	.135		
Grade 4	.108	.144			.203	.195		
Grade 5	.271	.253			.451	.300		
Step 2			.064	.042*			.162	.028
Age	.044	.103			.071	.136		
Grade 4	.057	.144			.223	.193		
Grade 5	.131	.259			.408	.298		
Decoding Eff.	.008*	.004			.008	.005		
Step 3			.066	.001			.413	.251***
Age	.057	.110			.148	.116		
Grade 4	.052	.145			.156	.163		
Grade 5	.118	.262			.320	.252		
Decoding Eff.	.007	.004			.001	.004		
Vocabulary Kn.	.002	.005			.023***	.004		
Step 4			.090	.024			.424	.011
Age	.108	.114			.168	.116		
Grade 4	.005	.147			.122	.165		
Grade 5	.040	.266			.302	.251		
Decoding Eff.	.006	.004			.001	.004		
Vocabulary Kn.	-.003	.006			.018**	.006		
Prior Knowledge	.009	.006			.007	.006		
Step 5			.127	.037			.434	.009
Age	.039	.118			.169	.116		
Grade 4	.110	.155			.120	.165		
Grade 5	.221	.278			.310	.251		
Decoding Eff.	.005	.004			.001	.004		
Vocabulary Kn.	-.003	.006			.017**	.006		
Prior Knowledge	.009	.006			.008	.006		
Intrinsic Motivation	.206	.108			.116	.103		

Note: * $p < .05$; ** $p < .01$; *** $p < .001$; Decoding Eff. = Decoding Efficiency; Vocabulary Kn. = Vocabulary Knowledge

CHAPTER 5

DISCUSSION

Introduction to the Chapter

The aim of the present study was to extend our understanding of factors necessary for informational text comprehension. Factors were examined for readers in general, and then more specifically for higher and lower comprehenders. In this chapter, I begin with a summary of the findings, and then connect the findings to previous research while focusing on implications for policy, practice, and research. I end with limitations of the study and directions for future research.

Summary of Results

Hierarchical regression analyses were used to study the unique contributions of decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation to informational text comprehension beyond the control variables of age and grade. In the whole sample, the current findings suggest the present variable set succeeded well in predicting informational text comprehension. These variables explained 63% of the total variance, and all were unique predictors that explained additional variance in informational text comprehension when entered into the hierarchical regression model in a bottom-up fashion. Beyond the control variables of age and grade, decoding efficiency explained 23% of the variance in informational text comprehension. The addition of vocabulary knowledge in the next step explained 22% more variance. Although their predictive power was smaller,

prior knowledge and intrinsic motivation each explained additional variance in the final two steps. Overall, vocabulary knowledge demonstrated the largest influence on informational text comprehension ($\beta = .026$), and the influence of this variable was about two times larger than prior knowledge ($\beta = .014$) and decoding efficiency ($\beta = .012$).

Next, I examined whether the factors would contribute differently to informational text comprehension for higher and lower comprehenders. The split sample analyses explained smaller amounts of variance than the model for the entire sample, and the selected reading components better predicted informational text comprehension for higher comprehenders than lower comprehenders. In the two final models, the coefficients for decoding efficiency and intrinsic motivation were five and two times larger for lower comprehenders compared to higher comprehenders. The coefficient for vocabulary was the strongest for higher comprehenders and actually negative (but nonsignificant) for lower comprehenders. The coefficient for prior knowledge was slightly larger for higher than lower comprehenders. These results are elaborated below.

For lower comprehenders, decoding efficiency was the only predictor that explained unique variance (4.2%), and this only occurred when the control variables – and no others – were entered into the model. When all variables were entered into the model, decoding efficiency no longer uniquely predicted informational text comprehension. The complete regression model explained 13% of the variance in reading comprehension and none of the variables explained unique variance.

For higher comprehenders, vocabulary was the only predictor that explained unique variance (25%) when entered into the model after decoding efficiency and the control variables. The complete regression model explained 43% of the variance in reading comprehension and vocabulary knowledge was the only significant predictor.

Connecting Findings to Previous Research

The correlations in the present study align somewhat with previous research (Best et al., 2008). Best et al. reported slightly lower correlations between informational comprehension and prior knowledge ($r = .47$ [corrected coefficient]) and informational comprehension and decoding ($r = .21$ [corrected coefficient]) than those found in the current study ($r = .56$ and $.49$ respectively). In addition, while both correlations in this study were significant, Best et al. only reported a significant correlation between informational comprehension and prior knowledge. The differences in these correlations may be due to the comprehension measures selected for each study. Best et al. administered their multiple choice reading comprehension assessment one-on-one and presented the questions with only three choices orally to students. In contrast, the current study administered a similar assessment in a whole-group setting and students read questions with four answer choices independently. Reading comprehension measures in which the questions are read aloud tend to be less sensitive to differences in decoding skill (Keenan et al., 2008), and this difference may explain why decoding did not significantly correlate with informational text comprehension in Best et al.'s study. Another possible explanation may be that the current sample included readers below the age-based normed mean in decoding efficiency. Decoding

efficiency correlates more highly with reading comprehension for younger and less developed readers (Ouellette & Beers, 2010).

Overall, results for the whole sample suggest that many reading component skills are necessary for informational text comprehension, and these may be similar to those researchers consistently show are important for narrative text comprehension (e.g., decoding efficiency and vocabulary knowledge). The component skills of decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation explained 63% of the variance in informational text comprehension for the overall sample. This result significantly extends prior research that explained only 25% of the variance in informational text comprehension using decoding and prior knowledge (Best et al., 2008). Current findings reveal the importance of vocabulary and prior knowledge and reiterate the importance of unconstrained skills in reading comprehension (e.g., Paris, 2005), especially for informational text.

The results also point to the importance of examining these component skills for different types of readers. Analyses of a whole group of readers may mask differences between good and poor comprehenders (Ehrlich et al., 1993). Understanding specific types of readers proves important for instruction and interventions (Riddle Buly & Valencia, 2002). In the present study, the influence of decoding efficiency was five times as large for lower than higher comprehenders. This suggests that lower comprehenders of informational text still exhibit difficulties accessing the words in the text. This lack of automatic word reading may be a strong inhibitor of comprehension, which is consistent with theory (LaBerge & Samuels,

1974) and research on poor comprehenders (Dennis, 2013; Logan et al., 2011; Riddle Buly & Valencia, 2002).

In addition to decoding skills, intrinsic motivation was marginally significant in explaining variation among lower readers. This finding is consistent with Logan et al. (2011), who found intrinsic motivation contributed to variance in comprehension and explained growth over a school year for lower-ability readers. This study provides additional support for the investigation of both cognitive and motivational variables in reading comprehension research for different types of readers. In particular, motivation may influence the amount of information a reader retains from a text as more motivated readers tend to process texts at deeper levels (Schiefele, 1999).

The importance of vocabulary knowledge in this study supports the assertion by Hiebert and Cervetti (2011) that the content-based, complex, and unique vocabulary contained in informational texts make these texts more challenging to comprehend than fiction. Low language and vocabulary skills can have profound effects on reading comprehension (Lesaux & Kieffer, 2010). In addition, the study by Ouellette and Beers (2010) supports the finding that decoding efficiency is more important for lower comprehenders, while vocabulary knowledge is more important for higher comprehenders. In their study, where they examined trends across elementary school, they found the contribution of vocabulary to reading comprehension increased while the contribution of decoding to reading comprehension decreased as students progressed from first to sixth grade. Once students gain proficiency with decoding, vocabulary knowledge becomes more

relevant for reading comprehension. Although the current study was not longitudinal, results indicate this finding may be true for informational text comprehension.

Although this study did not compare narrative and informational text comprehension directly, the findings are pertinent to research comparing the comprehension of narrative and informational texts. According to previous studies (Best et al., 2008; McNamara et al. 2011), prior knowledge explains variation in informational text comprehension beyond decoding. Along similar lines, the current study found prior knowledge explained unique variance over the contribution of decoding skill. This study also corresponds to research that found students with lower prior knowledge exhibit lower informational text comprehension (McNamara et al., 2011; Recht & Leslie, 1988). Of note, these studies examined either readers in general or high- and low-knowledge readers. In the present study, high correlations between vocabulary knowledge and prior knowledge ($r = .82$) indicate the inclusion of vocabulary may have reduced the unique influence of prior knowledge. Also, the way the sample was split and the overall prevalence of lower readers may have overemphasized the important contributions of decoding skills to informational text comprehension.

Implications for Policymakers

Researchers have argued that informational text should be included in the curriculum because it helps build knowledge, assists with later reading success, and motivates readers (Caswell & Duke, 1998). Accordingly – and to address the need for college and career ready students – the Common Core State Standards have clearly placed a greater emphasis on

informational texts than ever before (NGACBP & CCSO, 2010)². Given that this study examined how different components relate to comprehension of informational texts, my findings are particularly salient. Specifically, informational text comprehension relies on decoding skills, vocabulary knowledge, prior knowledge, and intrinsic motivation. Notably, the rollout of the CCSS proved challenging for two reasons. First, some suggest the standards were adopted too quickly, without significant teacher supports and professional development in place (Reutzel, 2013). In addition, some have questioned the research base for various aspects of the CCSS (Pearson, 2013). The present study has the potential to illuminate our understanding in these two areas.

First, the success of the Common Core is contingent on providing teachers with support and professional development related to instruction using informational texts. The importance of factors such as vocabulary and prior knowledge necessitates that teachers are provided with professional development related to building knowledge in these areas. In addition, given that different component skills influence informational text comprehension for diverse readers, teachers require support to tailor instruction to specific students.

Second, policymakers should be keenly interested in how we measure the success of the CCSS in our classroom. This requires that we pay attention to assessment. Although a strong correlation between informational and narrative text comprehension was found ($r = .75$) in this study, the differences inherent in these two types of texts (e.g., text structures, purposes, features) necessitate that students' results be reported separately by text type. This

² Although not a national policy, incentives were offered by the federal government to states who were willing to adopt CCSS.

study confirms that different factors contribute to successful comprehension of narrative versus informational texts, with decoding efficiency more strongly correlated to narrative comprehension than informational comprehension, while the reverse was true for vocabulary knowledge, prior knowledge, and intrinsic motivation.

Implications for Practitioners

In general, the finding that all reading components significantly and uniquely predicted informational text comprehension suggests that the skills that are traditionally important for reading comprehension in general remain important for informational text comprehension. Educators should continue to support the development of reading skills and strategies that positively influence reading comprehension in general when working with informational text.

The regression models also indicate vocabulary knowledge is essential for informational text comprehension and is an area that assists higher comprehenders with performing well on these texts. Given the importance of vocabulary knowledge for success with informational text comprehension and findings that low readers often exhibit low vocabulary (e.g., Leseaux & Kieffer, 2010), general instruction with informational text comprehension should focus on increasing students' vocabulary knowledge. Teachers should utilize instructional strategies that activate students' vocabulary knowledge or preteach challenging words to prevent comprehension difficulties.

The results for lower and higher comprehenders indicate instruction and intervention should be differentiated since these two groups have different needs. Consistent with what

we would expect in the classroom, it becomes important for teachers to differentiate instruction to meet the diverse needs of students. Not surprisingly, instruction for higher comprehenders need not focus on decoding and should focus on building vocabulary. On the other hand, lower comprehenders still might need support developing their decoding. In addition, teachers should be mindful to focus on the benefits of developing these students' intrinsic motivation and vocabulary knowledge. Because vocabulary knowledge and decoding efficiency are linked (Ouellette, 2006), lower comprehenders may need instruction that supports their ability to decode *and* understand the more complex and unique words found in informational texts. As teachers plan instruction, it is imperative that they are intentional in their vocabulary activities.

Implications for Researchers & Future Directions for Research

This study yields important implications for researchers and provides direction for future research. Consistent with prior research, the current study reiterates the importance of unconstrained skills (prior knowledge, vocabulary knowledge) and motivation for informational text comprehension. Although these factors explained significantly more variance than previous research and serve as a reminder for researchers to include multiple factors when examining comprehension of informational texts, considerable variance remained unexplained in all regression models. Further research should investigate additional components. Researchers of reading comprehension in general have noted that other component skills such as inferencing, comprehension monitoring, executive functioning, and knowledge and use of story structures may explain additional variance and should be

investigated in future studies of comprehension (e.g., Kieffer, Vukovic, & Berry, 2013; Oakhill, Cain, & Bryant, 2003; Strasser, & Ríó, 2013).

Furthermore, given the importance of vocabulary and prior knowledge to informational text comprehension, subsequent studies should determine if instruction or interventions in these areas improve informational text comprehension. Only intervention programs that manipulate the levels of certain skills while controlling for others can determine the causal nature of these reading components on informational text comprehension and how to best support instruction in this area.

This study also highlights the importance of examining reading comprehension for specific groups of readers. When possible, researchers should conduct secondary analyses that examine how comprehension might differ for specific groups of participants. The model for lower comprehenders explained only 13% of the variance in informational text comprehension. Future studies should investigate this group in particular to better understand the component skills that influence their informational text comprehension and why skills that characterize readers in general and higher comprehenders more specifically fail to explain as much variance in comprehension for this group. Qualitative studies that utilize verbal protocols (e.g., Pressley & Afflerbach, 1995) could deepen our understanding of informational text comprehension, especially for lower comprehenders. These types of studies would also assist with identifying other component skills for further investigation. Prior studies stressed the diversity of poor readers (e.g., Dennis, 2013; Riddle Buly & Valencia, 2002; Stanovich, 1988). Informational text comprehension should be investigated

with finer-grained analyses that better highlight the strengths and weaknesses of poor readers of informational texts, especially given the low predictive power of the model for lower comprehenders in this study.

This study also serves as a reminder of the influence that text type may have in studies of reading comprehension. All texts may not require readers to use the same components skills. Correlational results suggest students employed components differently across text types. As a result, researchers should be mindful of text type as they carefully evaluate and select assessments. In addition, researchers should focus on the development of informational text comprehension assessments. Current measures of informational text comprehension are interlinked with narrative text, and the results are not separable by text type. As a result, studies of informational text comprehension predominately utilize researcher-created assessments. This leads to results that are at best less generalizable across participants and studies, but at worst invalid or unreliable.

Limitations

The present study's findings should be interpreted within several limitations. First, the study's sample (N=177) was relatively small. As a result, when examining differences among higher and lower comprehenders, I split the sample along the median, which may have resulted in some overlap for participants who scored near the median. With more participants, I would have divided the sample into quartiles and used only students in the top and bottom quartiles for analysis. This method would create a distinct gap between the higher and lower comprehenders and ensure the groups differ in their levels of informational text

comprehension. In addition, a larger sample size would have permitted the inclusion of more reading components in the regression model, such as fluency (e.g., Klauda & Guthrie, 2008), reading amount (e.g., Becker et al., 2010), and inferencing ability (Oakhill & Cain, 2012). A larger sample also would have enabled more sophisticated analyses, such as latent profile analysis (e.g., Woolf, 2009) or structural equation modeling (e.g., Cromley, Snyder-Hogan, & Luciw-Dubas, 2010; Kendeou, van den Broek, White, & Lynch, 2009).

Second, the current analyses conflated the constructs of word decoding and fluency. Some prior research suggests that these two skills are separate and uniquely influence comprehension for diverse readers (Dennis, 2013; Klauda & Guthrie, 2008; Riddle Buly & Valencia, 2002). But other research, particularly with early or struggling readers, has demonstrated very high correlations between the measures, supporting the use of only one of the variables. For example, Conradi, Amendum, and Liebfreund (under review) found that students' fluency score on the GORT and their word reading efficiency on the TOWRE correlated at .91.

Third, the population of the study limits the generalizability of the findings. Although the sample represented a wide range of ability levels, the selected school served predominately low-income and minority students. Overall, the higher comprehenders exhibited reading skills in the average range, while lower comprehenders possessed reading skills in the low-average range. The current sample may not account for higher-performing students.

Finally, the contributions of specific reading component skills often depend on the reading comprehension measures selected (Cutting & Scarborough, 2006; Keenan, Betjemann, & Olson, 2008). Because of this, the results of this study may vary with the selection of a different or additional measure of informational text comprehension.

Conclusion

This investigation demonstrated that decoding efficiency, vocabulary knowledge, prior knowledge, and intrinsic motivation all influence informational text comprehension. The results add to a growing literature base providing evidence of the component skills necessary for informational text comprehension. The contributions of these skills vary for higher and lower comprehenders, and explain less variance for lower comprehension. Future research should continue to investigate informational text comprehension separately from narrative and focus on other component skills that uniquely influence the comprehension of lower readers.

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APPENDICES

Appendix A: Parent Letter

Appendix B: Reading Comprehension Assessment

Appendix A: Parent Letter

Department of Curriculum,
Instruction, Counselor
Education

NC STATE UNIVERSITY

College of Education
2310 Stinson Drive
Raleigh, NC 27695-7801
614.638.1619 (phone)
mkliebfr@ncsu.edu

Dear Parents and Guardians,

My name is Meghan Liebfreund and I am a doctoral student at North Carolina State University. I wanted to introduce myself because I am conducting a research study at Wahl-Coates Elementary School.

I am studying the factors that contribute to elementary students' success (or lack of success) in reading comprehension of informational text. In order to do this, I examine students' performance on various reading assessments.

As a normal part of their education, your child participates in assessments that provide his/her teachers with information about your child's reading comprehension. This year, we are using five assessments measuring reading comprehension, word reading, vocabulary, background knowledge, and intrinsic motivation. As a part of this, your child will take the assessments during class time. At one point, your child will be pulled out of his/her class for one hour of individualized assessments in word recognition, background knowledge, and vocabulary. These assessments will be conducted by me (a former elementary teacher) or a trained person with a background in education. If your child misses any work during this time, he/she will make it up during school hours.

After assessments are given, the scores will be shared with your child's teacher in order for him/her to provide targeted instruction to meet your child's needs. Your child's teacher may also share the information with you.

I will also be using the scores as part of my research, but when I use them, your child's name will no longer be attached to the data. (Each child will be assigned a numeric ID.) This is how we keep data confidential. No one will ever be able to recognize that your child was a part of this research (or that the research took place at Wahl-Coates Elementary School in Greenville, North Carolina.)

Since these assessments are a part of your child's daily activities, if you choose to withdraw your child from this study, he or she will still take the assessments, however their data will not be used for research purposes. I understand that you might have questions about the study. Please feel free to call me (614.638.1619) or email me (mkliebfr@ncsu.edu). If you would like to withdraw your child from the study, please contact me as well. In that event, we will not use any data received from your child's test scores.

Sincerely,

Meghan Liebfreund

Appendix B: Reading Comprehension Assessment

Daddy Day Care: Antarctica's ultimate stay-at-home dads

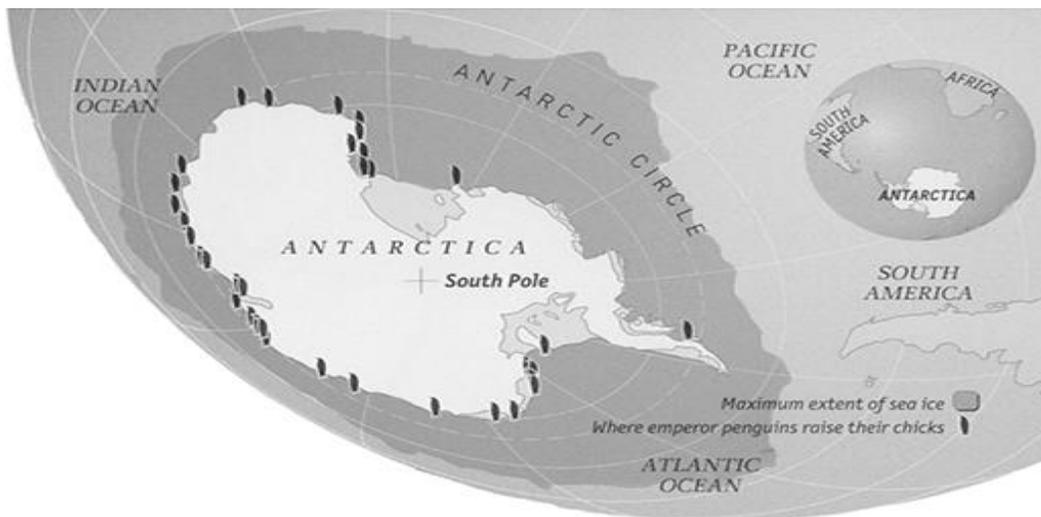
by Ruth Musgrave

When you think "tough," you may think of sharks, grizzly bears, or professional wrestlers, but you probably don't think of male penguins. Emperor penguins may not look it, but the males are tough enough to take on the deadly Antarctic winter and survive.

And they do it—without eating—while taking care of the eggs! When other animals head north in March to avoid the Antarctic winter, emperor penguins head south.

Antarctica is surrounded by a huge mass of sea ice in the winter. This ice floats on the ocean in the southernmost part of the Earth. Harsh and frigid, it is here where emperor penguins choose to mate and lay their eggs.

All the other animals, even other penguins, leave months before the Antarctic winter sets in. The only living things left above the ice are the emperors and the humans watching them.



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Foothold for Family

At the breeding colony, all the males and females find mates. After courtship, the female lays one egg and gives it to her mate. Nesting in this barren, ice-covered world isn't a problem because emperors don't build nests. The male incubates the one-pound egg on his feet, covering it with a featherless fold of skin called a "brood patch."

Each male emperor penguin holds his egg throughout the brutal, Antarctic winter months of May and June. Nestled against a dad's warm, protective body, the softball-size egg remains untouched by the frozen world.

Meanwhile, the female travels to the sea to feed. She won't be back until just about the time the egg hatches—in about two months.

Warm-Up for Dads

The Antarctic weather wears on the male penguins with a viciousness that would seem unbearable to humans. Feathers, fat, and other adaptations are usually enough to keep adult penguins alive. But scientists who visit have to wear 22 pounds of clothing to stay warm!

"The penguins make it look so easy," says Gerald Kooyman, a biologist who has made more than 30 research trips to Antarctica. "After watching them awhile you almost forget how remarkable they are—until the weather changes and the wind slices right through you!"

One of the impressive ways emperors stay toasty when temperatures plummet or the wind blasts is to "huddle." A huddle forms when hundreds, even thousands, of males crowd together. The birds move constantly, slowly rotating from the cold outside rings to the warm, wind-free center.

One scientist who spent an entire winter observing these amazing birds says it is staggering to see 10,000 penguins in a single quiet huddle. The temperature inside can be 77°F. Standing nearby when a huddle breaks up, observers can feel, smell, even see the heat. It's like a wall of steam. The penguins are packed in so tightly that when one comes out, the bird is square-shaped for a few moments from the pressure of the other birds.

All for One

Not only is it unbelievably cold while the emperor dad stands holding his egg all winter, it's also dark. Nevertheless, he keeps the egg warm, without stopping for anything, even food. He loses up to a half of his body weight before his mate comes back from feeding at sea in July. She takes over the egg, which then hatches. The male finally gets to go eat. When he gets back, the parents take turns holding the chick on their feet to keep it warm for the next eight weeks. At that point it's old enough to safely stand on the ice by itself.



A newly hatched chick stays warm by standing on top of a parent's feet.

Snack Time

These older chicks gather together in large groups while their parents feed at sea. When adults return with food for their young, they locate their chicks by their calls. Emperors may look alike, but they don't sound alike. Each individual has a unique call that is recognized by other penguins.

Looking like toddlers in overstuffed snowsuits, hungry chicks scurry to parents returning from sea. As they race toward the adults—and dinner—they chirp, letting their parents know "I'm over here!"



Older chicks gather together to stay warm while their parents find food.

Independence Day

By the time the chicks are finally ready to fend for themselves, it's December. This is summertime in the Antarctic. During the winter, the nearest open water could be 50 miles from the rookery. In summer, the ice that the chicks hatched on has begun to break up, so the chicks don't have far to go to the sea.

The chicks are on their own now. The adults leave to start the cycle again, so the young emperors must learn to swim and find food by themselves. Winter day care is over; it's time for summer independence!

1. What is the main purpose of the article?
 - A. To describe why older chicks stand together in groups
 - B. To help people understand what winter in the Antarctic is really like
 - C. To describe what male emperor penguins do to care for their young
 - D. To explain why emperor penguins travel south in winter

2. According to the article, what is the main way a male emperor penguin protects its egg from the cold?
 - A. By growing extra feathers
 - B. By gathering together with other penguins
 - C. By building a nest for the egg in the snow
 - D. By covering the egg with a flap of skin

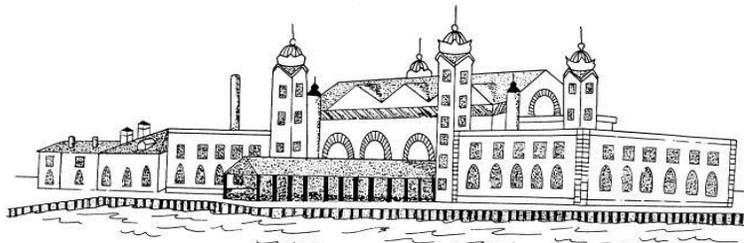
3. On the first page, the article says that emperor penguins live in a barren world. This suggests that the penguins live in a place where
 - A. almost nothing grows
 - B. few other penguins go
 - C. there is a lot of danger
 - D. it is dark most of the year

4. On the second page, the article says that one scientist found it "staggering to see 10,000 penguins in a single quiet huddle." This means the scientist
 - A. thought the penguins walked in a funny way
 - B. doubted that penguins could survive in groups
 - C. was amazed so many penguins could gather in this way
 - D. was confused because the penguins were so quiet

5. According to the article, how do adult emperor penguins returning from the sea find their own chicks to feed them?
 - A. They can smell their chicks.
 - B. The chicks wait in their nests.
 - C. Each chick sounds different.
 - D. Each chick looks different.

6. According to the article, why is summer in Antarctica a good time for the chicks to become independent?
 - A. There are no animals around that could hurt the chicks.
 - B. The sea is not far away in summer.
 - C. Both parents can be there to help their chicks.
 - D. It is easier to build nests in summer.

Ellis Island.



Doorway to America

by Bill Walter

F

or such an important place, Ellis Island did not start out as much. Named after Samuel Ellis, the 27-acre knot of an island barely stuck out of the water at high tide.

Ellis Island became important to millions of immigrants in 1892, however, when the U.S. government converted it to an immigration station. Between 1892 and 1954, the island became—for more than 17 million souls—the doorway to America.

As you will see in their own words below, America offered immigrants more than just opportunity. You also will see that the "the land of the free" was not so free to everyone, after all.

Escaping to America

The closing years of the 19th century were an oppressive time in many eastern and southern European nations. In such countries as Russia, Poland, and Armenia, millions of families were suffering. Wars, famines, and pogroms (organized massacres of Jews and other minorities) caused millions of people to flee.

Ida Mouradjian fled to America from Armenia to escape annihilation by the Turkish government:

They [the Turks] would displace every Armenian out of their own homes, out of their own towns and drive them into the Syrian Desert. The idea was to get every Armenian there and by the time they got there they would either die of hunger or exposure or pestilence.

But not all were running from the horrors of violence or poverty. Some, like Theodore Lubik from the Ukraine, wanted to avoid the military draft and simply saw the U.S. as a great opportunity:

A friend of mine, he had gone to America. He came to Europe once on a visit...He looked just like a governor—horses, wagon, dressed fine, giving his pocket change to us. He gave me ten cents or a quarter—that was big money.

Hard Time Traveling

In these times of turmoil, one could not easily move to the U.S. The trials of getting to Ellis Island were often life-threatening in themselves.

Along the way, many immigrants had to contend with border guards, thieves, and crooked immigration agents. But it was the trip across the Atlantic that immigrants tended to remember most.

Crammed into poorly ventilated sleeping areas or cabins below deck, immigrants—many of whom had never seen the sea before—often suffered rough crossings. Vera Gauditsa, pregnant during her crossing from Czechoslovakia, remembered the torture of seasickness:

I was pretty tough, but on the boat I was very sick. I thought the child wanted to be born right then.

I had a cabin, but in the cabin was nothing. You had to go through the whole boat to get to the showers and a toilet. So imagine when you are sick and you have to go to the bathroom and walk!

But upon seeing their destination, most immigrants—like Sarah Asher from Russia—forgot about sickness and thought only of a bright future:

About four or five o'clock in the morning we all got up. The sunshine started and what do we see? The Statue of Liberty!

Well, she was beautiful with the early-morning light. Everybody was crying. Beautiful colors, the greenish-like water— and so big. We could see New York already, with the big buildings and everything. . . There was a house where the boat stopped but only the Americans were able to go out, but we foreigners remained. Our boat moved further, and that was when we realized we were going to Ellis Island.

Stuck at the Door

Having to wait while first- and second-class passengers got off the boat, many immigrants began to realize that their troubles were not over.

After docking at Manhattan Island, immigrants in steerage were shipped by barge to Ellis Island, to go through examinations. On the island, the immigrants were guided into holding pens in the Great Hall. Irene Zambelli, from Greece, recalled the routine:

There were little gates, the same as you go [through] to the subways. The first gate we [Irene and her cousin] passed they asked what we were to one another. Then we came to the next gate and they asked us how much was two and two, and four and four. We answered and went to the next gate.

Cutting Back the Flow

The number of immigrants increased over the years, peaking at 1,285,349 in 1907. U.S. officials grew concerned. They saw the growing numbers as a threat to American workers. The officials were afraid the foreigners would take away wages and jobs. As a result, the entrance examinations were made tougher. They included a medical exam and a literacy test. An immigrant who failed one of these tests faced **deportation** (being sent back) to his or her native country.

Of all the examinations, the medical exam seemed to cause immigrants the most concern, recalled Catherine Bolinski, who came from Poland:

They turned your eye[lid] over— I had to blink a couple of times that way. I'll never forget it. They looked at your throat and to see if you had any rashes on your body. They found things wrong with some people. They sent them back, after they [had] sold everything to come here, so they were crying, they felt very bad.

The thought of being deported was terrifying. Fannie Kligerman, who escaped from Russia with her family, remembered the fear:

One of my brothers had something wrong with him. It was a sty. It left a funny thing and they put him aside. And they told us that if there was anything wrong with him, he'd have to go back to Europe. Oh, it was frightening. My father said, "I'm not going on without the children. We will all go back."

Charting America's Course

Only three percent of those who arrived at Ellis Island between 1892 and 1954 were turned away. By 1924, however, the government changed its policy. It slammed shut the "open door" that had allowed so many millions to flock to the U.S. The Immigration Act of 1924 set a quota of 164,000 immigrants per year. By 1954, Ellis Island had been shut down.

But for those who had passed through, America was truly a land of opportunity—despite often-severe hardships. Settling throughout the U.S., immigrants such as composer Irving Berlin, football coach Knute Rockne, and Supreme Court Justice Felix Frankfurter added to America's strength.

Having escaped from Russia, Arnold Weiss voiced the determination and hope of the immigrants who passed through Ellis Island:

From the whole story of what I went through in all my years— and some of it wasn't very pleasant— I still love this country. I love this country in spite of everything.

1. This passage is mostly about the
 - A. hardships of ocean travel in the nineteenth century
 - B. struggles of the early immigrants entering America
 - C. many opportunities to make money in America
 - D. effect of immigration on European countries

2. What did the immigrants dislike most about their trip to America?
 - A. Seeing Ellis Island for the first time
 - B. Leaving their native countries
 - C. Living conditions aboard the boat
 - D. Letting the Americans off the boat first

3. What most worried the immigrants about the medical examinations?
 - A. They did not want to be sent to the hospital.
 - B. They could not afford to pay the doctors.
 - C. They did not want to be deported.
 - D. They were too seasick to stand in line.

4. Ellis Island was called "the doorway to America" because it
 - A. was the place most immigrants had to pass through before entering the United States
 - B. had a large and famous entranceway that immigrants walked through
 - C. was the only port in the United States where foreign ships could dock safely
 - D. was actually a large ship that carried the immigrants to the United States

Marian's Revolution

by Sudipta Bardhan-Quallen

By 1939, Marian Anderson had performed for presidents and kings. She had been praised for having "a voice ... one hears once in a hundred years." Despite her success, when Marian wanted to sing at Constitution Hall that year, she was banned from doing so. The owner of the hall, an organization called the Daughters of the American Revolution (DAR), felt that Marian couldn't be allowed to sing there because she was African American.

Chosen by Music

That wasn't the first time Marian had been turned away because she was black. When she was 18 years old, she applied to music school. The clerk at the desk rudely sent her home because of her race. Marian was shocked by the clerk's words. "I could not conceive of a person," Marian said, "surrounded as she was with the joy that is music without having some sense of its beauty and understanding rub off on her."



Marian Anderson sings to a crowd of 75,000 people at the Lincoln Memorial on April 10, 1939.

*"I don't think I had much
to say in choosing it.
I think music chose me."*
—Marian Anderson



Because of segregation—the practice of keeping blacks and whites separate—the early 1900s were a difficult time for a young black woman to begin a professional singing career. But Marian was determined to sing. "It was something that just had to be done," she remembered. "I don't think I had much to say in choosing it. I think music chose me."

In 1925, Marian won a voice contest in New York, and sang with the New York Philharmonic. Still, her chances to perform in the United States were limited. To build her career, Marian traveled to Europe in 1928, where she became very successful.

A World-Class Singer Faces Racism

By 1939, Marian was a world-class singer. She returned to the United States to continue her career. But back at home, she faced racism in many ways. Segregation was still common on trains and in hotels and restaurants. No amount of vocal talent could spare Marian from that.

Even concert halls were segregated, although usually that was limited to the audience. Because black performers often appeared on stage in segregated halls, Marian had no reason to think she would be turned away from Constitution Hall. She believed that musical skill would be the only factor that the DAR would consider.

At first, the DAR told Marian that the date she requested was not available. Then they told her that all of her alternate dates were booked. Eventually, the DAR upheld their policy that only white performers could appear in Constitution Hall.

A Voice for Civil Rights

When news of the DAR's policy got out, many people were outraged. First Lady Eleanor Roosevelt resigned from the DAR. In a letter, she wrote: "I am in complete disagreement with the attitude taken in refusing Constitution Hall to a great artist You had an opportunity to lead in an enlightened way, and it seems to me your organization has failed."

Marian believed strongly in the civil rights movement. She knew firsthand the pain that racism caused. She understood that the way the controversy with the DAR was resolved would be a milestone for civil rights.

Despite public outcry, the DAR would not back down and let Marian sing. With Mrs. Roosevelt's support, the Secretary of the Interior arranged a special concert for Marian, to be held at the Lincoln Memorial. Seventy-five thousand people attended. In many ways, Marian's concert was considered to be America's first civil rights rally. That night, she took a stand against discrimination and for equality. The first words she sang were: "My country, 'tis of thee, sweet land of liberty, of thee I sing."

The Open-Hearted Way

Marian realized that equality in the United States would be achieved when every person was willing to stand up for what is right. As a public figure, she felt a responsibility to set an example. After the 1939 incident, she did her part by turning down concerts for segregated audiences.

"The minute a person whose word means a great deal dares to take the openhearted and courageous way," she said, "many others follow."

As Marian's career progressed, America changed. She performed in many prestigious locations, including Constitution Hall, where she sang after the DAR changed its policies. By 1954, segregation was declared unconstitutional. The Civil Rights Act was signed into law in 1964, the year Marian retired from performing. By then, many of the barriers she'd had to fight through were disappearing. Marian's farewell tour began in front of an admiring crowd at Constitution Hall.

Eleanor Roosevelt honors singer Marian Anderson.



1. What is the article mainly about?
 - A. Civil rights songs that Marian Anderson liked to sing
 - B. Marian Anderson's friendship with Eleanor Roosevelt
 - C. How Marian Anderson learned to sing
 - D. How segregation affected Marian Anderson's career

2. Why did Marian Anderson live in Europe from 1928–1939?
 - A. Her family had moved there.
 - B. There was less discrimination.
 - C. Housing was less expensive.
 - D. The voice teachers were better.

3. Why did Marian Anderson think she would be accepted to sing at Constitution Hall in 1939?
 - A. Because she believed the DAR would consider only her musical skill
 - B. Because she had sung at Constitution Hall before she went to Europe
 - C. Because she thought that Eleanor Roosevelt would recommend her
 - D. Because she knew that no other black singers had applied

4. Why did Eleanor Roosevelt resign from the DAR?
 - A. Because she did not agree with one of its decisions
 - B. Because she wanted to be in charge of its concerts
 - C. Because she was too busy being First Lady of the United States
 - D. Because she had been a member for too many years

5. On page 2, the article says that many people were outraged by the DAR policy toward Marian Anderson. This means that people
 - A. were hurt and sad
 - B. protested in public
 - C. were shocked and angry
 - D. spoke loudly about their feelings

6. On the third page, the article says that Marian Anderson performed in many prestigious locations. This means that she sang in places that were
 - A. far away from each other
 - B. famous and important
 - C. open to people of all races
 - D. large and crowded

What's the Buzz?

by Margery Facklarn

“What do bees do?” Ask most people and they will say, “Bees make honey and they sting.” They may even tell you that bees are fuzzy, black-and-yellow insects that live in hives. But there are lots of kinds of bees, and they’re not all the same. Some fly at night. Some can’t sting. Some live only a few months, and others live several years. Every species of bee has its own story. A species is one of the groups used by scientists to classify, or group, living things. Animals of the same species can mate with each other. And they give birth to young that can mate and give birth, or reproduce.

Scientists have named about 20,000 species of bees. But they think there may be as many as 40,000 species. Why so many?

Over millions of years, environments change. Animals slowly evolve, or change, too. These changes help the animals survive, or live, so that they can reproduce. And it’s reproducing that matters, not how long an animal lives.

To survive, some bee species developed new ways to live together. Some found new ways to “talk” to each other, or communicate. Others developed other new skills and new behaviors. Scientists call these kinds of changes adaptations. Over a long time, a group of bees can change so much it becomes a new species.

Bees come in different sizes. There are fat bumblebees and bees not much bigger than the tip of a pencil. There are bees of many colors, from dull black to glittering green. Some species of tropical bees are such bright reds and blues that they sparkle in the sun like little jewels.

Most bees play an important role in plant reproduction. Bees collect pollen, a powderlike material that flowers make. By carrying pollen from one flower to another,



Day-active
sweat bee

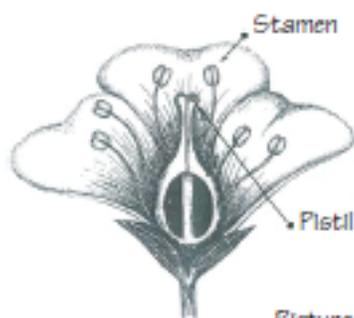
Stingless
bee



European
honeybee

bees help plants reproduce. Bees are among the world's most important insects. Without them, many plants might not survive. And for most animals, life would be impossible without plants.

Pollination



Picture 1

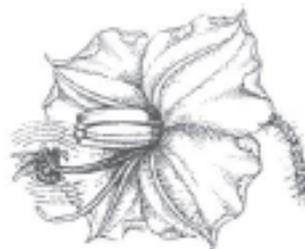
Pollination is the first step in making seeds. The male part of the plant is called the stamen. The female part is called the pistil. A plant can't make seeds until the pollen from the stamen reaches the pistil. Some flowers pollinate themselves when pollen from the stamen falls on the pistil. Other flowers are pollinated when pollen blows from one flower to another.

Many animals spread pollen. But bees are the best pollinators of all. They go to the flowers to gather pollen for food. Bees collect pollen in different ways. Some bees gather pollen from flower stamens by brushing against them. Some of the pollen then rubs off on the next flower the bees visit. In this way, bees spread pollen from flower to flower as they gather food.



Picture 2

Bees also drink nectar, a sweet liquid in flowers. As a bee goes inside this orchid for nectar, its weight makes the orchid's stamen bend over. Pollen from the stamen brushes on the bee.



Picture 3

Stingless bees like this one sometimes shake themselves to gather pollen from flowers. Shaking loosens the pollen and makes it fall on the bee.

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From *What's the Buzz, the Secret Life of Bees* by Margery Facklam, copyright © 2001 by Margery Facklam. Used by permission. Images courtesy of Patricia Wynne.

1. What is the main purpose of the article?
 - A. To describe the variety of bees and what bees do
 - B. To explain the ways pollen is used by bees
 - C. To show the ways bees communicate with each other
 - D. To show what different species of bees look like

2. According to the article, what can animals of the same species do?
 - A. Travel in groups over long distances
 - B. Live together in homes such as hives
 - C. Mate with each other and give birth
 - D. Find food for their young

3. On the first page, the article says that some bees "**sparkle** in the sun." This means that these bees
 - A. like to fly in the daytime
 - B. have unusual markings
 - C. prefer warm weather
 - D. look very shiny

4. On the second page, the article says, "Many animals **spread** pollen." This means that many animals
 - A. like to eat pollen
 - B. move pollen around
 - C. create their own pollen
 - D. spend time looking for pollen

5. What is one way stingless bees gather pollen?
- A. By brushing against the flower's seeds
 - B. By drinking nectar from orchids
 - C. By shaking themselves inside the flower
 - D. By rubbing against bees that sting

The Box in the Barn

by Barbara Eckfeld Conner

Jason heard his mom calling him. Instead of answering her, he slipped deeper into the tall weeds behind his house. He closed his eyes, thinking of what he had done.

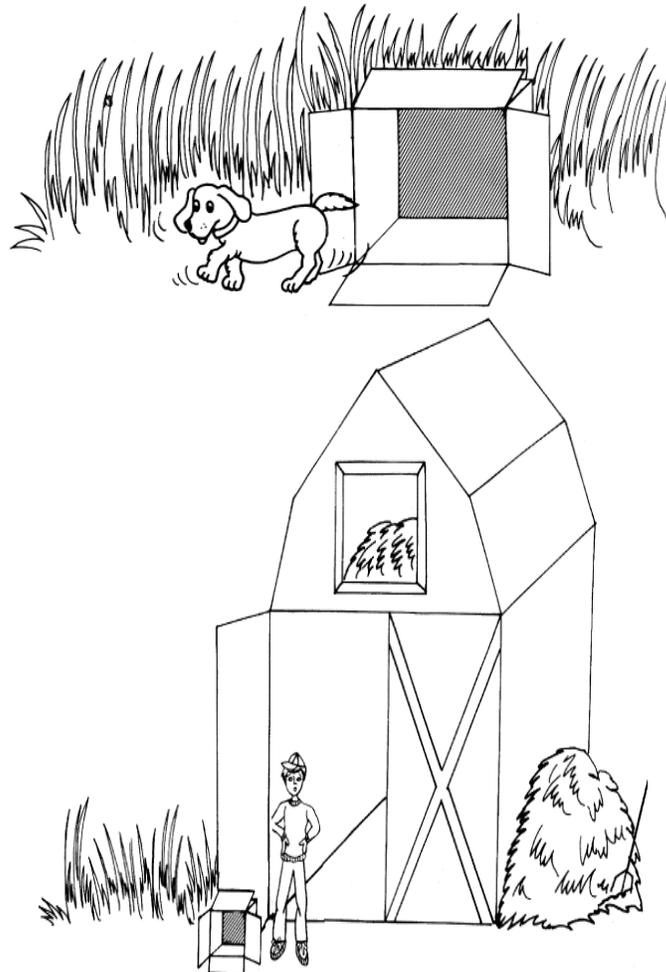
He had gotten up that morning in a good mood. Raspberry pancakes were on the table when he walked into the kitchen rubbing his eyes and yawning.

"After breakfast, Jason, I want you to go into town with me," Mom said quietly. "It's your sister's birthday, and we need to shop for her gifts."

Jason was eager to go, even if the gifts weren't for him. Buying presents was always fun.

As they drove to town, Jason couldn't help but ask the question that had been on his mind since yesterday when Aunt Nancy came. "What's in the big box that Dad took to the barn, Mom? Is it something Aunt Nancy bought for Megan's birthday?"

"It's a surprise, Jason, and I don't want you going near that barn today. Do you hear me?"



Jason sat staring at the road ahead. He knew that nothing would change her mind. Only now he was more curious than ever!

Back home, Megan ran out to meet Jason, her eyes wide and excited. "Jason, Jason, I'm six years old!" she cried, jumping up and down.

"I know, I know." Jason gave her a big hug.

Soon the house was buzzing with excitement. Megan sat on the stool watching while Mom and Aunt Nancy prepared the birthday dinner. Dad wouldn't be back for at least two hours. Jason wandered outside trying to think of something to do, but his thoughts kept returning to the box in the barn.

He started walking toward the barn, not at all sure what he'd do when he got there. He was hoping for just a glimpse of the box. Instead he heard a strange noise coming from inside the barn. He wished he could just turn back to the house, but his legs carried him into the barn. Jason saw the box. It was sitting between two bales of hay. He could hear loud wailing cries. Leaning over, Jason carefully lifted the lid. There was the most cuddly puppy he had ever seen!

"You must be pretty scared, huh, fellow?" Jason said quietly as he held the wiggly dog. "Megan's going to love you!" He secretly wished the puppy was for him. After all, Mom and Dad knew that he had been wanting his own puppy. Probably Aunt Nancy didn't know that, and anyway Megan would be happy.

Soon Jason was playing happily with the puppy, and he forgot that he wasn't supposed to be in the barn. Taffy, their big brown horse, stuck his head in the window as if to say, "What's going on?" Jason jumped, remembering that he wasn't supposed to be there. The puppy ran off as fast as it could out of the barn and into the field.

Jason stumbled out of the barn looking wildly for any trace of the puppy. "Come on, puppy! Oh, please come here!" he called, his eyes welling up with tears.

Now here he was, two hours later, hiding in the weeds. He'd looked everywhere, but the puppy was gone. He had ruined his sister's birthday.

"Jason! It's time for dinner!" Mom called even louder now. Just when he was determined to stay forever in the tall weeds, he heard his sister's voice.

"Jason! It's time for my party, Jason!" Megan yelled excitedly.

Jason rubbed his swollen eyes, trying to look normal. He couldn't ruin everything for her. "I'm here, Megan," he called.

"Are you OK?" she asked with genuine concern.

"Sure. Let's hurry." Jason grabbed her hand as they ran back.

As soon as they reached the house, the party began. Jason tried to pretend that everything was fine. When it was time to open Megan's birthday gifts, he sat in the big easy chair, hoping no one would notice him. Finally the last present was open.

"I'll be right back," Dad said.

Jason knew Dad was going to the barn. Megan would probably never forgive him for losing her birthday puppy. Everyone, even Aunt Nancy, would be angry when they found out the puppy was gone.

"Jason! Come here!" It was Dad calling from the front yard.

Jason slowly got out of the chair. It was hard to move, but Megan grabbed his hand and said, "Come on, Jason! Let's see what Dad wants."

Jason followed Megan out the door. Mom and Aunt Nancy followed close behind.

There was Dad standing with the box next to him in the grass. "Jason, I want you to open this box and see what's inside."

Jason looked up and saw that Dad was smiling. He turned and saw that Mom, Aunt Nancy, and Megan were smiling, too. What would he say to them when there was nothing in the box? But as Jason looked down, expecting to see nothing at all, he jumped back in surprise. The puppy looked up at him with sleepy eyes.

"Wow!" said Jason, bewildered.

"The puppy's for you, Son," his father said.

"I thought you'd like a gift, too, even if it isn't your birthday," said Aunt Nancy, laughing.

Megan started clapping. "Isn't he wonderful, Jason?" The puppy jumped up, ready to play. Jason and Megan spent the rest of the day with the puppy.

Later, when he was getting ready for bed, Jason turned to his father and said, "You know, Dad, I feel bad about something I did today."

Dad waited patiently as Jason explained what had happened. "And I still can't figure out how my puppy got back into his box!" he added.

"Well, Son, on my way home I saw your puppy running along the side of the road. I figured he had gotten out of his box somehow...You must have felt terrible during the party," Dad continued. "I get the feeling you've learned a lot today." He pulled back the covers on Jason's bed.

Jason looked down at his new puppy, who was sleeping soundly in a basket by the bed. "Dad, I think I'll call him Buddy."

Dad smiled and tucked the covers snugly around Jason.

1. Which best describes Jason's father?
 - A. Strict and unwilling to listen to Jason
 - B. Understanding and patient with Jason
 - C. Curious and puzzled by the empty box
 - D. Angry and sad that Jason hid

2. When Megan spoke to Jason in the tall weeds, she was concerned that
 - A. she wouldn't get enough presents
 - B. her dad wouldn't get back in time for the party
 - C. something was wrong with Jason
 - D. the puppy was missing from the box

3. What does Megan say in the story that shows how she felt about Jason's getting a gift on her birthday?
- A. "Jason, Jason, I'm six years old!"
 - B. "Are you OK?"
 - C. "Let's see what Dad wants."
 - D. "Isn't he wonderful, Jason?"
4. Jason's problem could have been prevented if
- A. his mother had not warned him to stay away from the barn
 - B. he had not let the puppy play along the road
 - C. his curiosity had not led him to open the box
 - D. he had not wanted a puppy of his own so badly
5. Jason probably would have felt better at the birthday party if
- A. the box had been put in the backyard
 - B. the puppy had not run out of the barn
 - C. the party had lasted longer
 - D. he had not hidden in the tall weed



Tough as Daisy

by David M. Simon

The sign on the YMCA door says Wrestling Tournament Today.

I enter the gym and take a deep breath. It smells like old sweat socks and the stuff they use to wash wrestling mats.

I love that smell. Weird, huh? Not to me.

I was raised around wrestling. My older brothers wrestle for the high-school team. My dad wrestled in college. So it was natural for me to want to wrestle. Except for one thing.

I'm a girl. I even have a girly name—Daisy.

My dad always says, "Pound for pound, no one's as tough as Daisy."

I see my family in the stands. I wave to them and smile, but I'm nervous.

Lots of boys are already on the mats, loosening up. I'm the only girl at the sign-up desk. Some of the boys point at me and laugh. We'll see about that.

Back in Ohio, people got used to seeing me wrestle. I kept showing up. I kept winning. They stopped pointing and started cheering.

Then we moved to California. Now I'm weird again.

The man says, "Name?"

"Daisy McGill."

"Have you wrestled before, honey?"

He didn't call any of the boys honey. "Yes, sir," I answer through clenched teeth. I hand him my registration form.

"OK," he says. "Climb on the scale." I weigh 70 pounds. He writes a number on the back of my hand. I head to the girls' locker room to change.

First match. The kid looks strong. That's OK. Boys with muscles always underestimate me.

I snap the chin strap on my headgear. The ref calls us to the middle of the mat. We shake hands. The kid says, "I can't believe I have to wrestle a girl."

The whistle blows, and I hit him fast with a fireman's carry. He's on his back in three seconds. The ref's hand slaps the mat. Pinned. One match down.

The kid refuses to shake my hand. The ref raises my right arm. He tells me, "Beautiful takedown!"

There's a lot of whispering going on. I hear someone say, "Man, she pinned him fast. No girl is going to beat me."

My family cheers wildly. I feel good. It always takes one match for the butterflies in my stomach to settle.

They call my number for the next match.

People crowd around the mat to get a look at Bizarro Wrestler Girl. Sounds like a good name for a superhero!

This kid is tall and thin. He looks serious about winning.

The whistle blows. I shoot for his leg. He kicks back and snaps my head down. He spins around behind me and takes me down. Good. I love a challenge.

Final period of this match, and I'm down three to nothing. Time to make my move.

I escape for one point, then shoot a quick takedown. All tied up. Thirty seconds to go. He raises one leg and I take a chance. I reach around his head and knee. My hands close tight. I roll him onto his back

The whistle blows. The ref holds up two fingers. I win by two points. Two matches down.

At least this kid shakes my hand. Some of the people watching even clap for me.

I'm in the finals for my weight class.

My brothers rub my arms and joke around with me. Dad says, "Just do your best, honey."

It's OK when he calls me honey.

I head for the mat. The next kid I'm wrestling pinned both of his opponents. There's a huge crowd watching us. I can't tell if they want me to win or lose.

Doesn't matter to me.

We shake hands. "You're pretty good," he says. "Good luck."

"You, too," I say.

The whistle blows. He shoots, and I'm on my knees before I can blink. Wow, he's fast. I feel my heart hammering in my chest. Easy, Daisy.

I spin away. Escape. He misses an arm-drag, and I catch him flat-footed. Takedown.

After two periods we're all tied up.

We're both gulping for breath as the last period starts. My brothers are screaming, but they sound far away. The kid shoots for my legs. I flatten out. He has one leg hooked. I force my forearm across his face like a wedge. We're locked up tight.

I can see the clock ticking down. With ten seconds left, his arms relax. Just what I was waiting for. I push down and spin behind him for the win. Yes!

I hear cheering and realize it's for me. The kid says, "Nice match. But next time, I'm going to win." He just might.

My dad wraps my sweaty body in a big bear hug. He says, "Pound for pound, no one's as tough as Daisy."

I guess today he's right.



1. What is the main problem Daisy faces in this story?

- A. She has to make new friends at school.
- B. She has to perform in front of huge crowds.
- C. She has to prove that she is a good wrestler.
- D. She has to wrestle against strong boys.

2. These paragraphs are from the first part of the story:

I enter the gym and take a deep breath. It smells like old sweat socks and the stuff they use to wash wrestling mats.

I love that smell. Weird, huh? Not to me.

What do these paragraphs help show about Daisy?

- A. She needs to learn how to wrestle.
- B. She enjoys different sports.
- C. She does not listen to other people.
- D. She enjoys being a wrestler.

3. According to the story, why was it natural for Daisy to be interested in wrestling?
 - A. Her father and her brothers wrestled.
 - B. Her coach at school encouraged her to wrestle.
 - C. She had seen wrestling matches on television.
 - D. Many of her friends were on the wrestling team.

4. On the second page of the story, Daisy says that she answered the man at the registration desk "through clenched teeth." This means that Daisy
 - A. had trouble speaking correctly
 - B. was nervous about joining the team
 - C. had hurt her teeth while wrestling
 - D. closed her teeth tightly when she spoke

5. On page 2, Daisy says that boys with muscles always underestimate her. This means that the boys
 - A. think Daisy is not very smart
 - B. think they can beat Daisy
 - C. feel sorry for Daisy
 - D. make fun of Daisy

6. What is the main way the author shows us how Daisy feels?
 - A. He uses pictures to tell her story.
 - B. He tells what other people say about her.
 - C. He tells what she is thinking.
 - D. He describes the way she wrestles