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Examining the Complex Morphology Within the Kindergarten and First Grade Exemplar Texts from the English and Language Arts Common Core State Standards in Light of What is Currently Known About the Importance of Morphology for Literacy Instruction

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Examining the Complex Morphology Within the Kindergarten and First Grade Exemplar
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What is Currently Known About the Importance of Morphology for Literacy Instruction

by

David L. Ray

A dissertation submitted in partial fulfillment

of the requirements for the degree of

Doctor of Education (PhD)

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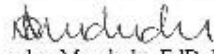

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(Nyarsalzo Mvuludu, EdD, Dean, School of Education)

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ACKNOWLEDGMENTS

My love of being lost in a wonderful children's book when young spurred my interest in helping those who struggle with reading. After all, the magic of entering endless worlds, the personal stories, the histories, and the explanations of how and why come largely from the tales and tracts written by others. To enable and empower all children to encounter those people, places, and ideas once hidden within the pages is perhaps the Lord's work.

My studies at Seattle Pacific University, first as an undergrad in English and History, and now in the completion of a Doctorate of Education, have shaped me into who I have become, because of the people I have encountered. I am grateful that the experts in the field of literacy are also approachable, warm, and supportive, as modeled by Dr. Bill Nagy. He has helped build the tools I need to make a greater impact in the literacy development of my students. For all of these reasons, I am forever thankful for the experience.

ABSTRACT

The purpose of this study was to identify and categorize the morphologically complex words in the Kindergarten and First Grade Common Core State Standards English and Language Arts (CCSS ELA) Exemplar Texts. Four text types were analyzed: student-read fiction, student-read informational text, teacher read-aloud fiction, and teacher read-aloud informational text. The results revealed that students will encounter many inflectional morphemes in both the books they learn to read and the books read-aloud to them. These texts thus provide strong support for meeting the CCSS ELA Conventions standards for kindergarten and first grade, which primarily address inflectional morphology. However, the student-read titles are not well suited for enabling students to achieve the Vocabulary and Use learning objectives as they relate to morphology. The prefixes and suffixes found within these student-read titles do not correspond with those mentioned in the CCSS standards, or with the most common affixes mentioned in published recommendations for morphology instruction (e.g., Graves, 2004; White, Sowell, & Yanagihara, 1989). In fact, the most common prefixes in the student-read fictional texts were not even listed by White, Sowell, and Yanagihara (1989). This current study helps fill a gap in the body of previous morphology research by providing a morphological analysis of high value Kindergarten and First grade titles, which were targeted specifically to meet CCSS ELA learning standards. The results of this study provided evidence that derivational morphology was not often exemplified in early student-read fiction. However, derivational morphemes were somewhat more common in the informational student-read texts. Because of this, they have potential to

be used as a bridge to the complex morphology in academic words that will become prevalent in the middle elementary school years and beyond.

CHAPTER 1: INTRODUCTION

Purpose of the Study

While perhaps surprisingly not receiving the same degree of attention as other components of reading and writing in the last forty years, morphology research is currently rapidly advancing in fields of literacy and linguistics. This is because the meaningful elements in words (morphemes) are central to many other elements of literacy development and success (Bowers, Kirby, & Deacon, 2010). For example, recent morphology research has focused upon: 1. how to develop morphological awareness in young children (the conscious awareness of morphemes in words); 2. how to improve spelling skills since English words largely retain the spelling patterns of morphemes within Latin roots and Greek combining forms (Apel & Masterson, 2012; Moats, 2005/2006); and 3. how to increase vocabulary knowledge (Nagy, Carlisle, & Goodwin, 2014). Yet even with these numerous advances, there remains little research on the types of morphemes young school-aged students are exposed to in the texts widely used in classrooms (Hiebert, Goodwin, & Cervetti, 2017).

The purpose of this study was to help fill this gap by examining the variability and complexity of the morphology present within the corpus of Kindergarten and First Grade Common Core State Standards English and Language Arts Exemplar Texts (National Governors Association Center for Best Practices & Council of Chief State School Officers [NGA Center & CCSSO], 2010b). These titles, which were given as models of children's literature that educators could use to meet specific literacy learning standards, equally represent works of fiction and nonfiction (i.e., informational text). While Exemplar poetry selections are also listed, just the books from the genres of fiction and informational texts were selected for morphological

analysis in this study, because the total number of words per title allowed for comparisons to be made, unlike the brief poetry passages.

Additionally, these Exemplar Texts are further divided in the ELA Standards guide by those meant for teachers to read-aloud to students and those meant for students to learn to read independently (NGA Center & CCSSO, 2010a). Comparisons of the types and frequency of words containing more than one morpheme were made across the four dimensions of teacher-read vs. student-read and fiction vs. informational texts. Additionally, the prefixes and suffixes attached to free stem words (i.e., complete words as opposed to morphemes that must be attached to other morphemes to make a complete word) within the Exemplar Texts were compared to those from previous corpus-based research (see Graves, 2004).

Definitions of Key Terms in this Study

A morpheme is defined as the smallest unit of language that carries meaning (Owens, 2016). All words consist of at least one morpheme, such as the word *big*. Adding an additional meaningful element, the morpheme *-est* (meaning *most*), changes *big* to the new word *biggest*, meaning the most *big* (note that the addition of morphemes to words can also impact spelling changes with the doubling of *g* in this case). Morphology has a large role in how words are spelled (Henry, 2003). There are several categories of word formation processes by which morphemes are combined to create new words: compounds, inflections, and derivations. A compound word is made from at least two separate words (e.g., *snow* and *man*), which are joined together to create a new word with a specific new meaning *snowman*. Inflectional morphemes consist of markers for grammatical elements, such as the plural *-s*, present tense *-ing*, and past tense *-ed*. They are described as grammatical endings (suffixes) and defined as changing the number (e.g., *kid* to *kids*), person (e.g., third person singular *-s*), or tense (e.g., present to past

tense in verbs by adding *-ed* of words, without changing the part of speech (Moats, 2005/2006). Derivational morphemes tend to change the part of speech of words or change the meaning of words, for example adding the suffix *-ly* to the adjective *sad* to make the adverb *sadly* or adding the prefix *re-* (again) to the verb *do* to express to do again.

When entering kindergarten, all but language delayed children have largely intact usage of many compound words and nearly all inflectional morphemes in their spoken language (Brown, 1973; Owens, 2016). The rich and growingly academic language found almost uniquely in books, even children's books (Cunningham & Stanovich, 1998; Hayes & Ahrens, 1988), plays a major role in exposing these young children to rarer derivational morphemes during the middle elementary school years and beyond, with prefixes, suffixes, and Latin and Greek word roots becoming increasingly common (Henry, 2003). These morphologically complex words will become much of the foundation for the estimated 3,000 new vocabulary words added each year to a child's lexicon (Nagy & Anderson, 1984; Hiebert et al., 2017; Anglin, Miller, & Wakefield, 1993).

While fiction is a mainstay of the books children learn to read early on, informational texts have also become commonplace, as evident by their inclusion in the CCSS ELA Exemplar Texts (NGA Center & CCSSO, 2010b). Researchers have found key differences within the language used in informational texts and that in fiction for elementary aged students (Duke & Kays, 1998). Because the purpose of informational text is to provide content rich knowledge, specific technical terms relating to the topic being addressed are used. These words tend to be rarer than the vocabulary used in the same grade/reading level fictional texts (Yopp & Yopp, 2012). This technical vocabulary tends to grow increasingly complex morphologically as students progress up grade levels (Hiebert et al., 2017).

Study Design

For this study, all teacher read-aloud and all student-read fictional and informational titles were included in the analyses, with a detailed coding system used to identify the number and variation of morpheme types within morphologically complex words - compound words, inflectional morphemes, and derivational morphemes (with separate categories for derivational prefixed words and derivational suffixed words). Implications for this study's results towards adding to what is currently known about the importance of morphology - including how best to teach the morphologically-related Common Core ELA standards (NGA Center & CCSSO, 2010) - were also addressed in the discussion section. An application of the results from this study was made to further evaluate a list of common prefixes and suffixes that students will encounter in the early elementary school grades (White, Sowell, & Yanagihara, 1989).

The Common Core English and Language Arts Standards

If there were ever to be a national English and Language Arts (ELA) Curriculum, the Common Core State Standards (CCSS) would be perhaps the closest we have ever come. The Common Core has been adopted by a wide majority of states - 42 states currently (NGA Center & CCSSO, 2010) - and is now the cornerstone of new ELA curricula that are written.

This dissertation's author and researcher participated in his school district's curriculum adoption team recently. He learned that if an ELA curriculum is not Common Core aligned, then it is not even considered. In fact, he observed that national curriculum developers appeared to be in a race to be the most CCSS aligned, as demonstrated by the marketing presentations given to his committee by representatives from four major national curriculum companies.

Returning to this study's purpose, many practical reasons warranted the use of the Exemplar Texts (NGA Center & CCSSO, 2010b) for determining the morphological complexity

and variation that Kindergarten and First Grade students will encounter in the classroom. First, the ELA CCSS are an agreed upon document, developed by committees of governors and educators, that states the key literacy elements, grade by grade, which should be taught and learned to prepare students to enter college or start a career after graduating from high school (NGA Center & CCSSO, 2010). One prominent component of the ELA CCSS is the list of grade level “Exemplar Texts,” which are recommended as strong titles that can be used to target these educational standards (NGA Center & CCSSO, 2010a).

One could make a case that these books are essentially becoming part of the national curriculum because they are so widely used in the classroom already and will likely only increase in usage due to being CCSS recommended titles. The fiction books were selected by the CCSS ELA committee in part because they are already well known and used by teachers and are considered some of the best children’s literature available (Eccleshare, 2009). Popular teacher read-aloud Exemplar Text titles include, for example, *Little House in the Big Woods* (Wilder, 1932/2007), *The Wonderful Wizard of Oz* (Baum, 1900/2000), and *Mr. Popper’s Penguins* (Atwater & Atwater, 1938/1988). The books selected for students to learn to read independently also are culled from teacher favorites (Eccleshare, 2009), such as Dr. Seuss’ *Green Eggs and Ham* (1960) and Arnold Lobel’s *Owl at Home* (Lobel, 1975). An emphasis on utilizing multicultural books within the Exemplar Texts also matches common practice by educators such as, *A Weed is a Flower: The Life of George Washington Carver* (Aliko, 1965/1988).

The books chosen for the CCSS informational Exemplar Texts are also used frequently, as is evident in their inclusion in Scholastic Books prepackaged order lists. For example, Aliko’s (1962/1989) *My Five Senses* (a student-read book) and the teacher read-aloud *What Do You Do*

With a Tail Like This? (Jenkins, 2003) are both included in the *New Classroom Collections* from the Scholastic 2017 catalog (Scholastic Inc., 2017).

Morphology Research

In the field of literacy instruction and intervention, the study of the morphological elements of words (i.e., the smallest units of language that carry meaning) has increased substantially within the last decade or so. The compelling reason for this is that morphology contributes to all other linguistic factors involved in reading and writing, including spelling, syntax, and vocabulary (which relates directly to reading comprehension) (Hiebert et al., 2017; Nagy et al., 2014). Still, a number of vital morphology topics have yet to be fully considered, with a focused analysis of the morphology within high value kindergarten and first grade classroom children's literature and informational texts being a prime example. Previous corpus-based research has tended to cast a wider net by looking at multiple age levels of text (e.g., see how Carroll, Davies, & Richmond's (1971) *The American Heritage Word Frequency Book* was developed).

Several important morphology studies have resulted from the morphological analysis of the words within Carroll et al's (1971) work. White, Sowell, and Yanagihara (1989) found that a relatively small number of common prefixes (twenty total) accounted for more than 96% of the almost 3,000 prefixed words in that corpus. Graves (2004) advocated for the teaching of these common prefixes to children as a highly useful tool for identifying the meaning of new words encountered in books. In fact, a more manageable list of just nine prefixes (*un-*, *re-*, *in-* (*im-*, *ir-*, *il-*), *dis-*, *en-* (*em-*), *non-*, *in-* (*im-*), *over-*, and *mis-*) were present in nearly three quarters of the words containing prefixes from this same corpus of words (Graves, 2004). It should be noted that the first three of these prefixes accounted for slightly over half of this amount. However,

these high value prefixes have yet to be evaluated by cross checking them against a corpus of frequently read kindergarten and first grade texts. Thus, the need for this present study.

Common Core State Standards Relating to Morphology

The importance for teachers to develop a strong knowledge base with current morphology research becomes apparent when looking at the number of Common Core ELA standards for early elementary students that directly require morphological instruction. These educational benchmarks include specific Kindergarten and then First Grade CCSS ELA standards targeting spelling, syntax, and vocabulary literacy goals, all areas where morphology plays a central role (NGA Center & CCSSO, 2010). Morphology's relationship with spelling, syntax, and vocabulary, along with reading comprehension, will be discussed in more depth in Chapter Two.

Goal of the Study

The goal of this study was to analyze a corpus of frequently used classroom texts in the Kindergarten and First Grade years in order to analyze the morphological complexity and variability that early elementary students will be exposed to during instruction. As described earlier, the Exemplar Texts from the Common Core ELA standards were chosen because they are already widely used due to many of these titles being considered as some of the best children's literature available. Also, the use of these books will likely only increase, since the developers of the ELA standards recommended them as strong examples of books that can be used to meet these instructional goals. Because the Exemplar Texts fall into four categories – teacher fiction read-alouds; student-read fiction; teacher informational text read-alouds; and student-read informational texts – comparisons of the types and complexity of morphemes across genres and across adult vs. student read books were of interest for this study. This allowed for

distinctions to be made in determining when students would encounter complex morphology within books they learned to read and those books that they heard read aloud to them.

Research Questions

The following research questions served as a guide for this study:

1. Which types of complex morphemes are students exposed to in the Common Core ELA Kindergarten and First Grade Exemplar Texts: compound words, inflectional morphemes, and derivational morphemes?
2. How do the types and frequency of complex morphemes differ in the four text types: teacher read-aloud versus student-read books and fiction versus informational titles?

Significance of this Study

The significance of this study comes from the small amount of previous research on analyzing a widely-used set of book titles in the early elementary school grades for type and variation of morphologically complex words. Consequently, unconfirmed assumptions with educational implications may exist regarding which morphemes are most commonly encountered in Kindergarten and First Grade classroom texts. While Hiebert, Goodwin, and Cervetti (2017) did analyze the Exemplar Texts from the Common Core, their focus was on confirming the presence of a set of preestablished vocabulary terms within morpheme families in only the student-read texts. In contrast, this study provided an in-depth analysis of the types and complexity of morphemes across student-read and teacher read-aloud books.

Because morphology is a nexus for almost all aspects of language and literacy — spelling, decoding multiple morpheme words, reading comprehension, and vocabulary development — educators will be aided in meeting a number of specific Common Core ELA standards by both learning about the morphology children will encounter in commonly used

classroom texts and by utilizing morphology instruction in their classrooms and in their literacy interventions. An opportunity to develop a powerful morphology instructional plan for the many students in CCSS aligned classrooms could result from this analysis and usage of the morphemes within these Exemplar Texts.

CHAPTER 2: LITERATURE REVIEW

Introduction

To understand the context for this study – an analysis of the morphological complexity and variation within the CCSS ELA K-1 Exemplar Texts – a number of key topics need to be described in depth. This includes background information on the development of the Common Core State Standards. Additionally, the unique role morphology plays across multiple linguistic elements required for successful literacy acquisition will also be addressed, including orthography (spelling), vocabulary, syntax, and reading comprehension. Much of recent morphology research has targeted these topics (Bowers et al., 2010; Nagy et al., 2014). Those Common Core State ELA standards discussed in the previous chapter that require morphology instruction to be successfully taught and learned will also receive a special focus.

Development of the English and Language Arts Common Core State Standards

According to the developers of the Common Core State Standards (NGA Center & CCSSO, 2010), the CCSS are built upon the work of individual states in the 1980s and 1990s, when sets of academic learning standards were established. In Washington State, the Essential Academic Learning Requirements (EALRs) and the Grade Level Expectations were established, for example. Like the majority of states, Washington has now adopted the CCSS, which supplanted the EALRs. One rationale for the development of CCSS was to ensure the delivery of a universal quality education, since state level standards were perceived as being unequal due to variation in how these standards were selected, assessed, and interpreted. For instance, some states appeared to have lower expectations for what children needed to learn than others. The Common Core State Standards were meant to address these inconsistencies by creating a

national document of agreed upon learning goals to prepare graduating students to be college and career ready (NGA Center & CCSSO, 2010).

The lineage of using an agreed upon set of national learning standards and skills has roots in the Essentialist educational philosophy in that all students need to learn a set body of knowledge and skills across the school years (Parkay & Hass, 1999). An important figure in this movement, E. D. Hirsch, updated the rationale for Essentialism in his work, *The Knowledge Deficit* (2006). In this book, Hirsch (2006) argued that progressive educational thinking has short changed students by overly emphasizing the development of “critical thinking” skills while disregarding the need to teach content. Hirsch (2006) made the case that it is the people with the greatest amount of knowledge who are the strongest critical thinkers and that content and critical thinking cannot be divorced.

Arguing from this same perspective, Hirsch wrote an earlier work, *The Schools We Need and Why We Don't Have Them* (1996), in which he provided a compelling reason for the creation of a (partial) national curriculum. He cited the growing number of transient students who move from district to district and who too frequently fall behind in their education when local districts determine the entirety of their curriculum. He noted that this lack of structure can often exist even within the same school when curriculum from grade to grade is not aligned. This lack of a coherent and consistent curriculum contributed to social injustice in Hirsch's (1996) view, with students who remained in the same school advantaged over those who did not remain.

For these reasons, Hirsch has been a strong advocate for the Common Core State Standards, and his thinking has been equally influential in their development. In fact, Hirsch was central in the development of an early Common Core aligned curriculum, the *Core Knowledge*

Language Arts program, which was adopted by the State of New York. More so than other CCSS aligned curricula that have been published, Hirsch (2012) ensured that specific content was heavily emphasized in the making of the *Core Knowledge Language Arts* materials.

Recognizing the tension between national and local curricular control, Hirsch has never suggested that a complete national curriculum be adopted. In fact, he suggested that no more than fifty percent of curriculum be agreed upon beyond the local level (Hirsch, 1996). Arguably, the Common Core State Standards gets close to this mark, since the rather narrow list of standards allows for flexibility in the types of materials used in instruction (NGA Center & CCSSO, 2010). The limited list of CCSS learning standards also allows for teachers to have enough time to target what needs to be taught. This was often not true of the elaborated state educational goals they replaced, such as the Washington State EALRs (NGA Center & CCSSO, 2010). Of course, as the author of this dissertation learned by being a member of his district's ELA K-5 adoption committee, the influence of the giant ELA curriculum textbook companies will perhaps stifle local creativity in meeting these standards. That the local/state versus perceived federal control of education is a dynamic and never settled debate is evident by the new presidential administration critique of the Common Core.

Definition of Phonemes and Morphemes

Before continuing with this chapter, it is useful to review several linguistic terms that will be emphasized throughout the discussion: phonemes and morphemes. Both are the building blocks of words. Phonemes are defined as the smallest unit in words that can change meaning (Owens, 2016). When substituting the phoneme /r/ with /t/, for example, the word *ran* changes to the word *tan*. Morphemes are the smallest unit of language that carry meaning (Owens, 2016). All words are made of one or more morphemes (i.e., base words and inflectional,

derivational, and/or compounding). For example, the word *tall* is a one-morpheme word. When the derivational suffix *-er* (meaning more than) is added to *tall*, a two-morpheme word that has two meaningful elements has been created, *taller* (indicating that one thing has more height than another). Developing students' knowledge of how to identify, read, and spell phonemes and morphemes is essential for literacy success, and as described earlier, the importance of morphology is evident by the number of CCSS ELA standards that directly target this linguistic element (NGA Center & CCSSO, 2010).

Linguistic Research Over the Last 40 Years: From Phonology to Morphology

Because morphology is central to almost all aspects of literacy - such as spelling, decoding more advanced words, reading comprehension, vocabulary, and syntax - research on morphology has grown exponentially (for a review of the subject, see Nagy et al., 2014; for meta-analyses, see Bowers et al., 2010 and Goodwin & Ahn, 2013) since the highly influential publication of the National Reading Panel (NRP, 2000) report.

Prior to the flood of recent morphology research, perhaps the greatest breakthrough and focus in reading research over the last 40 years has been in better understanding the critical importance of the “elusive” phoneme (Adams, Foorman, Lundberg, & Beeler, 1998; Bowers et al., 2010), the other linguistic building block of words. Through research sponsored by the National Institutes of Child Health and Human Development (NICHD), the mysteries of dyslexia, defined primarily as a phonological processing issue (International Dyslexia Association, 2014), were largely explained through the insights gained from the analysis of the fMRI picture clues taken of the reading brain (Kovelman et al., 2012; Wolf, 2007;). The processes involved in reading no longer remained hidden within a black box. It was discovered

that many struggling readers had an especially difficult time in identifying and processing the sounds of which words are made.

Phonemic awareness - the ability to identify and manipulate the speech sounds in words - became one of the five components considered necessary for literacy success as elucidated in the NRP report, with the other four areas being vocabulary, phonics, reading comprehension, and fluency (National Reading Panel, 2000). However, later research findings revealed that the five National Reading Panel Report components were an incomplete list of the linguistic elements vital to literacy success. For example, difficulty developing phonemic awareness was shown to be just one piece of the phonological reading disability puzzle, with processing speed, as measured by Rapid Automatized Naming tasks, explaining possible differing degrees of reading disability severity (Norton et al., 2014; Wolf & Bowers, 1999;).

Yet, even with these breakthroughs at the phonological level of language, the focus on the phoneme did not get to the other key component of words, the morpheme. That morphology research has lagged behind that of phonology is surprising when considering that the English writing system is morpho-phonemic in structure, meaning that essential linguistic elements of words are contained at both the phoneme/grapheme level (speech sounds and their spellings) and at the morpheme/morphograph level (meaningful parts of words and their spellings) (Bowers et al., 2010; Moats, 2005/2006).

In comparison to “shallow” orthographies like Spanish where phonemes and their spellings are consistent, English orthography is considered “deep,” with spelling inconsistencies due to the many English words taken from other languages (Bowers et al., 2010; Henry, 2003). That word pronunciation is also affected by morphology is evident by the differences in how the two vowels in a two-morpheme word (containing a prefix and a free stem) like *preamble* are said

(long /e/ followed by short /a/) and as just one sound (long /e/) in the one morpheme word *preach* (Bowers et al., 2010).

Morphological Knowledge, Awareness, and Processing

Several common terms used in the research literature to describe morphology include morphological awareness, morphological processing, and morphological knowledge (Bowers et al., 2010; Carlisle & Goodwin, 2013; Nagy et al., 2014;). Morphological awareness (i.e., the ability to consciously identify, analyze, and manipulate morphemes into new words) can be distinguished from morphological processing (i.e., simply producing spoken language and reading written language without being fully aware that morphemes are the building blocks of words) (Bowers et al., 2010; Carlisle & Goodwin, 2013). This explicit/implicit dichotomy is not always clearly delineated in research, so some linguists use these terms interchangeably (Bowers et al., 2010; Carlisle & Goodwin, 2013).

Nagy, Carlisle, and Goodwin (2014) identified differences that exist between morphological processing and morphological awareness at three levels: word form (including spelling patterns and word recognition), word meaning (semantics), and syntax (part of speech). These researchers stated that at the processing level, students are able to recognize and access information about words more efficiently because morphology adds another complementary redundant layer to the semantic, syntactic, orthographic, and phonological aspects of words. Morphological awareness enables students to deliberately use morphemes to aid in reading and spelling new words, to infer and create meanings in words, and to infer and create syntactical information in words (Nagy et al., 2014). Joining other researchers, such as Bowers et al. (2010), Nagy et al. (2014) used the term morphological knowledge to include both morphological processing and awareness.

Like phonological awareness, morphological awareness, which is largely stimulated by exposure to written language, is considered a metalinguistic skill that is essential for successful literacy development. The ability to attend to the parts of words is the essence of early reading development, since written language is broken down into a code for the linguistic subcomponents (Venezky, 1999). Berninger, Abbott, Nagy, and Carlisle (2010) described morphological awareness as being one of the three aspects of linguistic awareness required for learning to read and spell at the word level, along with phonological awareness and orthographic awareness (i.e., being aware of spelling rules and patterns). The coordination of instruction to ensure development across all three metalinguistic components of language was argued by these researchers to be necessary (multi-linguistic word study), since phonemic awareness development alone is not sufficient for reading success.

A number of researchers have listed additional key reasons why morphological awareness instruction benefits children over and above other linguistic areas (Bowers et al., 2010; Goodwin & Ahn, 2013). For example, the benefits of phonemic awareness instruction plateau in the early elementary grades (ceiling effect), but morphological knowledge growth continues throughout even the later school years (Anglin et al., 1993; Tyler & Nagy, 1989). As referenced earlier, the spellings of morphemes also aid children to develop more advanced orthographic skills as well (Nunes & Bryant, 2004).

Lexical Quality Hypothesis

As students gain morphological knowledge through the frequent practice of breaking words into component morphemes and assembling words from morphemes, the “lexical quality” (Perfetti & Hart, 2002) of words stored in long-term memory builds, with the links among spelling patterns of morphemes, the meanings of morphemes (and the meanings of words as a

whole), and the pronunciation of words becoming strongly associated with each other. In describing their Lexical Quality Hypothesis, Perfetti and Hart (2002) stated that developing accurate links among the “orthographic, phonological, syntactic, and semantic” features of a word aids in the retrieval of that word more efficiently. Bowers et al. (2010) emphasized this Lexical Quality Hypothesis to explain a key benefit of morphological instruction. They suggested that morphological knowledge can uniquely act as a binding agent across orthographic, phonological, grammatical, and semantic features of words, since morphology is central to each of these elements. For instance, morphemes impact and contain aspects of spelling patterns, pronunciation, part of speech, and word meaning.

These same researchers suggested that morphology instruction could improve reading comprehension for multiple reasons as well. Considering that struggling readers could learn to retrieve words more efficiently, this could allow them more time to construct meaning rather than being stuck figuring out the words on the page. In addition, morphology instruction could improve the comprehension of semantic information contained within each morpheme while reading, since vocabulary and reading comprehension have a well-established direct relationship (Bowers et al., 2010; Nagy & Anderson, 1984). Wolf (2007) broke the processes involved in reading a word into a timeline of milliseconds, with slow word retrieval robbing the reading brain of irreplaceable time to think beyond the words.

Categories of Morphological Relationships

The study of morphology focuses on the meaningful elements involved in the formation of words (Nagy et al., 2014). Multiple morpheme word constructions can be divided into three types: those found in compound word formations (e.g., two distinct words like *sun* and *down* which are combined to create a new word *sundown*), those found when inflectional morphemes

are added to base words (e.g., grammatical morphemes like the plural *-s*), and those found when derivational morphemes are added to base words (e.g., morphemes that change the syntactical class of a word, such as turning the adjective *mad* into the adverb *madly*) (Anglin et al., 1993; Berninger, Abbott, Nagy, & Carlisle, 2010; Nagy et al., 2014). Additionally, types of morphemes can be broken down into prefixes (e.g., *re-*), suffixes (e.g., *-est*), and word roots (e.g., both base words like *mark* and Latin roots like *-spect*, and Greek combining forms like *hypo-*) (Henry, 2003). The teaching of prefixes can be quite powerful in helping students derive the meaning of words, since just a handful of prefixes account for over half of the total prefixes found in words (White et al., 1989).

Another division of morphemes is by whether they are words in and of themselves (free morphemes) or whether they are parts of words that must be conjoined with other morphemes to make a complete word (bound morphemes). The etymology of morphemes is also often considered during morphological research and instruction as well. For example, Henry (2003) advised that word study follow the sequence of Anglo-Saxon morphemes and spellings, then Latin, and finally Greek. Henry (2003) also went beyond this by advocating for etymological study of individual words (e.g., the history of the meanings of the morphemes within words containing Latin word roots and Greek combining forms).

Morphological Development in Children

Valuable early research on morphological development in children included that of Berko (1958) who observed that preschool and kindergarten-aged students demonstrated the ability to apply inflectional morphology rules to made up new words, such as adding the plural *-s* and regular past tense *-ed* morphemes to nonsense words. An example of this would be asking a child what more than one *tog* would be (*togs*) (Berko, 1958). Further evidence of this is the

overgeneralization young children make in regularizing irregular past tense verbs, such as *drinked* for *drank* (Kuczaj, 1977). Anglin, Miller, and Wakefield (1993) noted that the development of derivational morphology matured later than that of both inflectional morphology and that of compound words. Brown's (1973) analysis of preschool children's expressive language development revealed a sequential pattern of inflectional morphology acquisition. He noted that most children enter kindergarten with largely intact inflectional morphology. Clark, Gelman, and Lane (1985) observed that some two-year-old children created novel compound words that associated one noun (modifier) with another (head) noun, such as *lion-box* for a *box* where a toy *lion* is stored. In their study, two-and-a-half-year-old kids could also understand the meaning of novel compound words that followed this format.

Morphology and Spelling (Orthography): Basics and Intervention Treatments

As mentioned previously, one key element that makes the study of morphology especially valuable for students is the consistent spelling of morphemes, even though the pronunciation of morphemes from word to word is unstable, known as the morphological principle (Moats, 2005/2006; Nunes & Bryant, 2004). An example of this is the spelling of the inflectional morpheme *-ed*, which is spelled consistently but is pronounced as a /t/, /d/, or /ɪd/ depending on the phoneme that precedes the *-ed* (unvoiced, voiced, or /t/ or /d/). As described by Nunes and Bryant (2004), the morphological principle for spelling *-ed* trumps the phonological principle of spelling each phoneme with the corresponding grapheme, which would lead to *walked* being spelled *walkt*. Even though *-ed* and all other inflectional morphemes would be typically intact in kindergarten children's spoken language, the challenge of reading and spelling words with these morphemes is reliant on morphological (and orthographic) awareness development. As Moats (2005/2006) strongly emphasized, educators need to understand that

English spelling patterns become highly regularized once the morphological principle is understood and included in instruction.

Morphology and Vocabulary

The interplay between morphology and vocabulary occurs in many ways. As described previously, measures of vocabulary and morphology correlate highly. Through the use of confirmatory factor analysis, Wagner, Muse, and Tannenbaum (2007) determined that the correlation between the constructs of morphological knowledge and vocabulary was .91, which is extraordinarily high. One reason for this is that academic vocabulary, which children encounter in the middle elementary years and beyond, is typically comprised of multi-morpheme words (Anglin et al., 1993; Nagy & Anderson, 1984). At grade three, children have developed strong inflectional morphology knowledge and are now encountering derivational morphemes at a rapid rate of increase.

In their classic study, Nagy and Anderson (1984) estimated that the meaning of three-fifths of these morphologically complex words could be derived largely from the semantic information at the morpheme level for children in grades 3 through 9. As children grew older, the strategy of determining word meaning by analyzing the word root and affixed component morphemes (i.e., “conscious morphological problem solving”) became increasingly used (Anglin et al., 1993; Nagy et al., 2014). For example, knowing the meanings of each morpheme in *un-control-able* gives strong clues about overall word meaning. Additionally, Anglin et al. (1993) estimated nearly half of the 10,000 words first graders could demonstrate semantic knowledge of could have been understood by morphological problem solving ability. This ratio also held true in the 40,000 words identifiable by fifth graders. Consequently, enabling children to become

stronger at morphological problem solving through morphological instruction is a highly productive educational strategy.

Morphology and Reading Comprehension

That vocabulary development directly impacts reading comprehension is well established (Anglin et al., 1993). In order to access an author's message, his or her words must be within the lexicon of the reader or at least be discernible. The connection between vocabulary and morphology is also direct – all words are made of morphemes, so measures of morphology and vocabulary correlate highly. Wagner et al.'s (2007) study found the correlation between the constructs of morphological knowledge and reading comprehension to be .86, which is robust. Additionally, researchers such as Nagy, Berninger, and Abbot (2006) have found that morphological awareness sometimes contributes unique variance to reading comprehension even when vocabulary knowledge has been accounted for. As described earlier, the meanings of morphologically complex (derived) words are often accessible by breaking words into individual morphemes. Another value of morphological awareness that also aids in comprehension is being able to determine a multi-morpheme word's part of speech (Tyler & Nagy, 1990), enabling the parsing of sentences.

Morphological Interventions for Students with Reading Disabilities

The ability to chunk words into morphemes is beneficial to students' literacy success as well. For students with dyslexia who struggle with the ability to identify and manipulate the phonemes in words in an efficient manner, morphological awareness development can be used as a compensatory strategy: these struggling readers can identify words by morphemes rather than individual phonemes (Berninger et al., 2003). As described by Nagy et al. (2014), multi-morpheme words tend to be long and contain many phonemes, so working memory demands are

lessened by breaking words down into the larger units of morphemes. Students with weak phonological processing skills need an effective strategy for reading and spelling these word forms. Because many students with dyslexia have otherwise strong language skills, the focus on morphemes allows these students to use their language strengths, since morphemes provide (redundant) links to other linguistic elements of words. Additionally, there is evidence that struggling readers benefit even more from morphological instruction than stronger readers (Bowers et al., 2010). Also, morphological instruction for struggling readers can increase student motivation to read more frequently and to become more curious about words in and of themselves, boosting vocabulary development (Bowers et al., 2010).

Morphology Research as a Whole

Together, these findings indicated that were something like the National Reading Panel be reconvened, it is quite likely that morphology would be explored in greater depth as the sixth necessary element for reading success (Berninger et al., 2010). Since spelling and morphology are so intricately linked, the seventh component could possibly be a focus on spelling rules and patterns or orthography (Apel, 2011; Berninger et al., 2010; Moats, 2005/2006). Current research in these areas indicates that students learn to develop stronger word level skills when spelling and reading instruction are combined (i.e., multi-linguistic word study), rather than when reading instruction occurs alone (Apel, 2011). Morphemes and their spellings grow increasingly important as children move up through the elementary grades and beyond, since the academic language common in mid-elementary school and beyond so often consists of morphologically complex words (Berninger et al., 2010).

Implications for the Common Core

The CCSS ELA guidebook lists a number of standards relating to morphology. For Kindergarten and First Grade, these fell into two subdomains: 1. Conventions of Standard English, and 2. Vocabulary Acquisition and Use (NGA Center & CCSSO, 2010). Even at these early grades, the development of morphological knowledge in children is essential. For example, the kindergarten Conventions of Standard English require instruction in the use of the plural *-s* inflectional morpheme and early spelling patterns. In first grade, these skills were expanded to include the use of singular and plural nouns when writing simple sentences, along with increasing development of spelling competency. Additional inflectional morphemes expected of first graders included the past, present, and future verb tenses.

In vocabulary development, the value of morphology instruction was also evident. Kindergarten children were expected to use inflectional and derivational morphemes to help determine the meaning of novel words (e.g., *-ed*, *-s*, *re-*, *un-*, *pre-*, *-ful*, *-less*). First graders built upon their morphological awareness and word solving skills by adding new affixes and also word roots to their repertoire to derive the meanings of additional morphological families.

Need for This Study

In this review of the literature, the importance of morphological knowledge development in children was determined to be essential because the morpheme is at the center of all linguistic factors involved in learning to read and to write: decoding, spelling, semantics, syntax, and reading comprehension. Because of this, the value for this current study – to determine the morphological complexity and variability within the Kindergarten and First Grade Common Core State Standards Exemplar Texts – is clear. Teachers and researchers have yet to have an in-depth analysis conducted on the morphology kindergarten and first grade children will be exposed to in a widely used corpus of classroom books.

This study also allows for the exploration of previous generalizations about when best and in which sequence morphology instruction should occur. For example, the teacher read-alouds may introduce children to the morphologically complex words that are typical in the texts students read in the later elementary years, such as with derivationally suffixed words. Gaining a better understanding of the types and frequency of prefixes, suffixes, and compound words in the books children will learn to read in Kindergarten and First Grade will also prove valuable. After all, the morphology based CCSS ELA standards in even the earliest years make use of these types of morphemes in order to ensure children develop vocabulary, spelling, and syntax skills.

CHAPTER 3: METHODOLOGY

This chapter contains a description of the methods and procedures utilized in this study. As described earlier, the purpose of this study was to determine the types and frequency of morphologically complex words that early elementary school children would encounter in a corpus of commonly used classroom texts. The Kindergarten and First grade CCSS ELA Exemplar Texts fell into four text types, one for each of the two genres (fiction versus informational text) and one for each of the two modalities (either student-read or teacher read-alouds).

When selecting titles for the grade level bands of the Exemplar Texts (e.g., K-1, 2-3,...), teacher and expert input was taken into consideration for determining grade level appropriateness (NGA Center & CCSSO, 2010a). Additionally, both qualitative and quantitative measures of reading complexity were used by the creators of the Common Core State Standards to identify texts students would experience success in learning to read (NGA Center & CCSSO, 2010a). While not specifically utilized by the Common Core developers as a leveling guide, an example of a widely used qualitative reading measure used by many educators is Fountas and Pinnell's (2018a) Guided Reading system. In this approach, trained experts use rubrics for leveling books from the start of kindergarten (level A) through twelfth grade (level Z). Over 60,000 titles have been analyzed at this time (Fountas & Pinnell, 2018a). Criteria for each of the levels include subject matter, text organizing structure, and words and sentences per page. According to Fountas and Pinnell's (2018b) text gradients, levels A-D are considered to be appropriate for Kindergarten students to learn to read and levels E-J are for First Graders.

The popular Lexile quantitative (computer software based) leveling system was referenced in the CCSS official materials (NGA Center & CCSSO, 2010a). On this elaborate

rating scale, word frequency, text length, and sentence patterns were utilized to determine reading levels. According to Metametrics' (2018a) website on Lexile metrics, over 100 million books, articles, and websites have been assessed and given Lexile scores. At the middle of first grade, a range of typical Lexile reading scores are available, with the higher end being approximately 300 (Metametrics, 2018b).

Table 1 provides measures of word length (wds.) and reading difficulty (Guided Reading levels and Lexile scores, when available). An analysis of these data revealed that the student-read informational text, *A Weed is a Flower: The Story of George Washington Carver* (Aliko, 1965/1988), appeared to be an outlier in its original labeling (i.e., a student read informational text). It was longer in word length and had an atypically high number of morphologically complex words when compared to other books within this same category. In an exchange of emails with an official representative from the Common Core (T. Mooney, personal communication, March 20, 2018), this text was determined to, in fact, be mislabeled. It should have been included as one of the teacher read informational texts. Consequently, this was how it was analyzed in this current study. It should be noted that other texts also varied in word length and reading difficulty within the same genre and reading modality, such as the teacher read-aloud *Kitten's First Full Moon* (Henkes, 2004). A judgment call was made to not challenge any other texts, however, in order to keep the number of books equivalent for the four text types.

Table 1

*Fiction and Informational Exemplar Texts for Kindergarten and First Grade***Student-Read Stories**

Wds.	Author	Title	GR	Lexile
440	Minarik, E. H. (1957)	<i>Little Bear</i>	J	370L
699	Eastman, P. D. (1960)	<i>Are You My Mother?</i>	I	240L
812	Seuss (1960)	<i>Green Eggs and Ham</i>	J	210L
508	Lopshire, R. (1960)	<i>Put Me in the Zoo</i>	H	220L
398	Lobel, A. (1971)	<i>Frog and Toad Together</i>	K	330L
378	Lobel, A. (1975)	<i>Owl at Home</i>	J	490L
319	Arnold, T. (2006)	<i>Hi! Fly Guy</i>	I	380L

Teacher Read-Aloud Stories

Wds.	Author	Title	GR	Lexile
1023	Baum, L. F. (1900)	<i>The Wonderful Wizard of Oz</i>	-	1030L
1006	Wilder, L. I. (1932)	<i>Little House in the Big Woods</i>	Q	930L
1001	Atwater, R. (1938)	<i>Mr. Popper's Penguins</i>	Q	910L
1012	Jansson, T. (1948/1990)	<i>Finn Family Moomintroll</i>	S	770L
922	Haley, G. (1970)	<i>A Story, A Story</i>	M	590L
449	Bang, M. (1987)	<i>The Paper Crane</i>	L	660L
1021	Young, E. (1989)	<i>Lon Po Po</i>	S	670L
1004	Garza, C. L. (1990)	<i>Family Pictures</i>	-	660L
1007	Mora, P. (1997)	<i>Tomás and the Library Lady</i>	N	500L
247	Henkes, K. (2004)	<i>Kitten's First Full Moon</i>	I	450L

Student-Read Informational Texts

Wds.	Author	Title	GR	Lexile
468	Bulla, C. R. (1960/2001)	<i>A Tree Is a Plant</i>	K	420L
309	Aliki (1962/1989)	<i>My Five Senses</i>	I	590L
340	Hurd, E. T. (1962)	<i>Starfish</i>	I	370L
240	Reid, M. E. (1996)	<i>Let's Find Out About Ice Cream</i>	-	500L
72	Nat. Geo. (2009a)	<i>Garden Helpers</i>	-	-
70	Nat. Geo. (2009b)	<i>Wind Power</i>	-	-

Teacher Read-Aloud Informational Texts

Wds.	Author	Title	GR	Lexile
1008	Provensen, A. (1987/2001)	<i>The Year at Maple Hill Farm</i>	M	630L
372	Gibbons, G. (1984)	<i>Fire! Fire!</i>	M	660L
324	Dorros, A. (1993)	<i>Follow the Water from Brook to Ocean</i>	J	600L
957	Rauzon, M. (1994)	<i>Water, Water Everywhere</i>	-	940L
828	Llewellyn, C. (2002)	<i>Earthworms</i>	K	600L
426	Jenkins, S. (2003)	<i>What Do You Do With a Tail Like This?</i>	L	510L

273	Pfeffer, W. (2004)	<i>From Seed to Pumpkin</i>	K	550L
812	Thomson, S. (2005)	<i>Amazing Whales!</i>	M	550L
583	Hodgkins, F. (2007)	<i>How People Learned to Fly</i>	M	550L
1001	Aliki (1965)	<i>A Weed is a Flower</i>	N	640L

Morphological Complexity Within the K-1 CCSS Exemplar Texts

In the final coding system used for this study, morphologically complex words were identified as being of one or more of four main types: inflectional morphemes, compound words, prefixed derivational words, and suffixed derivational words. Originally, subtypes of morphemes were delineated in order to capture the extent to which morphological complexity was associated with changes in spelling and/or pronunciation. Additionally, both regular versus irregular inflectional morphemes were noted. Because there were not a sufficient number of words for each subcategory to run statistical analyses, these categories were compressed into seven types (see Table 2): regular inflections, compounds with free stems, compounds with bound stems, suffixed words with free stems, suffixed words with bound stems, prefixed words with free stems, and prefixed words with bound stems. The decision to exclude irregular inflectional morphemes was made, since affixes are not added to these words. Table 2 provides detail for the final coding categories.

Table 2

Coding Categories and Examples

Inflectional Morphemes
plural (<i>trees, skies</i>)
past (<i>walked, tried</i>)
third person singular (<i>walks, cries</i>)
possessive (<i>John's</i> ,)
progressive <i>-ing</i> (<i>walking, dripping</i> – but not gerunds)
comparative or superlative (<i>taller, tallest</i>)

Compound Words
Compound - free stems (<i>everything, cowboy, birthday</i>)
Compound - bound stems (<i>thermometer, geology</i>)

Derivational Suffixation
Derivational suffixation – free stem (<i>kindness, furious, majority, mysterious, ability</i>)
Derivational suffixation – bound stem (<i>curious, identity, social, electric, obvious, necessity</i>)

Derivational Prefixation
Derivational Prefixation – free stem (<i>reheat, unhappy, untie, disregard, incapable, asleep</i>)
Derivational Prefixation – bound stem (<i>prevent, report, deceive, inception</i>)

Procedures

For each of the books analyzed in this study, the first 1,000 words plus the ending of a sentence (unless the total book length was under 1,000 words) were included in the data analyses. All of the 33 texts with words were coded by two raters to establish inter-rater reliability, which was greater than 95%. There were also three wordless books included in the Exemplar Texts. For all words that were not coded the same by each rater, a discussion occurred until agreement was reached.

Statistical Analyses

Seven dependent variables were examined in this study – the frequency of each of the seven categories of morphological complexity, expressed in frequency per thousand words to

allow for comparison across texts of different length. The independent variable was text type, with four levels – teacher read-aloud fiction, teacher read-aloud informational text, student-read fiction, and student-read informational text. Although a factorial design was considered for this study, with two independent variables (genre – informational versus fiction, and modality – teacher read-aloud versus student-read), it was decided that it was more appropriate to treat the four categories of text as levels of one independent variable, for two reasons. First, it could not be assumed that the distinction between informational text and fiction would be parallel in the two modalities, given the relative simplicity of the texts students are able to read on their own in kindergarten and first grade. Second, post-hoc tests would provide information about differences among the four types of text that would be more easily interpretable than a combination of main effects and interaction effects.

Consequently, two MANOVAs were run, one for the variability of morphological complexity and frequency by morpheme types (i.e., each individual multi-morpheme word) and one for the same with morpheme tokens (i.e., the types plus the number of occurrences of each of these individual words). To account for the differences in text length, the types and tokens were converted to frequencies per 1,000 words for each book. The two MANOVAs determined, for each category of morphological complexity, whether there were significant differences among the four types of texts examined. When significant overall effects for text type were found, the post-hoc Dunnett's C test was run to identify which specific types of text were different from the others. This test was selected because it did not assume homogeneity of variance or equal sample size.

As described previously, a focus of this study was also to provide an examination of the prefixes and suffixes in the Exemplar Texts in comparison to previous research. To do this, the

rank ordering of the prefixes and suffixes within free stem words identified in this study, across all text categories, were compared to those discussed by Graves (2004).

In summary, this study sought to determine the types and complexity of morphemes children will be exposed to in frequently used kindergarten and first grade classroom texts. There was also a special emphasis on affixed words with stems that can stand alone. The results of these statistical analyses are presented in Chapter Four.

CHAPTER 4: RESULTS

For this study, two MANOVAs were conducted to analyze the data: one for the number of different morphologically complex words per 1,000 words (called types), and one for the total number of morphologically complex words per 1,000 words (called tokens). The independent variable was the type of text, with four levels: student-read fiction, student-read informational texts, teacher read-aloud fiction, and teacher read-aloud informational texts. The dependent variables consisted of seven categories of morphologically complex words: regular inflections, compounds with free stems, compounds with bound stems, suffixed words with free stems, suffixed words with bound stems, prefixed words with free stems, and prefixed words with bound stems.

Data for Complex Morphological Types

Table 3 displays descriptive statistics for morpheme categories. Results showed that regular inflections were the most common category of multi-morpheme words across all text types. Additionally, a number of suffixed words with free stems and compound words with free stems were identified. In comparison, words with bound stems, whether prefixed, suffixed, or compound, were relatively rare. Student-read fiction books tended to have notably fewer examples of all complex morphological categories, by about one-third. In contrast, student-read informational texts more closely matched the volume of multi-morpheme words within both teacher read-aloud fiction and informational texts. However, student-read informational books also showed more variability than other categories of text for all but one morphological category. The data in Figure 1 illustrate this variability for suffixed free stems.

Table 3

Morpheme Types per 1,000 Words – Means and Standard Deviations

Text Categories		Regular Inflections	Compounds with Free Stems	Compounds with Bound Stems	Suffixed	Suffixed	Prefixed	Prefixed
					Words with Free Stems	Words with Bound Stems	Words with Free Stems	Words with Bound Stems
Student	Mean	34.98	5.57	.000	5.13	.64	2.00	.32
Fiction	SD	29.48	5.96	.000	5.05	1.10	2.32	.86
Student	Mean	96.99	25.08	1.34	22.77	3.05	6.13	2.23
Nonfiction	SD	38.47	10.34	3.279	21.26	5.73	6.60	3.15
Teacher	Mean	87.66	18.53	.79	22.42	4.28	9.05	6.75
Fiction	SD	20.91	8.58	.914	8.21	2.56	4.86	4.86
Teacher	Mean	98.68	20.67	1.13	23.57	5.66	11.00	6.27
Nonfiction	SD	23.93	4.53	1.560	10.17	3.84	4.03	5.46
Total	Mean	81.52	17.62	.83	19.17	3.70	7.62	4.42
	SD	36.06	9.76	1.682	13.36	3.84	5.53	4.90

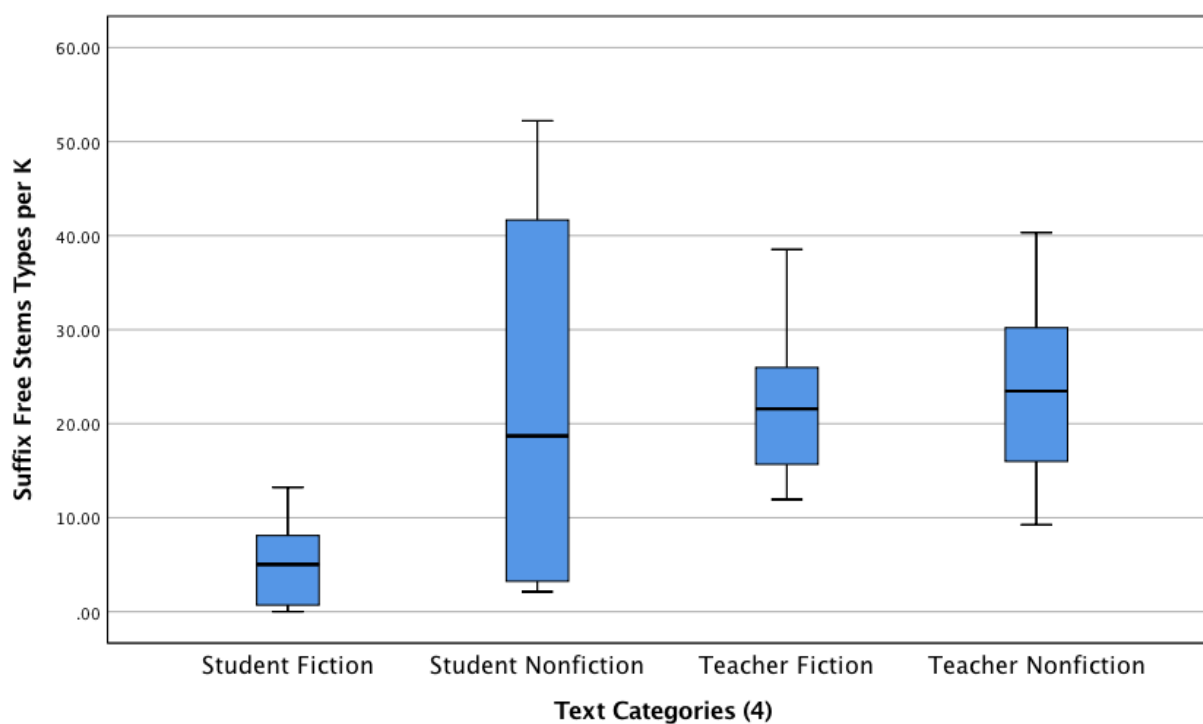


Figure 1. Suffixed free stems.

The measures of skewness and kurtosis (see Table 4) for the morpheme categories were not substantially above or below +/- 1, except for compound words with bound stems. This was because there were very few examples of this category in the data.

Table 4: Skewness and Kurtosis Measures

	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis
Regular Inflections Types	1.23	140.56	81.52	36.06	-.574	.011
Compound Free Stem Types	.00	42.86	17.62	9.76	.298	.450
Compound Bound Stems Types	.00	8.03	.83	1.68156	3.018	10.594
Suffix Free Stems Types	.00	52.21	19.17	13.35	.504	-.312
Suffix Bound Stems Types	.00	14.29	3.70	3.84	1.061	1.025
Prefix Free Stems Types	.00	18.32	7.62	5.53	.032	-1.237
Prefix Bound Stems Types	.00	18.82	4.42	4.90	1.042	.737
Regular Inflections Tokens	13.55	250.00	126.86	49.48	-.241	.701
Compound Tokens	.00	79.41	30.41	19.51	.735	.126
Compound Bound Stems Tokens	.00	8.03	1.08	1.98	2.089	4.095
Suffix Free Stems Tokens	.00	80.32	28.88	22.70	.649	-.403
Suffix Bound Stems Tokens	.00	23.83	5.26	6.11	1.496	2.322
Prefix Free Stems Tokens	.00	28.57	10.45	7.55	.204	-.579
Prefix Bound Stems Tokens	.00	24.50	6.07	6.81	1.079	.634

The results of the statistical analysis from the MANOVA for morpheme types (see Table 5) revealed a significant multivariate effect for text category ($p < .01$). In Table 6, univariate effects for five of the seven morphological categories were significant: regular inflections ($p < .001$), compounds with free stems ($p < .001$), suffixed words with free stems ($p < .05$), prefixed words with free stems ($p < .01$), and prefixed words with bound stems ($p < .05$).

Table 5: Multivariate Tests – Types Per 1,000 Words

Effect		Value	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	Sig.
Intercept	Pillai's Trace	.938	49.391 ^a	7.000	23.000	.000
	Wilks' Lambda	.062	49.391 ^a	7.000	23.000	.000
	Hotelling's Trace	15.032	49.391 ^a	7.000	23.000	.000
	Roy's Largest Root	15.032	49.391 ^a	7.000	23.000	.000
Text Category	Pillai's Trace	1.148	2.215	21.000	75.000	.006
	Wilks' Lambda	.191	2.469	21.000	66.594	.003
	Hotelling's Trace	2.582	2.664	21.000	65.000	.001
	Roy's Largest Root	1.768	6.315 ^b	7.000	25.000	.000

Note. Design: Intercept + text category.

^aExact statistic. ^bThe statistic is an upper bound on *F* that yields a lower bound on the significance level.

Table 6: Tests of Between-Subject Effects – Types per 1,000 words

Univariate Tests for Morphological Categories						
Dependent Variable	Type III Sum of Squares	<i>Df</i>	Mean Square	<i>F</i>	Sig.	η^2_p
Regular Inflections	19918.152 ^a	3	6639.384	8.873	.000	.479
Compounds with Free Stems	1451.347 ^b	3	483.782	8.797	.000	.476
Compounds with Bound Stems	7.305 ^c	3	2.435	.849	.478	.081
Suffixed Words with Free Stems	1757.181 ^d	3	585.727	4.300	.013	.308
Suffixed Words with Bound Stems	109.537 ^e	3	36.512	2.918	.051	.232
Prefixed Words with Free Stems	368.939 ^f	3	122.980	5.848	.003	.377
Prefix Words with Bound Stems	234.340 ^g	3	78.113	4.238	.013	.305

Post hoc Dunnett's C tests revealed that for these five categories of morphologically complex words, student fiction was different from both teacher fiction and teacher informational texts (regular inflections, compounds with free stems, suffixed words with free stems, prefixed words with free stems, and prefixed words with bound stems). For compounds, student fiction was also different from student nonfiction.

Data for Complex Morphological Tokens

The analyses of the multivariate and univariate tests for morphologically complex tokens (i.e., total number of examples) differed from that of morphologically complex types (i.e., unique examples) in one finding. The effect of text category was not significant for compounds with free stems (see Tables 7-9).

Dunnett's C post-hoc tests showed that for suffixed words with free stems, prefixed words with free stems, and prefixed words with bound stems, the pattern of differences was the

same for tokens as for types: student fiction was different from both teacher fiction and teacher informational texts. For regular inflections, however, student fiction was different only from teacher nonfiction.

Table 7: Tokens per 1,000 Words – Means and Standard Deviations

Text Categories		Regular Inflections	Compounds with Free Stems	Compounds with Bound Stems	Suffixed Words with Free Stems	Suffixed Words with Bound Stems	Prefixed Words with Free Stems	Prefixed Words with Bound Stems
Student Fiction	Mean	76.26	17.01	.00	5.45	.92	2.91	.32
	SD	47.92	19.93	.00	5.25	1.63	3.104	.86
Student Nonfiction	Mean	151.35	41.72	1.34	32.16	3.05	8.51	3.98
	SD	58.61	22.82	3.28	32.45	5.73	11.14	5.46
Teacher Fiction	Mean	117.34	28.57	1.28	36.62	7.12	12.68	9.38
	SD	18.45	18.41	1.67	17.47	6.83	6.07	7.89
Teacher Nonfiction	Mean	157.10	34.86	1.48	35.57	7.78	14.67	8.04
	SD	37.67	14.48	2.01	19.34	6.11	4.28	6.39
Total	Mean	126.86	30.41	1.08	28.88	5.26	10.45	6.07
	SD	49.48	19.51	1.98	22.70	6.11	7.55	6.81

Table 8: Multivariate Tests – Tokens per 1,000 Words

Effect		Value	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	Sig.
Intercept	Pillai's Trace	.945	56.026 ^a	7.000	23.000	.000
	Wilks' Lambda	.055	56.026 ^a	7.000	23.000	.000
	Hotelling's Trace	17.051	56.026 ^a	7.000	23.000	.000
	Roy's Largest Root	17.051	56.026 ^a	7.000	23.000	.000
Text4Cat	Pillai's Trace	.992	1.763	21.000	75.000	.039
	Wilks' Lambda	.249	1.972	21.000	66.594	.019
	Hotelling's Trace	2.100	2.167	21.000	65.000	.009
	Roy's Largest Root	1.589	5.675 ^b	7.000	25.000	.001

Note. Design: Intercept + text category.

^aExact statistic. ^bThe statistic is an upper bound on *F* that yields a lower bound on the significance level.

Table 9: Tests of Between-Subjects Effects – Tokens per 1,000 Words

Univariate Tests for Morphological Categories						
Dependent Variable	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.	η^2_p
Regular Inflections	31571.664	3	10523.888	6.524	.002	.341
Compounds with Free Stems	2255.436	3	751.812	2.197	.110	.101
Compounds with Bound Stems	10.549	3	3.516	.883	.461	.011
Suffixed Words with Free Stems	4952.052	3	1650.684	4.148	.015	.228
Suffixed Words with Bound Stems	259.078	3	86.359	2.676	.066	.136
Prefixed Words with Free Stems	647.795	3	215.932	5.327	.005	.289
Prefix Words with Bound Stems	405.330	3	135.110	3.625	.025	.198

CHAPTER 5: DISCUSSION

The purpose of this study was to analyze the frequency and variation of the complex morphology within the corpus of K-1 CCSS ELA Exemplar Texts. These specific books are of high value since they are already widely used in classrooms and will likely only increase in usage to meet educational objectives. As described in detail below, there are specific morphology learning goals starting even in kindergarten (NGA Center & CCSSO, 2010). Research on the types of derivational (and inflectional) morphemes students will encounter in books at the earliest elementary school grades has not been conducted to the same extent as that for somewhat older students.

Without examining the complex morphology within beginning reading books, instructional decisions could be made that would be based upon nothing more than informed speculation rather than having a solid research foundation. For example, what evidence is there that the teaching of prefixes and suffixes will be useful to kindergarten and first grade students in Common Core classrooms? The Exemplar Texts were suggested as strong titles to be used to meet learning objectives. Because of this, it would seem ideal that children would see examples of targeted morpheme patterns in the books they learn to read or at least in the books read-aloud to them. This study provided data to show how well matched these books were to helping young students meet CCSS instructional standards. Related to this, a direct application of the results from this study was also made to evaluate previous generalizations about when and in which order derivational prefixes and suffixes should be taught in the elementary school years (Graves, 2004).

Research Questions 1 and 2

The first research question that guided this study was to describe the types of complex morphology that students will encounter in the Common Core ELA Kindergarten and First Grade Exemplar Texts: compound words, inflectional morphemes, and derivational morphemes. Building on this, the second research question asked how the frequency and variation of these multiple morpheme words compare across the four text types involving genre and reader differences.

Overall, as shown in Chapter Four, regular inflectional morphemes were prevalent across all text types. When joined to free stems, there were examples of compound words, prefixed words, and suffixed words in all book categories, as well. However, these complex morphemes were rarer in words with bound stems.

What stands out from the data is how morphologically impoverished the language within student-read fiction texts is in contrast to that of all three other types. In comparison, the student-read fiction books had about a third of the number of inflectional morpheme types per 1,000 words, a fourth of compounds with free stems, zero examples of compounds with bound stems, a fourth of suffixed words with free stems, a sixth of suffixed words with bound stems, a third of prefixed words with free stems, and an eighth of prefixed words with bound stems.

Meanwhile, the student-read informational texts were strikingly similar in morphological complexity to both teacher read-aloud genres across a number of categories, including free and bound stem compound words and suffixed words with free stems. This ratio dropped to two-thirds for prefixed free stem words and just one-third for prefixed words with bound stems. These results indicated that student-read informational texts could play an important role in developing morphological awareness in young children. A caveat for this was that the student

informational texts were relatively uneven for some morpheme categories from text to text, as shown in Figure 1 in Chapter Four for suffixed free stems.

CCSS K-1 Morphology Related Standards

As discussed previously, there were a number of morphological related Kindergarten and First Grade Common Core English and Language Arts Standards (NGA Center & CCSSO, 2010). These standards were broken down into two categories: 1.) Conventions of Standard English and 2.) Vocabulary Acquisition and Use (see Tables 10 and 11).

Table 10: Kindergarten ELA Standards

Conventions of Standard English

- CCSS ELA-Literacy L.K.1.C
Form regular plural nouns orally by adding /s/ or /es/ (e.g., *dog, dogs; wish, wishes*).
- CCSS ELA-Literacy L.K.2
Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Vocabulary Acquisition and Use

- CCSS ELA-Literacy L.K.4.B
Use the most frequently occurring inflections and affixes (e.g., *-ed, -s, re-, un-, pre-, -ful, -less*) as a clue to the meaning of an unknown word.
-

Table 11: First Grade ELA Standards

Conventions of Standard English

- CCSS ELA-Literacy L.1.1.C
Use singular and plural nouns with matching verbs in basic sentences (e.g., *He hops; We hop*).
- CCSS ELA-Literacy L.1.1.E
Use verbs to convey a sense of past, present, and future (e.g., *Yesterday I walked home; Today I walk home; Tomorrow I will walk home*).
- CCSS ELA-Literacy L.1.2
Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

Vocabulary Acquisition and Use

- CCSS ELA-Literacy L.1.4.B
Use frequently occurring affixes as a clue to the meaning of a word.

- CCSS ELA-Literacy L.1.4.C
 - Identify frequently occurring root words (e.g., *look*) and their inflectional forms (e.g., *looks, looked, looking*).
-

Morphology Related Vocabulary Acquisition and Use Standards

For kindergarten, inflectional and derivational morphemes are emphasized to help students identify meanings of unknown words (L.K.4.B). Examples given include the regular past tense *-ed* and the regular plural *-s* inflectional morphemes. For first grade, having students identify common root words and the regular inflections of these base words is also targeted (L.1.4.C). As described previously, the frequency and variability of inflectional morphemes in the Exemplar Texts were relatively high across all text types, so children will encounter many examples.

The derivational prefixes *re-*, *un-*, and *pre-* and the derivational suffixes *-ful* and *-less* were also listed within the kindergarten standards (L.K.4.B). At the first grade level, the use of non-specified frequently occurring affixes (L.1.4.B) to help identify novel word meanings were added, as well. Exemplar Text data analysis revealed the following for the three kindergarten prefixes and the two suffixes: zero instances in the student-read fictional and informational books for four of the affixes and just one example of *-ful* (*beautiful*). In the teacher-read books, there were seven examples of *re-*, eleven of *un-*, two of *pre-*, eight of *-ful*, and one of *-less*. This indicates that teachers will need to supply virtually all of the models of affixed words that students will learn.

Data in Tables 12 and 13 depict the relatively few affixes found within the K-1 student-read texts. The data include all examples (not just the five affixes discussed above). In total, there were just 10 prefixed word types and 36 suffixed word types. Of these affixed words,

many had limited instructional value because of being semantically and/or orthographically opaque (e.g., *forget*). This scarcity of productive prefixes and suffixes would suggest that the student-read Exemplar Texts were not supportive of the K-1 derivational morphology related goals. A case could be made that the teacher-read books could be used as a scaffold, however.

Morphology Related Convention Standards

In the kindergarten and first grade convention standards, a number of inflectional morphemes are targeted. In kindergarten, the use of regular plural nouns (L.K.1.C) in spoken language is a goal. In first grade (L.1.1.C), subject and verb agreement with singular and plural nouns and the use of present, past, and future verb tenses (L.1.1.E) were also added. Considering the prevalence of inflectional morphemes within all text types, a strong case could be made that even the K-1 student-read Exemplar Texts are well suited to meet a number of these Convention Standards.

Differing Views on When Best to Teach Prefixes and Suffixes to Children

There are a number of curricula written for grades three and beyond that target the teaching of Latin and Greek derivational morphology, such as *Spelling Through Morphographs* (Engelmann & Dixon, 2007). Rasinski (2018) created a more recent program that focuses on just prefixes and suffixes for students in grades two through four. These publishers all followed Henry's (2003) recommended sequence for teaching the etymological layers within written English, with Latin and Greek morphology not being a part of beginning reading instruction.

Research to support this perspective comes, in part, from morphological studies that looked at the most common words in grades three to nine texts, with *The American Heritage Word Frequency Book* (Carroll et al., 1971) being a primary resource. White et al. (1989) used these data to establish the most common prefixes and suffixes students would encounter while

reading. Graves (2004) built his recommendations for teaching high value affixes upon White et al.'s (1989) earlier work. Yet, the utility of teaching multi-morpheme words at the younger grades is arguably not addressed by these studies, since kindergarten through grade two books were not sampled.

Other prominent literacy researchers advocated for early derivational morphology instruction. The author of this dissertation recently attended the Joyful Literacy Conference in Seattle, Washington, where several nationally-known literacy experts presented. The teaching of prefixes to young students was recommended by both Dr. Tim Rasinski (2018) and Dr. Maria Walther (2018). This dissertation's author asked these speakers to explain how they reached this decision and both said that children would see examples of this in what they read. (This may fall within the informed speculation category.) Dr. Rasinski shared word study lesson plans for teaching prefixes to first graders and noted how successfully this can be done. It is clear that the developers of the CCSS ELA standards hold to this "get started early" view, since both inflectional and derivational morphology are listed in the K-1 standards.

As an aside, Dr. Walther also said her instruction was based upon the research of Dr. Patricia Cunningham. However, Dr. Cunningham wrote to the author of this dissertation that she does not recommend the teaching of derivational morphology to such young students because they are simply not exposed to this type of complex morphology in what they read (P. Cunningham, personal communication, April 30, 2018). So, apparently there was a misunderstanding of some type.

An email exchange with Dr. Kenn Apel, an advocate for not waiting to focus on derivational morphology until the middle elementary school grades, provided a different perspective on this topic (K. Apel, personal communication, May 11, 2018). It should be noted

that Dr. Apel was a professor for the author of this dissertation when he earned his Masters in Speech-Language Pathology, and that Dr. Apel has done considerable research on morphology. Dr. Apel suggested that prefixes can still be taught to young children, even though they may not see many examples when learning to read beginning books. After all, the books read-aloud to students contain considerably more complex language. However, Dr. Apel also wondered if the developers of the CCSS ELA standards may be inappropriately pushing down higher-level linguistic skills into the lower grades.

Comparison of CCSS Exemplar Texts' Prefixes and Suffixes With Previous Research

An application of this study's results was made to compare the prefixes and suffixes in the CCSS ELA K-1 Exemplar Texts to that of the most common prefixes and suffixes identified from previous corpus-based research analyses (Graves, 2004). Table 12 lists the data for prefixes and Table 13 for suffixes. Results showed that the student-read books did not match what would have been expected from this previous research. In fact, nine of the eleven prefixed words referenced by Graves (2004) were not even found at all within these titles. Conversely, the most common prefixes (e.g., *a-*) from these books were not suggested by Graves (2004) for instruction. The suffixes from the student-read texts did fit somewhat better to what would have been expected, but there were still very few examples. As expected, the teacher read-aloud texts were filled with more examples of common prefixes and suffixes. However, it is not true that students would be able to benefit from using this morphological information to aid in the ability to read and comprehend books they are expected to read independently. Affixed words are simply too rare.

Table 12: Prefixes

Prefix	Number of types from Carroll, Davies, and Richmond (1971)	Total types in student-read text	Total types in teacher-read text
a-	a	6	17
ad-/ac-/at-	a	---	1
be-	a	2	14
con-/col-/com-/cor-	a	---	3
ex-	a	---	1
for-	a	1	2
out-	a	---	1
par-	a	---	1
per-	a	---	1
pro-	a	---	1
sur-	a	---	2
uni-	a	---	1
yester-	a	---	1
un-	782	---	13
re-	401	---	7
in-/ im-/ ir/- il- (not)	313	---	---
dis-	216	---	5
en- / em-	132	---	4
non-	126	---	---
in- / im- (in or into)	105	1	5
over-	98	---	2
mis-	83	---	---
sub-	80	---	1
pre-	79	---	3
inter-	77	---	---
fore-	76	---	---
de-	71	---	1
trans-	47	---	---
super-	43	---	---
semi-	39	---	---
anti-	33	---	1
mid-	33	---	1
under-	25	---	1

^aNot included in the table of frequent prefixes in Graves (2004), taken from White et al. (1989).

Table 13: Suffixes

Suffix	Number of types from Carroll et al. (1971)	Total types in student-read text	Total types in teacher-read text
-ade	a	---	1
-ain	a	---	4
-an	a	---	4
-ance	a	---	1
-ant	a	1	4
-ar	a	---	2
-ate	a	---	3
-ce	a	1	3
-ent	a	1	2
-hood	a	---	2
-in	a	---	4
-ish	a	---	2
-ist	a	3	3
-ite	a	---	2
-ize	a	---	2
-le	a	---	9
-like	a	---	1
-ling	a	---	2
-ory	a	---	1
-red	a	---	1
-st	a	---	1
-t	a	---	3
-th	a	1	5
-ure	a	---	5
-ward	a	---	4
-ly	144	6	57
-er, -or (agentive)	95	9	54
-ion, -tion, -ation, -ition	76	---	8
-ible, -able	33	---	4
-al, -ial	30	1	16
-y	27	8	55
-ness	26	1	5
-ity, -ty	23	1	9
-ment	21	---	5
-ic	18	---	3
-ous, -eous, -ious	18	---	6
-en	15	2	11

-ive, -ative, -itive	15	---	2
-ful	14	1	8
-less	14	---	1

^aNot included in the table of frequent suffixes in Graves (2004), taken from White et al. (1989).

As described previously, both White et al. (1989) and Graves (2004) based their research on the grades three to nine corpus-based analysis of Carroll et al. (1971). Because kindergarten through second grade texts were not included, another application of the CCSS ELA student-read data was made into a more expansive textual analysis. Zeno (1995) included texts from kindergarten through college when developing *The Educator's Word Frequency Guide*. This resource is searchable by grade level and word type. The data in Table 14 provide the total number of grade one words that contained the five CCSS ELA K-1 prefix and suffix examples. These data again show that derivational prefixed and suffixed words are uncommon in the books students learn to read.

Table 14: First Grade Affix Types from The Educator's Word Frequency Guide

Pre-	Un-	Re-	-ful	-less
Prepared	Uneasily	Recall	Colorful	Lifeless
	Unfriendly	Refresh	Grateful	Reckless
	Unload	Remove	Handful	Restless
	Unlocked		Mournful	Worthless
	Untie		Powerful	
	Unwilling		Rightful	
	Unwind		Successful	
	Unwrapped		Thankful	
			Truthful	

Suggestions for Future Research

Because morphology research has lagged behind that of other literacy elements, a number of topics warrant further study. To reiterate the importance of morphology: developing morphological awareness in students facilitates spelling, grammar, and vocabulary development. Reading comprehension skills also improve. Multi-linguistic word study, which has been

defined as best practice for all students but especially for struggling readers, has at its center the study of morphemes (Wasowicz, Apel, Masterson, & Whitney, 2012).

A valuable direct extension of this current study would be to analyze the complex morphemes within the next band of Exemplar Texts, grades two to three. The rationale for this is the same as that for the K-1 books – these are high value texts that are recommended by the developers of the Common Core to meet ELA standards, a number of which relate directly to morphology. Unlike the K-1 texts, the student-read fiction and informational text titles would likely include numerous instances of complex morphological words. There is value in determining the frequency and variation of multi-morpheme words that students will encounter in the books they learn to read at these grades, as morphological awareness and morphological problem solving will become increasingly essential for literacy success.

Limitations

Several notable limitations of this study are evident. While the K-1 Exemplar Texts are of high value because they are recommended by the developers of the ELA CCSS, it may be that a number of other titles will be used widely in classrooms across the nation. As discussed earlier, a small number of national curriculum developers will greatly influence the books students learn to read and those that teachers read-aloud to them. The variability of the complex morphology within the student-read informational texts especially may not generalize well to a different set of books. Additionally, the student fiction and informational texts were relatively short in length in comparison to the teacher read-aloud books. Even though these titles were multiplied by a factor to be equivalent to the types and tokens per 1,000 words, shorter texts reduce the sample size.

Conclusion

This study identified the morphologically complex words in a corpus of frequently used Kindergarten and First Grade books. The findings revealed that students will encounter many inflectional morphemes in both the books they learn to read and the books read-aloud to them. These texts provide strong support for meeting the CCSS ELA Convention standards. However, the student-read titles are not well suited for enabling students to achieve the Vocabulary Acquisition and Use learning objectives. The prefixes and suffixes found within these student-read titles do not correspond with those most common affixes discussed by Graves (2004). In fact, the most common prefixes in the student-read fictional texts were not even listed on the corpus-based findings of White et al. (1989). This current study helped fill a gap in the body of previous morphology research by provided an in-depth analysis of high value Kindergarten and First grade titles, which were targeted specifically to meet CCSS ELA learning standards. The results of this study provide evidence that derivational morphology is not often included in early student-read fiction. However, informational student-read texts can provide a bridge to the complex morphology that will become prevalent in the middle elementary school years and beyond. For kindergarten and first grade students, teachers will need to emphasize the complex morphological words in the texts they read-aloud to students in order to meet the ELA standards.

And finally, it would seem appropriate to end this study with one last dialogue with the developers of the Common Core. The author of this dissertation reported the results of his study – that student-read K-1 texts are morphologically impoverished – to an official representative.

Here is the emailed response:

The importance of vocabulary is highlighted throughout the standards reflecting the essential role of vocabulary in proficient reading. Texts that students read themselves in first grade do not grow vocabulary but the more complex texts read aloud can and these

texts as you noted will contain more of these morphemes. (T. Mooney, personal communication, May 16, 2018)

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