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The effects of systematic and explicit morphologic instruction of prefixes on vocabulary acquisition and comprehension

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The Effects of Systematic and Explicit Morphologic Instruction of Prefixes

on Vocabulary Acquisition and Comprehension

by

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Abstract

This study investigated the effects of a systematic and explicit morphological intervention of prefixes on the vocabulary and comprehension performance of fifteen fourth grade students in an urban primary school in the Midwestern United States. The intervention focused on systematic and explicit instruction, practice, and review of the 20 most commonly used prefixes in the English language (Stahl, 1999). A variety informal vocabulary and comprehension assessments were administered and used to analyze the effects of the intervention. Although the data demonstrated mixed results, the morphologic intervention greatly improved students understanding of the 20 most common prefixes and showed promising students growth in both vocabulary and comprehension.

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CHAPTER ONE: INTRODUCTION AND RATIONALE

Reading comprehension, or the ability to derive meaning from text, is essential for successful achievement both inside and outside the classroom. Reading comprehension is so important, it has been defined as, "the reason for reading" (Armbuster, Lehr, & Osborn, 2003, p. 4). The recent adoption of the Common Core State Standards (CCSS) has addressed the need for exceptional reading comprehension by requiring proficiency in standards focused on students' ability to read complex texts that push critical thinking, problem solving, and analytical skills (National Governors Association Center for Best Practices [NGA Center] & Council of Chief State School Officers [CCSSO], 2010). Both the Literature and Informational Text strands of the CCSS possess standards requiring first through fifth grade students to be able to determine the meaning of general and academic vocabulary when reading grade level texts. Further, as students leave the classroom setting and enter the workforce, they will be faced with a professional society in need of advanced literacy skills to meet the needs of increasingly demanding technology related careers. Therefore, the need for more developed literacy skills is vitally important for American students entering the workforce. (Graham, Graham, & West, 2015).

While there are many factors that can affect one's ability to comprehend text, vocabulary defined as the knowledge of word meaning, is a vital predictor of reading comprehension (Biemiller & Boote, 2006). The relationship between vocabulary and reading comprehension is critically important and complex (Pythian & Wagner, 2007). Likewise, Joshi (2005) argued that a well-developed vocabulary was also a component of fluent reading, or the ability to read with accuracy, speed, and proper expression. Biemiller (2005) deduced that by the end of second grade, significant vocabulary gaps between students begin to manifest whereas the highest group of students acquired approximately 8,000 word meanings, the average group of students acquired

around 6,000 word meanings, and the lowest group of students acquired approximately 4,000 word meanings. This lack of vocabulary knowledge has an impact on what is known as the fourth grade slump whereas 33% of fourth grade students were reading below basic level in a report by the National Assessment of Educational Progress (2011). In an effort to increase vocabulary knowledge and help all students develop literacy success, an increased emphasis on vocabulary acquisition must occur beginning as early as Kindergarten (Biemiller & Boote, 2006).

There are many strategies that must be employed to successfully build students' vocabulary knowledge at all grade levels. Incorporating morphological awareness instruction is a critical method to effectively impact the lack of vocabulary achievement and meet current reading demands. Morphological awareness is defined as the conscious ability to manipulate and separate words into their smallest unit of meaning (Bowers & Kirby, 2009). As students' progress through school, studies have demonstrated that skills in morphological awareness accounted for 10% of the variance for vocabulary knowledge when phonological and reading skills were accounted for (Mcbride-Chang, Wagner, Muse, Chow, & Shu, 2005). Furthermore, students encounter a magnitude of unknown words every day. Because it is impossible to explicitly teach all unfamiliar terms, morphological problem solving is an effective strategy to help children infer meaning. Nagy and Anderson (1984) argued that students could determine approximately 60% of novel words using morphological problem solving strategies. Strands in Phonics and Word Recognition of the Common Core State Standards (2010) addressed this important instructional need by requiring students in primary grades to identify and decode common prefixes, suffixes, and Latin roots.

Research Questions

Students in kindergarten through fifth grade need to develop and apply skills in morphologic analysis to infer meaning from unknown words. Through this process, students will improve vocabulary acquisition and comprehension skills. Based on the expectations defined in the Common Core State Standards (2010) for English Language Arts, the researcher of this study framed questions pertaining to vocabulary acquisition and morphological awareness. What strategies were most effective to help improve vocabulary acquisition at the primary level? What effect does morphological analysis instruction have on students' vocabulary acquisition? What types of morphologic strategies were most effective in helping to improve students' vocabulary knowledge? The Common Core State Standards (2010) and these three questions guided the design and implementation of this study.

Methodology

Through the course of this study, the researcher taught morphological awareness skills with a focus on the 20 most commonly used prefixes (Stahl, 1999; see appendix A). There were 15 participants involved in the study including eight males and seven females. Eleven students were African American and four were Hispanic. The study was conducted for nine weeks with week one and week eight dedicated to pretest and posttest measures. An additional posttest was administered in Week Nine to assess for transference of learning to new prefixed words. Week Two through Seven were dedicated to a systematic intervention which comprised of three sessions per week and were 30-45 minutes in duration. The six-week intervention was designed to support participants' understanding of the 20 most common prefixes (Stahl, 1999). Students were introduced to three new prefixes in weeks two-five and four new prefixes in weeks six-seven. Each week included an introduction of new prefixes, practice using each prefix, and

review of all prefixes taught from prior weeks. Data was collected, analyzed, and scored by the researcher.

Conclusion

The goal of the researcher was to determine if explicit instruction in morphological awareness using prefixes would improve vocabulary and comprehension skills of fifteen fourth grade students. Research testified to the importance that vocabulary plays in one's ability to comprehend text (Pythian & Wagner, 2007). Offering students the gift of morphological awareness can open the door to rapid vocabulary growth and consequently improved comprehension of primary grade students (Bowers & Kirby, 2009). During the nine week study the researcher explored the effectiveness of an explicit and systematic morphological awareness intervention involving 20 of the most common prefixes. The researcher instructed a classroom of fifteen students through the use of explicit instruction, guided practice, and review.   All of the pre assessment and post assessment data was collected, analyzed, and scored by the researcher. Failing comprehension scores on national assessments, Common Core State Standards, and valuable research in vocabulary drove the need for this study. The next chapter explores the research highlighting vocabulary and morphological awareness.

CHAPTER TWO: LITERATURE REVIEW

Vocabulary instruction is a vital component to an effective literacy program. It was determined by many researchers that vocabulary knowledge was a key component to strong reading achievement, particularly in the area of reading comprehension. Anderson and Freebody (1981) explained that the relationship between comprehension and vocabulary could be referred to as the *instrumentalist hypothesis* that described the impact word meaning instruction had on reading comprehension. Currently, it is understood that effective vocabulary instruction builds vocabulary knowledge, molds readers' prior knowledge, and improves the ability to make important inferences while reading advanced text (Maynard, Pullen, & Coyne, 2010). Moreover, students often rely upon their oral vocabulary knowledge to help determine the meanings of unknown words while reading. As a result, students with limited vocabulary knowledge were at greater risk for reading failure. Unfortunately, much of the instruction using incidental vocabulary exposure, was an ineffective method for students who were at risk for reading failure (Maynard et al., 2010). Therefore, it is extremely important for educators to provide explicit and systematic vocabulary instruction to close the achievement gap and improve reading success for all students. For these reasons, among others, researchers have dedicated additional time to identify effective researched based instructional strategies to teach vocabulary. Currently, research in morphologic awareness and instruction has moved to the forefront. Morphological awareness, the understanding of how to break down a word into its smallest units of meaning, is thought by many prominent researchers to be a logical method to help students develop greater vocabulary knowledge of multisyllabic words (Schwiebert, Green, & McCutchen, 2002).

This chapter summarizes studies that addressed the importance of explicit and systematic vocabulary instruction and described effective strategies that have proven significant in

improving word learning knowledge. In addition, the research in this chapter stressed the

importance of including morphological awareness interventions in all primary school classrooms

that teach vocabulary as part of an effective literacy program. This chapter answered important

questions that pertained to this action research project including: What strategies were most

effective to help improve vocabulary acquisition at the primary level? What effect does

morphological instruction have on students' vocabulary acquisition? What types of morphologic

strategies were most effective in helping to improve students' vocabulary knowledge? The

research summarized in the first section highlight a variety of researched based strategies used to

teach vocabulary effectively. Research in the second section addressed the important

contribution that instruction in morphological awareness has on vocabulary acquisition of

elementary students.

Vocabulary Instruction and Strategies

Reading is a critical skill necessary for school and career. Consequently, there is a direct

link between literacy and success in life. This important connection has not gone unnoticed by

professionals in the field of literacy and language. According to the Reading First component of

the Elementary and Secondary Education Act of No Child Left Behind (2001), there is an

important need for scientific research to identify methods and strategies in effort to teach reading

more effectively (Maynard et al., 2010). Vocabulary is a critical area of reading instruction

which required research based strategies to help students more successfully develop word

knowledge. As one of the five key components of effective reading instruction, vocabulary

knowledge is a critical predictor of reading comprehension. In this section, a number of

researchers studied vari1ous methods to best teach vocabulary. The first study, conducted by

Maynard et al. (2010), compared the impact of explicit and systematic vocabulary instruction to

incidental vocabulary exposure through storybook reading. The second study by Penno, Moore, and Wilkinson, (2002) explored the effects of repeated storybook readings and explicit teacher led explanations to increase vocabulary knowledge of target words within context. Similarly, the third study conducted by Biemiller and Boote (2006) sought to determine whether the number of repeated readings was significant to students' vocabulary acquisition when words were taught implicitly and explicitly. The fourth study, conducted by Brabham and Lynch-Brown (2002) explored the effects of three read aloud styles on third grade students' ability to learn new and complex words. The fifth and final study in this section, conducted by Graham et al. (2015) investigated the use of multi-component vocabulary strategies including student engagement, cooperative learning, graphic organizers, and explicit instruction on students' ability to learn and retain social studies vocabulary. All five studies explored a variety of strategies that have proven effective to improve vocabulary acquisition and comprehension in primary school children.

Maynard, Pullen, and Coyne (2010) compared the impact of explicit and systematic vocabulary instruction to incidental vocabulary exposure through storybook reading. The research questions were: Do first grade students acquire the meaning of story words taught using rich or basic instruction to a greater effect than story words that were not taught explicitly? What is the best method of instruction (rich, basic, or incidental) for acquiring the meaning of story words? The independent variables were direct and explicit vocabulary instruction using a three-step approach including: conspicuous and scaffolded instruction, opportunity for practice with high quality feedback, and multiple exposure of target words within a variety of contexts. The dependent variables included measures that assessed receptive, expressive, and context dependent vocabulary knowledge. The baseline measures consisted of the Peabody Picture Vocabulary Test III (PPVT-III; Dunn & Dunn, 1997) and the Expressive Vocabulary Test-2

(EVT-2: Williams, 2006). The PPVT-III was used to measure the participants' prior word meaning knowledge. The EVT-2 was used to measure expressive vocabulary through participant's ability to orally define words. Post assessment measures were conducted three to five days after the final storybook reading. The measures were used to assess the impact of the explicit and systematic vocabulary instruction including: expressive measure of story word definitions, receptive measure of story word definitions, and measure of story words in context. To assess participants' ability to retain the meaning of taught words, they were also assessed a second time in a delayed posttest measure approximately three weeks following the final storybook reading. The expressive measure of storybook words was utilized to assess participants' ability to orally define target words. The receptive measure of storybook words was used to assess the participant's ability to identify the correct picture representing the target word. Finally, the measure of story words in context was used to assess the participant's ability to determine if a target word was used correctly within context. Each measure consisted of twelve target words including six taught and six untaught for a total of 36 words. Additionally, each target word was awarded one point towards the participant's final score on the assessment, allowing him/her an opportunity for a composite score of twelve on each individual measure.

The participants in this study consisted of a diverse population of first grade students including 130 Caucasian, 50 African American, 14 Asian, 22 Hispanic, and eight students from a variety of ethnic groups. Participants were derived from moderate to low socio-economic backgrounds within the central Virginia District. The number of participants equaled 224 from three different schools. Each school held a differing number of participating classrooms and each class was randomly assigned to a condition group. The experimental groups were separated into two instructional categories including: rich and basic. The control group was labeled as the

incidental instruction group. Ultimately, there were five classrooms assigned to rich instruction

(97 total participants), three classrooms assigned to basic instruction (55 total participants), and

four classrooms assigned to incidental instruction (72 total participants).

Teachers in the three schools received training, materials, and a procedure manual prior

to beginning the week-long study. Acting as the main instructor, teachers were instructed to

adhere to all procedures and were observed on multiple occasions throughout the course of the

study. The participants in the rich, basic, and incidental groups were asked to listen to the story:

Goldilocks and the Three Bears by James Marshall (1998). The participants heard the story

three separate times throughout the course of the study. The researchers selected twelve target

words for the participants across the three groups. They selected words that they agreed were

both important and unlikely to be known by an average first grade student. The target words also

appeared one time throughout the story and were surrounded by context to help support the

word's meaning.   The rich and basic groups received the same explicit and systematic

instruction throughout the study. The groups were taught three words in conjunction with the

first reading and three words in conjunction with the second reading. The third reading was set

aside for review. Both the rich and basic group were also provided with deeper questioning

strategies and more opportunity for instructional conversation. Participants were asked to repeat

the target word and raise their hand when they heard the word within the text. Teachers were

instructed to provide simple definitions for each target word, read the definition in place of the

target word within the text, and provide corrective feedback. The rich instructional group

differed from the basic instructional group because participants were afforded the opportunity to

practice using target words through a variety of extension activities. Beyond the repeated

readings of *Golilocks and the Three Bears* (1998), the incidental groups did not receive explicit

instruction or discussion regarding the target words. Participants however, were actively

engaged through simple story discussion and question-answer techniques.

To determine if differences between groups occurred at the time of initial testing, means

on PPVT-III and EVT-2 assessments were compared using analysis of variance (ANOVA).

ANOVA baseline measures demonstrated that there were no differences on the PPVT-III.

Maynard et al. used a series of nested ANOVAS to analyze post-test assessments for the three

dependent measures for target words taught including: expressive definitions, receptive

definitions, and words in context. Using the student as the unit of analysis there was a

statistically significant effect of the explicit and systematic vocabulary instruction of taught

words (F=3.79, 2, 210, p <.05). There was no significant effect for class-within-treatment so

researchers ran a second investigation to analyze the statistical progress of the class, as a unit of

analysis. This too revealed statistically significant effect of the explicit and systematic

instruction of taught words (F = 45.47, 2, 9, p < .05). Further analysis of effectiveness

demonstrated that instruction in the rich and basic groups was more effective when compared to

the instruction in the incidental group expressed in the following data: d = 3.60–5.18. The effect

sizes demonstrated that participants in the rich and basic groups made more progress than those

participants in the incidental group. Results for the delayed post test revealed similar findings.

The main effect for time between the post assessment and the delayed post assessment was also

statistically significant for the composite words taught analyzed by students as the unit of

analysis (F = 46.034, 2, 211, p > .05). Once again, there was no significant effect for class-

within treatment using student for the unit of analysis (F = .905, 2, 211, p > .05) so the student

was used as the unit of analysis resulting in significant effect shown by the following data: F =

.905, 2, 211, p > .05. Further analysis of effect sizes indicated that participants in the rich and

basic groups were better able to retain learned vocabulary knowledge of the composite target

words when compared to the incidental group as demonstrated in the following data set: $d =$

1.28–1.88. Similar dependent measures and nested ANOVAs were used to analyze participant's

knowledge of untaught words including: composite untaught, receptive definitions untaught,

expressive definitions untaught, and untaught words in context.   As demonstrated in the analysis

of taught words, there was also a non-significant class-within-treatment effect for untaught

words learned. The data, $F = .947, 2, 210, p > .05,$ revealed that there was no significant effect

of instruction on the composite untaught words learned using the participant as the unit of

analysis.   In addition, effect size was calculated and demonstrated that the instruction in the

incidental group had very limited effectiveness on the participant's ability to use expressive ($d =$

$-.05–.28$, receptive ($d = -.40–.28$), and contextual ($d = -.10–.12$) vocabulary of untaught words.

This data demonstrated that there were not significant differences between the scores in any of

the condition groups. Researchers did not conduct an analysis for untaught words in a delayed

post-test. The results of each post assessment are further broken down within the study and

reflect similar significant results explained in the composite data above.

     Through the course of the study Maynard et al. (2010) were able to discern that the three

step approach was an effective strategy to teaching vocabulary. Although students may have

learned words through incidental exposure of storybook readings, they did not acquire the depth

of knowledge necessary to utilize the words in instructional or everyday discourse. Through

further examination of the three step approach, the researchers indicated that instructors could

teach approximately 216 words effectively if they spend 15 minutes per day using this approach.

By implementing this rich instruction students could learn 136 words expressively and

contextually and gain full knowledge. It is through explicit and systematic instruction

demonstrated in this study that students will develop vocabulary knowledge necessary for improved reading success.

Similar to Maynard et al. (2010), Penno, Moore, and Wilkinson (2002) explored the effects of explicit instruction and repeated storybook reading on participants' vocabulary knowledge. Unique to this study however, Penno et al. (2002) further investigated whether specific vocabulary strategies would help overcome the Matthew Effect. The authors answered the following questions throughout the course of the study: Does exposure to new vocabulary items within the context of a story result in vocabulary learning? What effect does frequency of exposure to stories have on the use of a new vocabulary item? What effect does teacher explanation of target words as they occur in context have on learning those words? What are the effects of frequency of exposure and teacher explanation on children with differing language abilities? Does the effect of explanation of target words generalize to other, non-target words? The independent variable was repeated storybook readings and direct explanation of target words within context. The dependent variables were designed to assess vocabulary gains as well as the depth of word knowledge. The baseline measures consisted of the Renfrew Action Picture Test (RAPT; Renfrew, 1988) and the Word-Finding Vocabulary Scale (WFVS; Renfrew, 1990). The RAPT (1988) was used to assess subject's expressive language skills in response to a picture or question and was administered one to two months prior to the study. The WFVS (1990) was used to assess participants' vocabulary knowledge through use of picture cards. There was no overlap between the target words taught within the treatment session and the vocabulary used on the assessment. Likewise, two multiple choice tests were designed to assess students' vocabulary gains from pretest to post-test. Participants were instructed to point to a picture that corresponded to the word read by the assessor. The picture choices on the multiple choice

assessment were semantically, phonetically, and syllabically similar. Thirty target words, 15

from each story, were chosen and used in the design of the multiple choice assessment. Of the

15 words, ten were marked as target words and five were labeled as generalization words. Penno

et al. (2002) agreed that the 30 vocabulary terms were both challenging and unfamiliar. In

addition to the multiple choice assessments, the research group designed a retelling task created

to assess participant's ability to use target and generalization words. The participants were

individually instructed to retell the story from the beginning to the end as if they were the

teacher. The researchers used the retellings to assess the participant's depth of vocabulary

knowledge after each storybook reading to determine whether he/she used more target words in

the first, second, or third retelling. Penno et al. (2002) used a coding system consisting of the

following six categories: no knowledge or use of target word/faulty knowledge (0-1 point),

developing knowledge (2 points), synonym (3 points), accurate knowledge (4 points), and

generalized knowledge (5 points).

The participants in this study included 43 students from a suburban school in Auckland,

New Zealand. The 43 participants were separated into two groups labeled as class A and class

B. Class A consisted of 23 students including 15 boys and 8 girls with an average age of six

years and six months old. Class B consisted of 24 students including 9 boys and 15 girls with an

average age of five years and eight months old. The 23 boys and girls comprising class A were

derived from a variety of backgrounds including: three Europeans, fifteen Maoris, and five

Pacific Islanders. The 24 boys and girls comprising class B also were derived from a variety of

backgrounds including: six Europeans, one Maori, six Pacific Islanders, five Asians, and six

from other ethnic backgrounds. All participants spoke English as their first language.

Participants in each class were randomly separated into four small groups consisting of 11-12 students. Using a Counterbalanced Latin Square model designed by Winer in 1991, each group was exposed to the experimental condition (explanation) for one story and the control condition (no explanation) for the other story for a total of nine weeks. In week one of the study, each group participated in a pre assessment to measure prior vocabulary knowledge. In weeks two-four following the pre assessment, the four groups listened to either *No Place Like Home* (Elliot, 1990) or *Anak the Brave* (Ling, 1990) and received the experimental *or* control conditions. In week five, participants were assessed on the story they had been exposed to at the beginning of week two. They were also provided a second multiple-choice pretest using target words from the story they were to explore. The same pattern was then repeated for the participant's second story. Students in the experimental condition were offered explicit explanations of target vocabulary. Explanations consisted of simple definitions, use of synonyms, use of role play, and use of illustrations to help define target words. Conversely, the control group was not offered any explanation of target vocabulary. If participants asked questions the instructor answered with, "that's an interesting question, let's keep reading" (p. 26)

Researchers conducted an ANOVA of between subject data including: age, ability, ethnicity, and gender. The within subject variables were: story, explanation, pretest and post-test. The three retellings were analyzed using orthogonal polynomials one of which represented linear effect of time and the other represented the quadratic effect. The between subject factors were analyzed using the mean scores of individual assessments. Within subjects were analyzed using two assessments for *No Place Llike Home* (Elliot, 1990) and *Anak the Brave* (Ling, 1990). Data of within subject analysis, $F(1, 108) = 6.88$*, p* < .01 revealed that students made significant gains from pre assessment to post assessment and participants who received explanations performed

exceptionally better than those participants who did not receive explanations. It was also important to note that both groups scored similarly on the pre assessment. The between-subjects analysis identified two significant variables: class and ability. According to the data, there was an important difference between the scores in class A, who identified more words correctly ($M=$ 4.25) than class B ($M = 3.24$). Ability was also significant as the higher ability children continued to score higher than the lower ability children. This data demonstrated that the strategies explored in this study did not help children overcome the Matthew Effect (the high achieving students continue to be high achieving and the low achieving students continue to be low achieving). After analyzing the generalization words on the pre assessment and post assessment data, results indicated that there was no main effect in the with-in subject analysis. However, the interaction between story and explanation proved to be significant (F (1, 108) = 12.26, $p < .01$). As with target words, class and ability reached significance for the between subjects variables. Again, Class A identified more generalization words correctly ($M = 4.30$) that that of class B ($M=3.14$). After analyzing the with-in subjects data from the retelling assessments, it was evident that the retellings grew more accurate over time (Time 1, $M = 6.07$; Time 2, M = 7.99; Time 3, $M = 10.11$). Results also demonstrated a main effect for explanations ($M = 11.21$) in that they played a critical role in the participant's ability to use target words in his/her retelling (no explanation- $M = 4.90$). Data also demonstrated a greater increase in scores with each successive reading and retellings. Much like the multiple choice assessment, the retelling data also demonstrated that the higher achieving participants made more progress than that of the lower ability participants. Participants also used more generalization words with each successive retelling, especially when immersed in the experimental condition (explanations: $M=$

5.22; non-explanations: $M = 4.48$). Furthermore, class A ($M= 10.06$) more accurately used generalization words in their retellings than did class B $(M = 6.21)$.

Through this study, the researchers concluded that there were significant benefits to students' vocabulary growth through repeated storybook readings and explanation of target words. Findings also demonstrated that study conditions were not able to effectively advance vocabulary acquisition of students with lower ability levels. The results indicated that additional strategies would be needed to effectively advance vocabulary knowledge of students with lower level abilities.

Similar to Penno et al. (2002), Biemiller and Boote (2006) explored the effects of repeated readings and direct word explanations on students' vocabulary acquisition. The researchers also investigated the effect of pretesting on students' word learning acquisition. Through this basic pre and post assessment study, the researchers considered whether pre assessment and the number of repeated readings interacted significantly with and without direct instruction of word meaning. The researchers hypothesized that pretesting would be an effective method to improving students' vocabulary acquisition both with and without direct word instruction. Biemiller and Boote (2006) broke this study into two parts-Study One and Study Two. The independent variables in Study One were pre assessment, inclusion of repeated readings, and reading with and without direct explanation. The independent variables in Study Two were four modifications used to increase the percentage of word meanings learned including: increased number of word meanings taught, implemented vocabulary review, implemented additional reviews with words used in context sentences, and used teacher explanations of word meaning only. The dependent variables in Study One included a general vocabulary test and a test of instruction words. The general vocabulary test was administered

one month prior to the pre assessment and included a version of Test B used in a study by Biemiller and Slonim in 2001 and was used to determine cohorts. This test was also similar to the Peabody Picture Test III (PPTV-III; Dunn & Dunn, 1997). Each child was assessed individually and all questions were answered orally. To assess the effect of pretesting on vocabulary acquisition, the researchers divided each classroom into two cohorts assessing half of the 48 vocabulary words on the pre assessment and all 48 vocabulary words on the post assessment. Participants were awarded a score of 1.0 for known vocabulary, .5 for possibly known vocabulary, and 0 for unknown vocabulary. The same method was used for the test of instruction words. The words however, were drawn from books that were utilized within the study. The dependent variables in Study Two were the same as those used in Study One. A second post assessment was administered six weeks following instruction and used the same word meanings used in the first study. The assessment also included questions not used within the books used in the intervention. To assess the amount of retention, the participants were first assessed two weeks following the initial instruction and again six weeks post instruction.

The participants in this study consisted of children from a public Catholic school in Toronto, Ontario, Canada. The majority of students were from working class Portuguese families. Although all participants attended the same Catholic school in Toronto, Ontario, Canada there were some key differences between Study One and Study Two. Participants in Study One included children in grades Kindergarten through second grade including 43 Kindergarteners (24 girls), 37 first grade students (13 girls), and 32 second grade students (14 girls). Participants in Study Two included 28 Kindergartners (16 girls), 37 first grade students (16 girls), and 42 second students (21 girls). Seven students were not able to complete the

immediate or delayed post assessment and were therefore were omitted from the study. Approximately 50% of the participants in both studies were English language learners.

In Study One three fiction books were selected for each grade level. Twelve vocabulary words were selected from texts that were read twice and 24 vocabulary words were selected from text that was read four times for a total of 48 words. Two of the books were read twice and the third text was read a total of four times. The researchers chose words that they determined to be unknown by participants based on grade level appropriateness. Vocabulary that was known by 80% or more of fourth grade students in *Living Word Vocabulary* (LWV; Dale and O'Rourke, 1981) was omitted. Participants in each cohort were pre and post assessed on 24 words, half of which were taught for meaning. The method of the study was divided into systematic steps. Prior to the first reading of each book one or two vocabulary terms were explained and basic comprehension questions were asked after the story was completed. The book was then read either one or three additional times including instruction of four to six new vocabulary terms. To explain each new term, teachers would reread the words within context and ask participants to explain what they understood about the word's meaning. If the participants were unsure of a words meaning within context, the teacher would explain its meaning and read on. If the story was read a third or fourth time, then the teacher stopped and explained the meaning of additional words while encouraging students to listen for previous words discussed.

In Study Two, two books were used at each grade level. Similar procedures were used to select vocabulary words. Additional words were eliminated when they were known by 85% or more of the participants on the pre assessment. This left 42 words meanings taught in Kindergarten, 55 word meanings in first grade, and 46 word meanings in second grade. There was also one second grade no-intervention group, which provided researchers with important

data regarding vocabulary gains without the use of read alouds and direct instruction to teach

selected vocabulary. The intervention process used in Study Two was similar to Study One. The

first reading of each story was read with no interruptions regarding vocabulary. Just as in Study

One, one or two vocabulary terms were taught prior to the reading. The same process was used

to teach seven to ten new words during each additional reading. In addition to the process used

in Study One, a review was added each day to clarify the meaning of all new words discussed.

On the fifth day the story was not reread but all words were reviewed using new context

sentences not based on the books read during the intervention.

To determine statistical results of Study One an ANOVA was conducted on pre

assessment and post assessment scores. Researchers analyzed three between group factors

including grade, gender, and cohort. They also studied pre assessment versus post assessment as

the within group factor. Pre assessment to post assessment results demonstrated that the

intervention was highly significant at, $F(1, 100) = 182.726$, $p<.001$. Results also indicated that

there were no significance with grade, $F(2, 100) = 2.986$, $p < .06$, gender, or cohort. Overall,

participants knew 25% of the vocabulary words at the start of the intervention and 42% of the

words and the end of the intervention. An ANOVA was also conducted looking specifically at

the impact of words that were taught (22%, SD = 19%) versus words that were not taught (12%,

SD = 15%) on gain scores. The results demonstrated that direct vocabulary instruction makes a

significant impact on student understanding at $F(1, 109) = 19.715$, $p < .001$. Overall, there was

no significance in scores when books were read four times versus two times. Data also

demonstrated significant interaction in gains between number of readings and grade level, $F(2,$

$100) = 3.489$, $p <.05$, with first grade students having the most impact from repeated readings

(gain scores = 7%). Study Two results demonstrated that pre assessment to post assessment

effect size was 2.97 with significant interaction, $F(4, 192) = 4.617$, $p < .002$. As in Study One, first grade students made the largest gains in comparison to all three grade levels within the study. There were no significant interactions in gender or cohort. The group with no intervention gained an average of 4% between pre and post assessments. A mixed ANOVA was also conducted and found that there was a significance in the interaction between word list, cohort, and grade at, $F(2, 100) = 3.663$, $p < .05$. However, there was little overall difference between accuracy when vocabulary was used in new or old context sentences.

In conclusion, results demonstrated that pretesting has no significant impact on students' vocabulary acquisition in any of the three grade levels within the study. Although repeated readings alone did not significantly impact vocabulary acquisition, it did help to improve the probability that vocabulary was learned when it was not taught explicitly. Results proved clearly, however, that when word meanings were effectively instructed, students were able to make larger gains in their vocabulary acquisition and use. Study Two helped to solidify the need for review of previously learned word meanings which resulted in a gain of 19% in word meanings learned from Study One to Study Two. It was also important to note that the amount of initial word knowledge had no direct impact on the word knowledge gained.

Similar to the studies conducted by Maynard et al. (2010), Penno et al. (2002), and Biemiller and Boote (2006), Brabham and Lynch-Brown (2002), designed a quantitative study with a goal to improve students' vocabulary and comprehension. Brabham and Lynch-Brown's (2002) study was unique, however, in that they explored the effects of read aloud s*tyle* on students' vocabulary acquisition and use. The specific purpose of the study was to examine the effects of three types of reading styles. The researchers hypothesized that interactive read aloud styles would most effectively improve reading comprehension and vocabulary acquisition. The

independent variables involved performance reading interventions, interactional reading interventions, and classic read aloud interventions. The dependent variables included a vocabulary and comprehension assessment measure that was derived from previous published tests (Brabham et al., 2000) for each book read aloud. The vocabulary pre assessment and post assessment measures were comprised of 20 vocabulary words from each of the two informational storybooks used within the study. Each vocabulary term was derived from meaningful context within the texts used during the intervention. The comprehension assessment was comprised of 17 researched based multiple-choice questions and assessed both literal and inferential abilities of the participants.

Participants included 24 classrooms in five schools in the Southeastern United States. Students in 12 first grade and 12 third grade classrooms participated and were composed of a mixture of ethic families including: 10 Asian students, 40 African American students, 171 Caucasian students, and 8 Hispanic students (seven students' ethnicities were not identified). Participants came from low to middle income families and lived in a mixture of urban, rural, and suburban neighborhoods. Of the total 360 participants, 114 were absent for a portion of the intervention leaving 117 first grade participants and 129 third grade participants. More specifically, there were both 123 males and 123 females involved in the study. Across both grade levels the researchers randomly assigned reading aloud styles concluding with 87 students in classic reading classrooms, 79 students in performance reading classrooms, and 80 students in interactional reading classrooms.

All preservice teachers involved in the study were provided scripts to follow to ensure fidelity. *Call me Ahnighito* by Pam Conrad (1995) and *Everglades* by Jean Craighead George (1995) were chosen due to their rich vocabulary and unique content. Both books were read

during the course of two weeks. Each book was read three times during a three-day period. As mentioned above, participants were randomly assigned to reading style groups. Reading intervention teachers were instructed to read from scripts that required students to not ask questions or make comments at any time throughout the reading. Students were instructed to reply to questions independently after the book was read. Teachers involved with the performance reading intervention groups and interactional reading intervention groups were provided scripts with questions that emphasized discussion of story elements, inferences, facts, and vocabulary. Participants involved in the performance style intervention group were instructed to make comments and ask questions before and after reading. Teachers also discussed targeted vocabulary words prior to reading. After the story was read teachers were encouraged to answer questions, invited discussion, and conversed about story details. Conversely, participants in the interactional reading intervention group were encouraged to ask questions, discussed important vocabulary, and made comments before, during, and after reading.

Brabham and Lynch (2002) conducted pre and post assessment measures for all participants. To analyze effects of reading style and grade on vocabulary/comprehension results, researchers used a multivariate analysis of variance (MANOVA). Effects of grade levels were statistically significant for all variables *(p <.001)* with the exception of vocabulary acquisition for the book *Call Me Ahnighito* (1995), $F(2, 240) = 1.69$, $p = .19$; (n2 = .01). Read aloud styles demonstrated significance for both books on vocabulary and acquisition measures $F(2, 240) = 24.15$ and 26.16, $p = .001$. Effects of style on comprehension using the book *Call Me Ahnighito* (1995) were significant at, $F(2, 240) = 11.43$, $p = .001$. Likewise, effects of style on comprehension using the book *Everglades* was also significant at, $F(2, 240) = 26.16$, $p < .001$.

Data also uncovered a larger effect size for vocabulary acquisition (n^2 = .17 and .18) than for comprehension (n^2 = .09 and .03). However, data demonstrated opposite results when analyzing results for each grade level. Interactional reading interventions had significantly higher gains for vocabulary acquisition than any other read aloud style used throughout the study (*M*=5.10 for *Call Me Ahnighito* and *M* = 5.37 for *Everglades*). Likewise, results indicated that the interactional read aloud intervention had the most beneficial effect on participants' comprehension (*M* = 11.84 for *Call Me Ahnighito* and *M* = 9.80 for *Everglades*).

Results from this study concluded that strategies utilized in the interactional read aloud style produced the most improvement in first and third grade students' vocabulary acquisition and comprehension scores. Just reading produced the smallest benefit resulting in the least amount of vocabulary and comprehension gains. It was important to note that there was not simply one read aloud strategy that will best teach all skills necessary to create an expert reader. However, Brabham and Lynch-Brown's (2002) study was useful in helping educators choose the best read aloud style that helped students learn specific skills for each intended instructional purpose.

In contrast to the studies described within this section, Graham, Graham, and West (2015) investigated the effects of vocabulary acquisition on comprehension of social studies curriculum through the use of multi-component vocabulary strategies. Throughout the course of this correlational quantitative study the researchers sought to answer the following two part question: What is the effect of multi-component social studies vocabulary instruction on comprehension, and is that difference sustained? The independent variables were muti-component vocabulary strategies. The dependent variables consisted of three measures and was used to answer the research questions described above. The Test of Silent Contextual Reading

Fluency (TOSCRF, 2006), a vocabulary curriculum based measure (CBM) adapted from the

Teacher Quality Grant (Simmons, Rupley, Hairrell, Byrns, Vaugn, &, Edmonds, 2005), and a

multiple choice exam called Checkpoints were administrated to determine student progress

throughout the course of the study.   The TOSCRF (2006) was used to measure the length of

time it took the students to identify words within a series of reading passages. As the passages

progressed, the vocabulary, content, and grammar became more complex. The information

gained from this measure was used to identify the students' overall reading ability. The

vocabulary CBM was designed as a matching assessment and utilized as a pre and post

assessment measure. This measurement determined vocabulary growth of each participant at the

close of the intervention. Finally, the Checkpoint assessment was created to measure students'

comprehension of expository text.   The 20 multiple choice questions were derived from the

curriculum utilized within the district and administered as a pre and post assessment measure

The participants in this study consisted of 23 teachers and 375 fourth grade students from

three districts in the Southwestern region of the United States. The study population comprised

of 208 females and 165 males. Many ethnic groups were represented in the study including:

Asian, African American, Hispanic and, Caucasian.   The students' names were anonymized and

randomly assigned to either the treatment or comparison group. Likewise, teachers were also

randomly assigned to teach each of these groups. There were 15 treatment groups and 14

comparison groups.

All teachers assigned to the treatment groups were trained in the following instructional

methods: student study teams, vocabulary maps, connections webs, explicit instruction, semantic

feature analysis, and active engagement. The research team implemented the methods to

incorporate repetition of new vocabulary and provided multiple exposure of target vocabulary.

Teachers were also taught a variety of engaging learning games such as: Ready, Set, Go;

Vocabulary Memory; and Jeopardy. All materials, curriculum, and multi-component strategies

were provided for treatment group teachers. Intervention sessions were separated into three 30

minute periods for a total of 90 minutes per week. The intervention was six weeks in duration.

Graham et al. (2015) collected pre assessment data in the week prior to the start of the

intervention. Post assessment One data was collected on week six of the intervention, while Post

assessment Two data was collected six weeks following Post assessment One. Observations and

data collection were conducted by one of the members of the research team as well as four

trained data collectors. Observations, used to control fidelity, occurred a minimum of one time

per week during social studies instruction. The data collection team used a checklist and

assessed seven different areas including: time/date/students present, the seven different

comprehension strategies, seven vocabulary strategies, grouping arrangements, materials being

used, and the implementation of intervention instruction. Repeated measure ANOVAS were

used to analyze the data and answer both research questions. The first question addressed the

effect of multi-component vocabulary strategies on comprehension and was measured using the

CBM and the Checkpoint tests. Checkpoint data revealed that the control group had a mean of

11.00 on the pretest and a 13.38 on post assessment Two. The experimental group demonstrated

slightly higher averages with a mean of 11.37 on the pre assessment and 14.13 on Post

assessment Two. CBM data revealed that the control group had a mean of 4.53 on the pre

assessment and 8.63 on the post assessment. Contrastively, the experimental group began with a

slightly lower mean on the pre assessment (M=4.14) and demonstrated substantial growth on

post assessment One (M=13.27). The difference score analysis for the experimental group on the

CBM pre and post assessment Two demonstrated significant difference when p<.001. The

second research question addressed whether or not comprehension was sustained post intervention. Both the CBM and Checkpoint measures were administered six weeks post intervention. Both assessments were analyzed for the effect of time and group by time. CBM data revealed the effect of time was .297, p = .001 with a partial η^2 of .703 and the effect for group by time was .744, p = .001 with a partial η^2 of .256.

In conclusion, the research conducted by Graham et al. reiterated the need for strong vocabulary instruction, which involved a variety of key components such as student engagement and multiple opportunities to reinforce new vocabulary. In addition, this study also demonstrated that the increase in vocabulary helped to improve students' comprehension. Retention of the skills, when taught effectively, was also demonstrated through this study as well. Overall, multi-component vocabulary strategies were a crucial component of this study.

The five studies explored in the section, *Researched Based Vocabulary Strategies,* provided valuable insight into fundamental strategies used to teach vocabulary to primary school children (grades K-5). The research presented within the studies, reiterated the vital role that word knowledge had in the reading achievement of young children. The first study conducted by Maynard et al. (2010) confirmed that the three step approach outlined in the study was an effective strategy to teaching vocabulary. The second study conducted by Penno et al. (2002) confirmed the need for repeated storybook readings coupled with direct explanation of target was an important strategy to improve children's word knowledge. Much like the study by Penno et al., the third study conducted by Biemiller and Boote (2006) sought to determine whether the number of repeated readings was significant to students' vocabulary acquisition when words were taught implicitly and explicitly. The fourth study conducted by Brabham &Lynch-Brown (2002) explored the effects of different read aloud styles on students' vocabulary acquisition and

comprehension. The final study in this section, conducted by Graham et al. (2015) investigated the use of multi-component vocabulary strategies on students' ability to learn and retain social studies terms. Research data from these studies demonstrated the need for explicit vocabulary instruction, multi-component vocabulary strategies, student engagement, interactive read alouds, repeated storybook readings, and repeated exposure to new vocabulary.

Morphologic Instruction and Strategies

Morphological awareness, the conscious ability to manipulate and separate words into their smallest unit of meaning, develops early in a child's life and continues to develop throughout the elementary years (Bowers & Kirby, 2009). Many researchers have accepted morphology as an important explanation for how children learn words that they have not been taught explicitly (Bowers Kirby, 2009). Likewise, a growing body of research has focused on the role morphological awareness has on vocabulary acquisition. Nagy and Anderson (1984) estimated that approximately 60% of words that students encounter in text could be determined by morphological manipulation. Researchers also argued that morphological awareness could help students transfer understanding of taught words to additional derivations of untaught words (Bowers & Kirby, 2009). In this section, a number of researchers studied the strong connection between morphological awareness and vocabulary acquisition. The first study conducted by Carlisle (2000) sets the foundation for the argument addressed in this chapter. Through Carlisle's research, a significant correlation was identified between morphological awareness, vocabulary, and text comprehension. The second study conducted by Schwiebert, Green, & McCutchen (2002), explored the impact of morphologic instruction on students' reading and spelling achievement through studying specific literacy skills that were enhanced. The third study administered by Good, Lance, and Rainey (2015) explored the effects of explicit and

systematic morphologic instruction on student success in reading, spelling, and vocabulary acquisition. The fourth study conducted by Bowers and Kirby (2009) addressed the need for explicit morphologic instruction to help children more effectively learn taught and untaught words. The fifth study in this section administered by Baumann, Edwards, Font, Tereshinski, Kame'enui, and Olejnik (2002) and explored the effects of morphemic and contextual analysis skills on students' vocabulary and comprehension abilities. Similar to Bowers and Kirby (2009), the research team studied the effects that morphological and contextual analysis had on students' understanding of words taught and words not taught when provided in isolation and within context. The sixth study conducted by Apel, Brimo, Diehm, and Apel (2013) explored the impact of explicit and systematic morphologic instruction with kindergarten, first, and second grade students. Likewise, the seventh study administered by Ramirez, Walton, Roberts (2013) explored the effect of morphological awareness on Kindergarten students' vocabulary development using compound words. Although unique, all seven studies examined the important role that morphologic instruction played on word learning in the primary years.

Carlisle (2000) conducted a correlational study that explored the relationship between morphemic knowledge and its role in word reading and understanding of morphologically complex words. Through the course of the study, Carlisle (2000) sought to answer the following questions: What is the relationship between children's knowledge of the meanings of morphologically complex words and their awareness of word structure and use? Does awareness of structure contribute significantly to their definitions of morphologically complex words? Is there a significant relationship between awareness of morphological structure and reading of morphologically complex words? To what extent do awareness of morphological structure, the ability to read morphologically complex words, and knowledge of the meanings of

morphologically complex words contribute (together and independently) to reading

comprehension? The independent variable was a battery of tasks used to identify students'

morphological awareness. The dependent variables were four measures used to assess students'

ability to read morphologically complex words and understand the relationship between base and

derived forms. The measures also assessed students' knowledge of morphologically complex

words and reading comprehension skills. Both the Word Reading Test (WRT) and the Test of

Morphological Structure (TMS) were designed by the researcher and administered to assess

students' morphological awareness. Specifically, the WRT assessed the students' ability to read

three sets of morphologically complex words (words with both phonological and orthographic

shifts, words with orthographic shifts only, and words with phonological shifts only). This

assessment included nine *Transparent* words or words in which the base form was fully

represented in the derived form. It also included 16 *Shift* words or words which were

orthographically and phonologically different than the base forms. The TMS measure was

designed to assess student understanding of the relationship between base and derived forms.

Part one of this assessment defined as the Decomposition Task, required participants to complete

sentences by decomposing derived words (e.g., *farm* to *farmer*). Part two of the TMS

assessment, defined as the Derivation Task, required participants to do the opposite, thereby

produced a derived word to complete the sentence (e.g., *driver* to *drive*). Suffixes that were

thought to be the most common for third and fifth grade students were used in the measures. The

Test of Absolute Vocabulary Knowledge (TAVK: Anglin, 1993) was administered orally and

used to assess participants' ability to produce definitions and sentences of specific

morphologically complex words. Words with inflected endings, derived forms, compounds, and

idioms were all included within this measure. The idioms, however, were not included in the

analysis of the results. Finally, the Vocabulary and Reading Comprehension subtests of the Comprehensive Testing Program III (CTP; Educational Records Bureau, 2010) assessed the participants' vocabulary and comprehension knowledge.

The participants involved in this study included 34 third grade students and 26 fifth grade students. There were18 boys and 16 girls in third grade and 10 boys and 16 girls in fifth grade. Data was missing for one fifth grade participant leaving 25 students in fifth grade. All participants attended a Midwestern private school in a middle to upper class community. After administering the Educational Records Bureau assessment, all students in the study scored at or above the 30th percentile on vocabulary and comprehension subtests.

The participants were all administered the WRT, TMS, and TAVK assessments individually for 40 minutes. The CTP III was administered to each class during the spring term of the school year. The WRT was tape recorded and scored by the research team. Each participant was awarded two points for each correct answer and one point if there were delays, self-corrections, or repetitions. The TAVK was also tape recorded and was scored by adding the total points for the words that were provided appropriate definitions.

To determine statistical results from this study, an AVOVA was conducted on all measures described above. Results were analyzed and third and fifth grade results were compared. Both the Word Reading Test (WRT) and the Test of Morphological Structure (TMS) were designed to measure participants' morphological awareness. Results on the TMS demonstrated a significant effect for task in that the third grade participants performed lower on the Derivation Task than on the Decomposition Task, $F(1,33) = 144.37$; $p < .001$. Due to the fact that the fifth grade participants approached the celling on several parts of the TMS assessment, a Friedman Analysis of Variance for Ranks was conducted. Results indicated that

the participants performed differently on the two tasks, X^2 (3, N= 25) = 52.76; $p < .001$. Results

of the WRT indicated that the third grade students reading of the three word types differed

significantly, X^2(2,N = 34) = 42.61; $p < .001$. Similarly, test results also indicated that the fifth

grade students reading of the three word types differed significantly, X^2 (2, N = 26) = 33.40; $p <$

.001. Overall results suggested that there was a significant relationship between students'

morphologic awareness and understanding of morphologically complex words (grade 3: r = .46,

$p < .001$ and grade 5: r = .64, $p < .001$). Likewise, results indicated that there were significant

correlations between morphological awareness and vocabulary in grade 3: $F(3, 29) = 6.59$ $p <$

$.01^2$, grade 5: $F(3, 21) = 8.03$; $p < .001$ and reading comprehension in grade 3: $F(3,30) = 7.42$; p

$<.001$) and grade 5: $F(3,21) = 8.68$; $p <.001$.

In conclusion, this study helped prove the important connection between morphological

awareness and the ability to define morphologically complex words. Likewise, this study helped

prove the extent to which having strong morphological awareness coupled with the ability to

read derived words contributed to reading comprehension.

Two years following the study conducted by Carlisle (2000), Schwiebert, Green, and McCutchen

(2002) administered a correlational study that explored the benefit of morphologic instruction on

students' reading and spelling achievement and emphasized vocabulary acquisition. Unique to

this study, the research team strived to identify which specific literacy skills were enhanced by

morphological instruction through the following questions: For more experienced readers, does

morphological knowledge contribute to reading and spelling achievement beyond phonological

and orthographic awareness? Which aspects of literacy achievement are effected by

morphological awareness? The researchers hypothesized that this study would demonstrate an

important connection between morphology and increased reading and spelling achievement

beyond phonological and orthographic awareness. The independent variable was a group of

tasks used to assess participants' reading and spelling achievement. The dependent variables

included measures to assess participants' morphological awareness, word identification ability,

and phonological awareness. To assess participant's oral morphological awareness, the research

team administered a group of three subtests derived from a preliminary version of the University

of Washington Morphological Awareness Battery (Berninger, Nagy, Vaughn, Vermeulen,

Thomson, Brooks, Kushmerick, and Busse, 1999). The first subtest focused on participants'

knowledge of derivational suffixes and required students to choose among four words with the

appropriate derivational suffix that best fit the corresponding sentence. Additionally, students

were required to choose among a group of derivational suffixes that best completed the

corresponding question. Both questions helped researchers gain a clearer understanding of the

semantic and syntactic role of morphology. The second subtest entitled, Plausible Words with

Derivational Suffixes (Berninger, et al., 1999) consisted of five items in which participants were

required to identify the correct usage of a morphologically complex and unfamiliar word used

within a corresponding sentence (e.g., *dogless*). The Comes From (Berninger et al., 1999)

subtest was the final assessment in the battery of tests. This assessment required participants to

determine if one word was derived from another word and thus were morphologically related

(e.g., *rat* and *rattle*). In addition to the morphological awareness assessments, a word

identification subtest was administered from the Woodcock Test of Reading Mastery (WTRM,

Woodcock, 1991). This assessment measured participants' ability to recognize words out of

context. Participants' phonological awareness skills were also assessed using the Segmenting

Non-words subtest of the Comprehensive Test of Phonological Processing (CTOPP; Wagner,

Torgesen, Rashotte, 1999). The participants were required to segment 27 non-words into

individual phonemes. Additionally, participants completed two group administered assessments and a writing sample including: The Gates-MacGinitie Reading Test Level 4 Form L (MacGinitie & MacGinitie, 1989) consisting of a vocabulary and comprehension component and the spelling subtest of the WIAT (Berninger et al., 1992) otherwise referred to as the Alphabet Task in this study. The writing sample was derived from The Expressive Connection: A Structured Approach to Teaching Storytelling for School-Aged children (Klecan-Aker & Brueggman, 1991) and required participants to write a story based on a specific picture. Participant writing samples were analyzed and scored for morphological accuracy in the following categories: present tense verbs, past tense verbs, present tense particles, copula, plurals, auxiliaries, derived form, and possessives. Through four different regression analyses, Schwiebert et al. (2002) were able to identify important connections between morphology, reading, and spelling. It is important to note that phonological and orthographic awareness variants were also considered as part of the overall analysis. Each model compared one or more variables to the four main literacy measures mentioned above. Model One compared segmenting non-words to each achievement measure. Model Two compared segmenting non-words and the alphabet task to each achievement measure. Model Three compared segmenting non-words, the alphabet task, and the written morphological accuracy assessment to the four achievement measures. Finally, Model Four compared segmenting non-words, the alphabet task, and the oral morphological awareness task to the four achievement measures.

The Participants consisted of 58 fourth grade students including 31 females and 27 males. The age range of the participants was nine years and six months to ten years and ten months at the time testing was initiated. All participants spoke English as their first language and 88% of the students were Caucasian. Participants were derived from public and private elementary

schools in the Greater Seattle Area. A variety of reading ability levels were included in the

study; however, none of the students had been labeled as having reading disabilities. The

participant pool was unique in that the students had been chosen from a larger group of students

who had participated in a previous study exploring the effects of phonological awareness on

literacy achievement.

Participants were individually administered all five tasks by one of four familiar trained

testers. No reading was required for any of the measures used to identify the participants'

morphological awareness. The participants were however, allowed to see the stimulus words and

sentences.

When analyzing the word recognition measure, Models One and Two indicated that

phonological and orthographic awareness accounted for very little influence on word

recognition. Model Three focused on Written Morphological Accuracy (B=.613, t=5.132,

p<.001) and Model Four focused on Oral Morphological awareness (B=.407, t=3.379, p<.005)

and accounted for significant variance. The second achievement measure was utilized to assess

the correlation between spelling and morphological awareness. Model One did not account for a

significant portion of the variance, however Model Two demonstrated that spelling was

significantly affected by one's orthographic knowledge. When Written Morphological Accuracy

was incorporated into Model Three (B=.579, t=5.661, p<.001) and Oral Morphological

Awareness was entered into Model Four (B=.268, t=2.275, p<.05), significant levels of variance

was demonstrated. The Vocabulary measure demonstrated no correlation between segmenting

non-words in Model One. However, significant variance was indicated by Written

Morphological Accuracy in Model Three (B=.638, t=6.186, p<.001) and with Oral

Morphological Awareness (B=.439, t=3.857, p<.001) in Model Four. Data also indicated that

orthographic fluency also played a significant role in the vocabulary measure. Finally, the comprehension measure demonstrated that non-word segmentation and the alphabet task had little correlation to participants' comprehension. Model Three however, proved significant variance when Written Morphological Awareness was added (B=.745, t=7.564, p<.001). Likewise, Oral Morphological Awareness demonstrated similar variant significance when included in Model Four (B=.280, t=2.162, p <.05).

Through analysis of the data above, Schwiebert et al. (2002) were able to confirm their hypothesis regarding a direct correlation between morphology and literacy achievement in spelling and reading with specific importance to spelling, word identification, vocabulary, and comprehension. The data from this study indicated that morphological knowledge improved reading and spelling achievement beyond orthographic and phonological awareness.

Similar to the study conducted by Schwiebert et al. (2002), Good, Lance, & Rainey, (2015), explored the effects of explicit morphologic instruction on reading, spelling, and vocabulary success. The researchers attempted to answer the following questions throughout the course of the study: Will accuracy on the experimental reading, spelling, and vocabulary measures improve as a result of the intervention program? Will the performance on the experimental measures be influenced by group membership? Will the participants be able to generalize this knowledge to words that were not taught during the program? The authors hypothesized that an intervention program which included linguistically explicit morphologic instruction will improve children's reading, spelling, and vocabulary knowledge. The independent variable was the use of linguistically explicit instruction to teach morphological awareness. The dependent variable included a variety of tasks used to measure improvements in reading, spelling, and vocabulary. The vocabulary measure consisted of an oral assessment

designed to determine if participants could correctly define a morphologically complex word

which included an affix. The spelling measure included 32 words, all of which contained affixes

taught throughout the intervention sessions. Finally, the reading measure consisted of 32 words

and 68 additional filler words. The participants were asked to read a word which contained

familiar (taught in treatment sessions) and unfamiliar (not taught in treatment sessions) affixes.

The participants in this study consisted of sixteen third grade students including 10

females and six males. All participants attended private or public elementary schools in

Conway, Arkansas and spoke English as their first language. With the assistance of classroom

teachers, participants were chosen because of suspected language and/or literacy concerns. It was

also noted that neither sensory, neurological, nor motor deficiencies were present in any

participant involved in the study. There was one exception involving a participant who had a

mild articulation disorder. To confirm participant eligibility for the study the results from a

variety of assessments were used.   All eligible participants had to score at or above a second

grade level on the Woodcock Mastery Test-Revised/Normative Update (WRMT/R-NU;

Woodcock, 1998) and 85 or below on the Spoken Language Quotient subtest included in the Test

of Language Development-Intermediate: Fourth Edition (TOLD-I-4; Newcomer & Hammill,

2008). Finally, participants had to score above the second grade level on the spelling subset of

the Wide Range Achievement Test-Third Edition (WRAT-3; Wilkinson, 1993).

Following the pre assessments, participants were randomly divided into either the control

or experimental group. The participants met in teams of two-four, two days a week for

approximately 30 minutes. The control group received linguistically implicit morphologic

instruction and the experimental group received linguistically explicit morphologic instruction.

Lessons focused on morphological structure of words targeting specific affixes, and teaching

participants to apply newly learned knowledge to alternative reading, spelling, and vocabulary

tasks. Both groups were otherwise exposed to the same treatment stimuli with similar activities

including: word sorts (experimental group), word searches (control group), letter blocks for

spelling instruction (both groups), vocabulary activities (experimental), and word match/bingo

review games (control group). After the ten week intervention period, the participants were

given a post assessment to measure whether the interventions improved reading, spelling, and

vocabulary skills as hypothesized.

Through analyses of the data the authors discovered that the third grade children with

language impairments benefitted from explicit linguistic instruction in morphologic awareness.

To answer the questions pertaining to this study, a mixed-model repeated measures ANOVA was

utilized. The difference between Time 1 and Time 2 served as the within subject variable

whereas the group (experimental, control) served as the between-subject variable. Partial eta

squared reported treatment effects as: .01 (small effect), .06 (medium effect), and .14 (large

effect). The results of the reading measure demonstrated a significant main effect for time at $F(1,$

$14) = 19.365, = p <.001$. The reading measure results did not demonstrate substantial differences

between the two groups. The results of the spelling measure was also significant for time $F(1,$

$14) = 4.59, = p <.001$. Consequently, the participants in the experimental group were able to

correctly spell more words following the intervention than the control group. Finally, the

vocabulary measure demonstrated a significant main effect for time $F(1, 14) = 18.307, = p <$

$.001$. As with the spelling measure, the post test results demonstrated significantly higher scores

than the pre assessment for the experimental group. The results indicated greater growth in

vocabulary knowledge than that of the control group.

The results of the nested factor of the reading measure was significant at *p*=.837 and the spelling measure (nested factor) was significant at *p*=.870. The findings of both measures demonstrated that there was no group difference in the participant's ability to read or spell taught and untaught words. However, results of both measures demonstrated the participants could generalize new knowledge to untaught words. The nested factor of the vocabulary measure was significant at *p*=.007. The findings indicated there was a greater improvement on taught words than untaught words. The research also demonstrated generalizations were much greater for the experimental group than the control group. Overall, the experimental group had significant growth in all three measures and outperformed the control group in both the spelling and vocabulary measures.

Over the course of the study, it was concluded that children with language impairments can benefit from either implicit or explicit morphologic instruction. Although the group differences for the spelling and reading measures were not significant, the researchers determined that the results were "promising" and suggested that morphologic instruction would help to improve reading, spelling, and vocabulary skills in children with literacy impairments.

While Good et al. (2015) and Schwiebert et al. (2002) worked to define a relationship between morphological instruction and reading, spelling, and vocabulary knowledge, Bowers and Kirby (2009) designed a study to investigate the effects of explicit and systematic morphologic intervention on students' ability to independently apply learned knowledge to unknown words. Bowers and Kirby (2009) studied average readers in effort to create motivated problem solvers who could apply new knowledge to unknown words while reading advanced text. The research team attempted to answer the following questions: Can fourth and fifth grade students learn to identify the bases of morphologically complex words as a result of instruction?

Does instruction about morphological structure lead to gains in vocabulary learning after controlling for initial vocabulary knowledge? Does ability to identify bases in complex words explain variance in vocabulary knowledge for both the control and experimental groups at post-test? The independent variable in this study was structured inquiry, problem solving morphologic instruction. The dependent variables included two researcher created assessments, one in which the participant was instructed to locate the base word and the other in which the participant was instructed to explain its meaning. The assessments were used to measure if the problem solving inquiry based instruction led to gains in vocabulary learning. The pretest measure consisted of the Peabody Picture Vocabulary Test III (PPTV-III; Dunn & Dunn, 1997). In this measure participants were instructed to match words to the appropriate picture to assess prior vocabulary knowledge. Two posttest measures were conducted to assess the impact of the morphologic instruction. The Base Identification measure was used to assess the participants' ability to identify the base of 30 words with multiple morphemes.

The 30 words were separated into three groups: *Words taught*, *Base taught*, and *Affix taught*. Participants were instructed to "circle the main part of the word" and were assessed on a three-point scale. The Morphological Vocabulary was utilized to measure the participants' ability to explain the meaning of the words used in the Base Identification measure. Participants were also assessed on a three-point scale. The *Words Taught* group included words that the instructor taught explicitly in class. The words in the *Base Taught* group consisted of bases and affixes taught explicitly but never in the specific derivational or inflectional form used within the assessment. Because students would have to apply knowledge to words that were not explicitly taught, this category represented a transfer level of knowledge. Finally, the *Affix Taught* words used bases that were not taught during instruction. Although the affixes were taught explicitly,

they were only used in conjunction with other bases during instruction. This group represented the greatest transfer of knowledge.

 The participants in this study included 81 fourth and fifth grade students from Kingston, Ontario. There were originally 110 students in the four classes, however 16 students did not return permission slips, one student moved, and the other nine were dropped because of a learning disability, learning impairment, or autism. The average age of participates was ten years (experimental group) and ten years and one month (control group). All participants were derived from suburban and small town public Catholic schools. Both the control and experimental groups included two fourth and two fifth grade classes.

Following the pre assessments, participants were randomly divided into the control or experimental group. While the control group participated in typical instruction, the experimental group participated in three or four 50 minute lessons for a total of 20 sessions. The experimental group received explicit, inquiry based instruction which utilized morphological matrices and word sums to teach sets of morphologically related words. This study was unique in that the instructors did not teach bases or affixes in isolation. Instructors used tools to help participants understand how morphemes within complex words act as clues to unravel the meaning of unknown words. The interventions consisted of three main instructional activities including: exploratory-problem solving, focused problem solving, and structured practice. To practice, students wrote and orally spelled the morphemes that made up a multi morphemic word. Participants also learned specific rules that helped correctly spell words with suffixes.

Means and standard deviations of the PPVT-III (1997) pre assessment were assessed for vocabulary knowledge using a *t*-test. This data demonstrated minor difference between the vocabulary knowledge of the control and experimental groups, $t(79) = 1.29$, $p = .20$. Post

assessment data however, revealed significant differences between the two groups of participants. Raw scores on post assessment measures were transformed into *z*-scores. ANCOVA results demonstrated the Base Identification covariate was found to have a significant effect $F(1, 78) = .4.57, p < .05, \eta^2_p = .06$. The pre assessment vocabulary was used as the covariate in this measure. There was also a significance of the group effect for each level of transfer (Word Taught-near transfer: $F(1, 78) = 39.49, p < .001, n2p = 34$), (Base Taught- mid transfer $F(1, 78) = 28.02, p < .001, \eta^2_p = 26$), and (Affix Taught- far transfer $F(1, 78) = 13.33 p, < .001, \eta^2_p = 15$), This data provided evidence that the experimental group outperformed the control group on this assessment. Likewise, the Morphological Vocabulary assessment showed similar results with the PPVT-III as the covariate. Once again, the covariate was significant at each level of transfer: Words Taught $F(1, 79) = 35.6, p < .001, \eta^2_p = .31$), Base Taught $F(1, 79) = 20.2, p < .001, \eta^2_p = .20$) and Affix Taught $F(1, 79) = 18.6, p < .001, \eta^2_p = .19$). The results demonstrated that well-structured morphologic instruction helped participants define words only when the base or whole word had been explicitly taught.

Through this experiment, Bowers and Kirby (2009) concluded that students required explicit morphologic instruction in order to master morphologic linguistic content. Results demonstrated that the morphologic instruction had positive impacts on the Word taught and Base taught groups, but not on the Affix taught group. This evidence proved that morphologic analysis helped students improve vocabulary knowledge beyond the words that were explicitly taught in the classroom. However, further data suggested that this intervention did not assist students beyond the morphological families taught. It was found that students must learn the meaning of the base words in order to become successful morphological problem solvers.

Similar to Bowers and Kirby (2009), Baumann, Edwards, Font, Tereshinski, Kame'enui, and Olejnik (2002) explored the effects of morphemic and contextual analysis skills on students' vocabulary and comprehension abilities. Specific to the study conducted by Baumann et al. (2009) however, the research team studied the effect that morphological and contextual analysis had on students' understanding of words taught and words not taught when provided in isolation and within context. They also studied students' comprehension of text that had morphologically and contextually decipherable words. The independent variable in this study was instructional intervention involving three experimental groups (morphemic-only group, context only group, and morphemic-context group) and one control group (instructed control). The dependent variables included two pre assessments and seven post assessment measures. Degrees of Word Meaning (1993) and Lesson/Transfer Words were pre assessment measures used to evaluate preexisting vocabulary knowledge and differences in participants. After completing the first pre assessments, three high, medium, and low participants were selected and interviewed. Each interview included a morphemic and contextual analysis followed by open ended questions regarding morphemic and contextual analysis strategies used during the assessment. Of the seven post assessment measures, five measures were immediate and two measures were delayed. The immediate post assessment measures included: Morphemic Production Posttest (examined students' knowledge of word meanings), Morphemic Recognition Posttest (examined students' knowledge of words in isolation), Context Production Posttest (examined students' ability to write a word's meaning), Context Recognition Posttest (examined students' understanding of words within context), and Vocabulary in Passages Posttest (examined students' knowledge of words within text). The delayed measures included: Morphemic Recognition Posttest and

Context Recognition Posttest. These measures were administrated five weeks after the completion of the intervention.

Participants from this study involved four fifth grade classrooms in a public school in Southeastern United States. Participants' came from a variety of diverse backgrounds including: 56% African American, 35% European American, and 9% Latino/Asian/Native American. Of the 92 students who returned permission slips, data from four students was not included leaving a total of 88 participants in the study.

This study represents a quantitative and descriptive method design. Each of the four researchers involved in the study taught one of the four experimental groups. Each intervention session was 50 minutes in length. The intervention constituted 12 days as well as two days of pretesting, four days of immediate post testing, and two days of delayed post testing. The morphemic-only group (MO) focused on eight high frequency prefix families and ten morphemic lesson words (not family, number family, below/part family, against family, excess family, and bad family). The context only group (CO) received intervention lessons on contextual analysis focused on generic and specific context clue strategies and ten context lesson words (word definitions, synonyms, appositives, mood/tone/setting, antonyms, and figurative language). The morphemic-context group (MC) was a combination of the two groups described above. They were taught both the MO and the CO strategies and lesson words. To ensure fidelity with time, the MC participants were provided fewer examples and practice items than that of their peers in the MO and CO groups. All groups also included three review days as an important component of the intervention.

Each experimental groups incorporated the same three part framework: an introduction including explicit examples, instruction that included direct explanations, modeling, and practice

of the morphemic and contextual strategies, and independent practice of the strategies taught. The control group labeled as Instructed Control (IC) included no explicit instruction of morphemic or contextual analysis strategies. Participants were taught vocabulary implicitly through discussion of vocabulary words within text.

Baumann et al. conducted pre and post assessment measures to determine the effectiveness of morphemic and contextual analysis on students' vocabulary and comprehension abilities. An ANOVA was conducted for each of the pretest measures: Degrees of Word Meaning (1993) pre assessment $F(3, 84) = .197$, $p < .898$ and the Lesson and Transfer Words pre assessment $F(3, 84) = .385$, $p < .764$ demonstrated that there was no difference in the participants general vocabulary prior to the intervention. The research group planned five contrasts to analyze the reminder of the quantitative data: A = (MO +MC)/2 – (CO + IC)/2, B = (CO + MC)/2 – (MO + IC)/2, C = MO-CO, D = CO – MC, E = MO – MC. The data from various post assessment measures indicated that participants who received morphemic analysis instruction outperformed students who did not receive instruction as suggested by effect sizes that were .8 higher for the Morphemic Lesson Words Production Test (contrast A = 1.32, C. = 1.58, D. = -1.00) and the Context Lesson Words Production Test (B = .87, C = -.99, E = -.81). Data reveled statistically significant effects for the Morphemic Transfer of Words Recognition Test (A = .31 and C = .42. Likewise, there was significant effect for Context Transfer Words Production Test, B = .27 and C = -.25). There was not a significant effect for E in regard to this measure. This data emphasized a strong immediate effect of morphemic instruction on students' understanding of untaught words. Finally, data also demonstrated that it was equally beneficial to provide independent morphemic and contextual analysis instruction independently as it would to combine the two skills. Interview data proved that MO ($M =.76$) and MC ($M = .79$) students

performed higher on morphological tasks that students in the CO ($M = .23$) and IC ($M = .37$) groups. Second, data revealed no differential effects between students who received morphemic and contextual combined instruction and those who received morphemic analysis instruction only (MO). This data indicated that both types of instruction are equally effective. Participants who were involved with morphemic instruction were much more strategic in their ability to identify the meaning of unknown words using prefix families learned throughout the intervention. Both CO ($M = .81$) and MC ($M = .89$) participants scored higher on context performance measures than the students in the IC group ($M = .58$). The MO students however, scored unexpectedly high on the contextual measures ($M = .83$) suggesting that these participants were able to transfer some general knowledge to the contextual assessments. Once again, data also revealed that combined instruction (MC = .89) was as effective as independent instruction of contextual analysis strategies (CO = .81).

In conclusion, the results of this study support the belief that teaching morphology including prefixes is an important way to help student improve vocabulary knowledge. However, it is also important to note that student's morphemic and contextual analysis skills degrade over time, thus pointing to the importance of continued review and practice. Although the researchers did not discount the fact that morphologic and contextual analysis strategies helped to improve students' comprehension, this study did not prove a connection. Overall, this study proved the importance of teaching morphemic and contextual analysis strategies to help improve vocabulary knowledge. It is agreed, however, that much more research was needed to determine how to best teach contextual and morphological analysis in order to successfully address student needs.

Similar to the other studies addressed in this section, Apel, Brimo, Diehm, and Apel (2012) explored the feasibility of using researched based morphological awareness strategies to

improve morphological awareness in primary grade students. However, this study was unique in

that it focused on explicit strategies used to teach morphology, with emphasis on derivational

and inflectional affixes. Apel et al. (2012) hypothesized that the participants would demonstrate

gains in morphological awareness with medium to large effect sizes. The independent variable

was a nine week morphologic awareness intervention. The dependent variables were a variety of

morphologic tasks including: phonological/phonemic awareness, word-level reading, reading

comprehension, and receptive language. Examiners administrated all measures prior to and

following the intervention. The four measures used in this study were designed by Apel and his

team. The Rehit task, Relatives task, Affix Identification task, and Spelling Multi-morphemic

Word task were used to assess participants' morphologic understanding. The Rehit task required

participants to combine real affixes to nonsense base words. Participants were then instructed to

judge the semantic acceptability of the non-sense words within two different sentences. The

Relatives task required participants to orally complete a sentence by changing the inflectional or

derivational endings. The Affix Identification task was group administered and required students

to identify and circle all affixes or "add ons" on 51 items within three minutes. The Spelling

Multi-morphemic Word task was required students to spell the words given while the examiner

read aloud the words with the target affix and a sentence using the word. The affixes were the

only part of the word assessed and scored for this particular measure. Additionally, participants'

phonemic/phonological awareness was assessed using the Elision subtest of the Comprehension

Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999). This subtest

of the CTOPP provided measures of phonological manipulation. Finally, participants' word level

reading ability and reading comprehension were assessed using The Test of Word Reading

Efficiency (TOWRE; Torgeson, Wagner, & Rashotte, 1999) and Test of Silent Reading

Efficiency and Comprehension (TOSREC; Wagner, Torgesen, Rashotte, & Pearson, 2010). The TOWRE required examinees to read as many real words and decode as many non-sense words as possible within 45 seconds. The TOSREC required first and second grade participants to silently read sentences and then mark yes or no to indicate if the corresponding question was true or false. The Concepts and Following Directions subtest of the CELF-4 (Semel et al., 2003) was chosen by the research group as a counterfactual measure. This assessment defined participants' semantic and syntactic comprehension skills by pointing to objects in a book after listening to oral directions. The skills were not predicted to significantly improve over the course of the intervention due to the lack of explicit instruction in their regard. The purpose of the counterfactual measure was to account for gains made but not as a result of the intended intervention.

The participants in this study included kindergarten, first, and second grade students from low SES public schools in the Southeastern United States. Students were randomly chosen for an initial screening consisting of the Concepts and Following Directions subtest of the CELF-4. Apel et al. (2012) sought out 22 students from each grade level whose assessment results were greater than or equal to the 16th percentile. Four students were removed from the study and as a result 19 kindergartens, 21 first graders, and 21 second graders participated. Each grade level was composed of a diverse participant pool including: 45 African American students (Kindergargen-13, first grade-15, second grade -17), 6 Caucasian students (Kindergarten-2, first grade-3, and second grade-2), 4 Hispanic students (Kindergarten-2, first grade-0, second grade-2), and 7 students of mixed ethnic backgrounds (Kindergarten-2, first grade-3, and second grade-1). Additionally, eight males and eleven females comprise the Kindergarten group, ten males

and eleven females comprised the first grade group, and eleven males and ten females comprised the second grade group.

The morphologic awareness intervention was nine weeks in duration. Pretesting was completed two weeks prior to the intervention and post-testing was completed two weeks following the intervention. Participants were grouped in small groups of four-five from like grade levels. Each group met four days a week for 25 minutes. The overarching intervention consisted of two affix lessons for four days followed by two day review lessons. First and second grade students focused on increasing awareness of affixes and inflected and derived words (written and spoken). Kindergarteners focused primarily on awareness in spoken form only. All students were motivated by using magnifying glasses and encouraged to become "word detectives." The affix lessons consisted of four main components including: introduction of target affix (explicit definition was provided), word sort, writing activity, and a wrap up. The two review lessons consisted of three main components including: review of the target affix, an affix related game, and a word relatives activity (Wasowicz, Apel, Masterson, & Whitney, 2004). The word relatives activity involved discussion of words that relate because they shared meaning (e.g., *beat* and *beating*). All interventionists were trained and followed a script to ensure fidelity across the grade levels.

Apel et al. conducted paired sample *t*-tests and used relevant data to calculate effect sizes. Effect sizes were used on the within subject pre and post assessment data. Cohen's (1988) recommendations were utilized to assign significance to the *d* scores whereas .20 represented a small effect, .50 represented a medium effect, and .80 represented a large effect. Results from the morphological awareness assessment measures demonstrated large or very large effect sizes for all three grade levels ranging from .74-2.96. Specifically, the TOSREC and TOWRE Word

Identification assessment results demonstrated medium to large effect sizes (d= .50-.87) for

kindergarten, first, and second grade. Conversely, the effect sizes indicated greater differences

between grade levels on the TOWRE decoding task and the CTOPP Elision subtest, whereas

kindergarten effect sizes were large (d=.85) and first and second grade effect sizes were medium

(ds = .58 and .50). Results on the phonemic awareness measures demonstrated medium effect

sizes for kindergarten and first grade (ds = .61 and .76) and small effect size for second grade

participants (d = .32). Finally, results from the counterfactual measure assessed using the CLEF-

4 subtest demonstrated small effect sizes for the first grade participants (d = .32) and

insignificant effect sizes for the kindergarten and second grade participants (d = .11- .17).

Apel at el. created this study to identify the effects of morphological awareness

intervention on kindergarten, first grade, and second grade students from low SES backgrounds.

From their findings, the researchers concluded that there were significant improvements in the

students' morphological awareness abilities due to explicit and systematic intervention. To help

students make greater improvements in their morphological awareness, Apel et al. (2012)

reiterated the importance of encouraging students to think about and manipulate morphemes as

demonstrated in this study.

Similar to Apel et al. (2012), Ramirez, Walton, and Roberts (2013) explored the effect of

morphological awareness on vocabulary development of kindergarten students. Unique to this

quantitative study however, Ramirez et al. (2013) focused specifically on compound words in

relation to morphology. The research team also analyzed the effects of students' vocabulary

knowledge on their development of morphological awareness. Using systematic and explicit

instruction, the research team sought to answer the following questions: What effect does

morphological instruction with emphasis on compound words have on the development of

Kindergarten students? Does growth in morphological awareness predict subsequent vocabulary development? Does growth in vocabulary knowledge predict subsequent development in morphological awareness? The independent variable in this study was whole group, teacher delivered morphological awareness and vocabulary instruction focused specifically on compound words. The dependent variables included a making words measure and the second edition of the Expressive Vocabulary Test (EVT-2; Williams, 2007). The Making Words measure assessed the participants' morphological awareness of compound words. Students were provided ten scenarios and instructed to create new compound words. The EVT-2 (2007) measure was used to assess the participants' ability to identify a synonym or antonym when presented with a picture clue. Trained research assistances collected testing data individually across three sessions. Pre assessment data was termed Time 1 and post assessment data was termed Time 2.

Participants in this study included 108 kindergarten students of which 43% were female. The participants came from small cities in British Columbia, Canada. The research team chose these small city schools because they met the low socioeconomic status that was required for the study. The majority of the participants came from Caucasian backgrounds while 10% percent were Aboriginal and 4% belonged to other minorities such as Hindi.

The researchers began this study by teaching specific strategies to improve vocabulary development of young children. Through the course of the study, the researchers dedicated ten hours preparing six Kindergarten teachers. Each teacher was provided flashcards, teaching instructions, ten picture books, and a list of 10-15 words to teach per book. Teachers were also encouraged to incorporate additional strategies and activities beyond what was encouraged by the research team. Teachers executed a total of 24 sessions over a three month period. Each

session was composed of both whole group and small group instruction. Before each read aloud, the teacher would discuss the meaning of one important vocabulary term including the morphemes that comprised the word. After reading the text, the teacher would discuss additional target vocabulary and help students separate the words into morphemes. In small groups teachers encouraged the participants to create new compound words by analogy. Each of the ten books was read three times. Through videotaped lessons, Ramirez et al. (2013) ensured that all teachers were spending the same time teaching target words and morphological analysis as well as ample opportunities for participants to practice using the new words. The order in which the teachers read the books however, was different from teacher to teacher.

Ramirez et al. (2013) conducted pre and post assessment measures individually to all participants. Morphological growth was measured using ANOVA looking specifically at ability level (between subject variable) and time (within subjects factor). Participants were divided into low, medium, and high groups. Data for the low, medium, and high groups demonstrated significant gains from pretest (Time 1) to post assessment (Time 2): low group: M= 4.5% (Time 1) and 45% (Time 2), medium group: M= 36.9% (Time 1) and 59.6% (Time 2), and high group: M= 63.9% (Time 1) and 71.0% (Time 2). As a whole, participants showed strong growth in morphological awareness $F(1, 97) = 149.45$, $MSE = .02$, $p < .001$, Partial Eta = .61. Children in the low ability group had the most improvement as shown by $t(20) = 10.45$, $p < .001$, $r^2 = .62$. The high ability groups also improved as shown by $t(27) = 2.01$, $p = .054$, $r^2 = .14$. Data from the post assessment also indicated fewer differences between groups.   Researchers also used ANOVA to measure students' vocabulary gains. Mean data suggests that students' vocabulary knowledge also improved across all groups (low: $M = 60.4$% (Time 1) and 71.5% (Time 2), medium: $M = 76.7$% (time 1) and $M = 87.3$% (Time 2), and high: $M = 90.6$% (Time 1) and 95.5% (Time 2). Participants

in both the low ability group, $t(25) = 6.38$, p < .001, r ^{2} = .62, and medium ability group, $t(51)$ = 9.37, p < .001, r ^{2} = .63, demonstrated the most growth in vocabulary. The data also revealed a statistically significant relationship between higher levels of morphological awareness and more gain in morphological awareness.

In conclusion, this study revealed that the Kindergarten participants in this study made significant gains in morphological awareness in relation to compound words. Participants who had high morphological awareness at the start of the study, however, remained consistent over the four month intervention. Results also demonstrated that as participants improved their morphological awareness, they also made important gains in vocabulary and vice versa. The overall findings in this study demonstrated the importance of including morphological awareness curriculum beginning in Kindergarten. By developing morphological awareness early, students learned early on how to analyze morphemes and thus increased their overall vocabulary knowledge.

The seven studies in this section provided insight into the strong connection between morphologic instruction and vocabulary acquisition. In addition, this section illustrated researched based methods required to teach morphologic awareness effectively at the primary level. The first study by Carlisle (2000) provided a foundation for the important connection between morphological awareness, vocabulary, and comprehension. The second study conducted by Schwiebert et al. (2002) explored the correlation between morphological awareness and participants' reading and spelling achievement including vocabulary acquisition. The third study conducted by Good et al. (2015) confirmed that morphologic instruction will help to improve reading, spelling, and vocabulary skills in children, especially those with language impairments. The fourth study conducted by Bowers and Kirby (2009) confirmed that morphologic analysis

could help students improve vocabulary knowledge beyond the words that were explicitly taught in the classroom. The fifth study administered by Baumann et al. (2002) supported the growing body of research that claimed instruction in morphology was an important method to help student improve vocabulary knowledge. The sixth study conducted by Apel et al. (2012) confirmed that explicit and systematic instruction involving strategies such as introduction of target affix (explicit definition was provided), word sorts, writing activities, and wrap up/review, significantly improved students' morphological awareness abilities. Finally, the seventh study conducted by Ramirez et al. (2013), proved that students as early as Kindergarten can benefit from simplified morphologic instruction. Throughout this study, the benefit of early morphologic instruction on students' vocabulary acquisition was clearly defined.

Conclusion

The research addressed in the first section of this chapter discussed strategies that reflected the need for explicit and systematic vocabulary instruction to improve students' vocabulary knowledge and overall reading achievement. The studies conducted by Penno et al. (2002), Biemiller and Boote (2006), Brabham &Lynch-Brown (2002), and Graham et al. (2015) proved this need for systematic and explicit vocabulary instruction. Both Maynard et al. (2010) and Penno et al. (2002) explored the importance of repeated and interactional read alouds on expanding children's vocabulary knowledge. The second section of this chapter discussed the need for explicit instruction in morphological awareness as well as effective strategies used to teach children to become morphological problem solvers. Research conducted by Carlisle (2000), Schwiebert et al. (2002), Good et al. (2015), Bowers & Kirby (2010), Baumann et al. (2002), Apel et al. (2013), and Ramirez et al. (2013) proved the advantages that morphological instruction had on vocabulary acquisition of primary school children. The research presented in

this chapter established the importance of morphologic instruction in effort to improve students'

vocabulary and create independent and strategic readers. It is through systematic and explicit

vocabulary instruction including morphemic awareness that both high and low achieving

students can better understand how our language is constructed and thus apply this knowledge to

morphologically complex words. As a result of such instruction, students can also begin to

generalize to unknown words within text. Through the key ideas addressed in this research

educators can make meaningful and important changes in literacy instruction.

CHAPTER THREE: STUDY PROCEDURES

Through the course of this study participants engaged in systematic interventions that provided effective morphological awareness strategies in an effort to improve vocabulary acquisition. The overall purpose of this chapter is to identify and describe the sample population, or participants involved within the study, as well as the intervention procedures employed. A detailed description of the data collection and analysis procedures was also included.

Description of Population

All participants involved within this study originated from a diverse city in the Midwestern United States. Participants represented various multicultural and low socio-economic backgrounds. Students attended a small independent, public charter school and were randomly chosen from one of three fourth grade classrooms. There were 15 participants including eight males and seven females involved in the study, eleven African American and four Hispanic. Instructional reading ability differed greatly as indicated by Fountas and Pinnell (2008) records in Fall of 2015 (see Table 1). Running records were administered and scored by the classroom teacher. Parents of the 15 students received a letter detailing the study and agreed to allow their child to participate.

Table 1

Fountas and Pinnell Level: Fall 2015

Number of students	F & P Level
1 student	Level E
1 student	Level L
2 students	Level M
2 students	Level N
2 students	Level O
1 student	Level P
1 student	Level Q
1 student	Level T
1 student	Level U
2 students	Level W
1 student	Level X

Note. All levels are indicative of participants' instructional level.

Description of Procedure

The study was conducted for nine weeks with week one and week eight dedicated to pre assessment and post assessment measures. An additional post assessment was administered in Week Nine to assess for transference of learning to new prefixed words. Pre assessment and post assessment measures included the Standardized Test for the Assessment of Reading (STAR: Renaissance Learning, 2014), the Vocabulary Measure, and the Comprehension Measure. Both the Vocabulary Measure-1, Vocabulary Measure-2, and the Comprehension Measure were created by the researcher and were based off of research by Harris (2010; see Appendices B, C and D). Weeks two through seven comprised of three sessions per week and were 30-45 minutes in duration. The systematic intervention was designed to support participants' understanding of the 20 most common prefixes (Stahl, 1999). Three target prefixes were

explicitly taught on weeks one through five and four target prefixes were explicitly taught on

weeks six and seven (see Table 2).

Table 2

Systematic Instruction of the 20 Most Common Prefixes

Week	Prefix	Definition
Week 2	un	not
	re	again
	in, im, il	not
Week 3	dis	not
	en em	in/into/with
	non	not
Week 4	in, im	not
	over	above and beyond
	mis	wrongly
Week 5	sub	under
	pre	before
	inter	among
Week 6	fore	before
	de	downward, undo
	trans	across

Note. List of prefixes are adapted from work by Stahl (1999)

Day one of each week began with explicit instruction of the target prefixes using a

modified six step process adopted by Blachowitcz, Fisher, and Watts-Taffe (2005). The process

began with an introduction of the target prefix in isolation (e.g., *un*). After introducing the target

prefix, three base or root words that incorporated the target prefix were presented to the students

(e.g., *unkind*, *unfriendly*, and *unhelpful*). Next, the target prefix was defined for the student and

three sentences that included the example word were presented and read aloud.   The example

word was also defined as used in each example sentence (e.g., The man was *unkind* to the dog.).

Finally, participants would add the new prefixes, example words, and sentences to a graphic

organizer that was cut out and glued inside their word work notebooks (see Appendix E). After

all target prefixes were taught explicitly, participants had the opportunity to become word

detectives and raised their paper magnify glass each time they heard one of the target prefixes

read aloud. Day two was dedicated to practice using the target prefixes. Participants' engaged in

a spelling activity titled *Slam and Jam*. When given the definition, each student had to "slam" or

spell the target prefix correctly and add it to the base or root word. Students also completed a

word sort which required them to match the base or root word to the correct prefix. This

permitted further opportunity to discuss the meaning of each prefix and related to specific base

or root words. Additionally, participants were required to read short text, identify, and define

words that used target prefixes previously learned. Day three focused on review of the prefixes

that were taught explicitly prior to the review session. For example, review in week five

comprised of all prefixes taught from weeks two through five.   Review began with the game *I*

Have Who Has. This activity required each student to be responsible for his/her assigned

definition. For example, Student One would say: *I have not kind, who has to not legal*? and

Student Two would respond: *I have illegal, who has to play again*? The activity continued until

the 15 students had the opportunity to participate. *I have Who Has* was followed by various

kinesthetic, visual, interpersonal, and linguistic learning activities (see appendix F).

Description of Data Collection

Three types of measures were used to assess students' understanding of the prefixes and its

impact on vocabulary and comprehension ability. Two of the three measures were created by the

researcher and administered orally to all participants. The Vocabulary Measure-1 consisted of

20 questions and was used to determine participants' ability to define single words using the 20

most common prefixes (see Appendix B). Each prefix was used one time and context was not

provided. Participants had the opportunity to earn two points per question for a total of 40 total

points. Zero points were awarded for incorrect or no response, one point was awarded for a

partial response, and two points were awarded for a correct response. The correct response had

to include the prefix definition and the base or root (e.g., *unkind*: not kind, *dislike*: not like).

Vocabulary Measure-2 was very similar to the Vocabulary Measure-1 however, unfamiliar base

words were used to analyze the students' ability to transfer knowledge (see Appendix C). The

Comprehension Measure was comprised of 20 questions and included the same prefixes used in

both of the Vocabulary Measures (See Appendix D). Each question presented the student with a

sentence using the target prefix. After each sentence, the researcher read aloud a prompt that

capitalized on the participant's knowledge of the target prefix to answer the question correctly

(e.g., Sentence: Elijah needed to buy new clothes due to the subzero weather conditions. Prompt:

What kind of clothes did Elijah need to buy?) Students were awarded one point for a correct

answer and zero points for an incorrect answer. To receive credit, answers had to include

knowledge of the target prefix. Participants' vocabulary and comprehension knowledge was also

measured using the Standardized Test for the Assessment of Reading (STAR; Renaissance

Learning, 2014). The STAR Reading (2014) assessment is a researched based, standardized test

that is used to assess vocabulary acquisition under the domain of language: vocabulary

acquisition and use. Likewise, the STAR (2014) measure was used to assess gains in

comprehension from pre assessment to post assessment. The assessment measured

comprehension through domain scores in both literature and expository text.   All measures were

administered prior to the beginning of the intervention (week 1) and again following the

completion of the intervention (week 8 and/or week 9). The pre and post assessment data was

analyzed using a *t*-test and results determined the effectiveness of the intervention.

Conclusion

The purpose of this study was to explore the effects of morphological awareness on participants' vocabulary and comprehension abilities. Twenty of the most common prefixes were explicitly and systematically taught in an effort to improve the important skills needed to create independent and strategic readers.   Fifteen fourth grade participants were randomly selected to participate in this study. Intervention procedures were six weeks in duration and were preceded and followed by pre assessment and post assessment measures. The intervention was systematic and included explicit instruction, practice, and review. Review activities constituted a variety of learning styles. Three informal measures were used to collect pre and post assessment data and determined the effectiveness of the intervention on participants' vocabulary and comprehension abilities. The following chapter will examine the effectiveness of the intervention using the data gathered during the study.

CHAPTER FOUR: RESULTS

This nine week study examined the effects of a six-week intervention focused on increasing students' vocabulary and comprehension through explicit and systematic morphologic instruction of the 20 most commonly used prefixes (Stahl, 1999). Weeks One and Eight of the study were dedicated to collecting pre assessment and post assessment data. A second version of the Vocabulary Measure-2, also created by the researcher, was administered in Week Nine to assess the students' transference of knowledge. The researcher utilized three types of measures to assess students' understanding of the prefixes and its impact on vocabulary and comprehension. Both forms of the Vocabulary Measures and the Comprehension Measure (see Appendices B, C, and D) were created by the researcher and administered orally to all participants. The STAR Reading (2014) measure was used to assess vocabulary acquisition as well as gains in comprehension from pre assessment to post assessment. This assessment analyzed comprehension through domain scores in both literature and expository text. The six week intervention included explicit and systematic instruction of the 20 most commonly used prefixes (Stahl, 1999). Three target prefixes were explicitly taught on Weeks One through Five and four target prefixes were explicitly taught on Weeks Six and Seven. Instruction included explicit and systematic instruction of the target prefixes, practice using the prefixes, and review of all prefixes learned in previous weeks. Various kinesthetic, visual, interpersonal, and linguistic learning activities were incorporated into the weekly intervention procedures (see Appendices F-M). Following the intervention, post assessment data was collected and analyzed by the researcher. The results of the intervention are presented within this chapter.

Analysis of the Data

Students' vocabulary and comprehension knowledge were assessed using a variety of informal assessment measures. These measures focused on the relationship between morphological awareness through instruction of prefixes and how it impacted the participants' vocabulary and comprehension skills. The Vocabulary Measure-1 was created by the researcher and used to determine the students' knowledge of the 20 most common prefixes. This was accomplished through analysis of the students' ability to define words that contain these target prefixes (Stahl, 1999). Students were assessed individually and were orally presented 20 words that contained a target prefix. They were directed to provide the meaning of each word and were awarded points depending on the answer. Two points were awarded for answers that provided the definition of the prefix (e.g., definition of *unhappy*: not happy), one point was awarded for definitions that were correct, but did not provide the meaning of the target prefix (e.g., definition of *unhappy*: someone who is sad and cries a lot), and zero points were given for incorrect answers or unanswered questions (e.g., definition of *unhappy*: someone who is silly).

To ensure that the data collection was accurate and reliable the researcher collected pre assessment and post assessment data results for the Vocabulary Measure-1 (see Appendix B). Pre assessment data, presented in Three, was collected to determine the students' previous knowledge of 20 target prefixes. Pre assessment results indicated a range of 4-17 resulting in a difference of 13 points. The average for the Vocabulary Measure-1 pre-assessment was *M*=12 or *M*=30% and the standard deviation was *SD*pre=3.84. Post assessment data, also illustrated in Table Three, was collected and analyzed to determine the effect of the systematic and explicit morphologic intervention on students' vocabulary knowledge. The data demonstrated an increase in the mean from pre assessment (*M*=12) to post assessment (*M*=29) and a growth in the overall

percentage from pre assessment (*M*=30%) to post assessment (*M*=74%). Post assessment results

also presented a range of 17-38 resulting in a difference of 21 points. Similar to the increase in

the range of scores, the standard deviation from pre (*SD*pre= 3.84) to post assessment

(*SD*post=6.02) also increased. To determine the significance of this data the researcher ran a one

tailed dependent *t*-test. Results demonstrated that there was a significant difference between the

pre and post assessment scores on the Vocabulary Measure-1 measure, $t(28)$, $p= 0.0000000009$,

$p<.01$. The results suggested that the intervention was successful in improving students'

understanding of vocabulary using the target prefixes.

Table 3

Vocabulary Measure-1 and Vocabulary Measure-2 Data

Student ID	Vocabulary Measure-1		Vocabulary Measure-2
	Pre Assessment	Post Assessment	Delayed Post Assessment
1	16	33	24
2	13	31	22
3	7	28	23
4	6	27	19
5	12	26	28
6	13	20	12
7	14	35	29
8	13	28	32
9	14	38	33
10	12	25	18
11	10	33	32
12	17	37	37
13	4	17	16
14	17	35	37
15	14	2	30

Note. All data represented raw scores. The Maximum score for the Vocabulary
Measure was 40 points.

The 20 target prefixes and base/root words contained in the Vocabulary Measure-1 were taught explicitly during the six week intervention. To determine if the students retained and transferred the knowledge to untaught base/root words, a secondary measure was administered in week nine (see appendix B). Vocabulary Measure-2 was administered in the same manner as Vocabulary Measure-1. This assessment was comprised of the same 20 target prefixes, however the base/root words were not explicitly taught during the six week intervention. Table Three lists the raw data from the pre-assessment to the secondary post-assessment (Vocabulary Measure-2). Results indicated an increase of 14 points in the Mean from the pre assessment of the Vocabulary Measure-1 (M=12) to the post assessment of the Vocabulary Measure-2 (M=26). Results also demonstrated a range of 12-27 indicating a difference of 15 points. The standard deviation on the pre-assessment (SDpre=3.84) and the post assessment-2 (SDpost-2=7.70) also increased. A one tailed dependent t-test was administered to determine the effectiveness of the morphologic instruction on the students' ability to retain and transfer the knowledge learned. Statistics indicated that the differences were significant from the Vocabulary Measure-1 pre assessment to the Vocabulary Measure-2 post assessment, t(28), p=0.0000015, p<.01. These results suggested that the intervention aided in students' ability to transfer their morphologic knowledge of prefixes to words that were not explicitly taught.

The second assessment used to measure the students' vocabulary and comprehension knowledge through explicit and systematic morphological awareness instruction was also created by the researcher. The Comprehension Measure (see Appendix B) was designed to analyze the students' ability to use a prefixed word to determine the meaning of a sentence. The students were individually assessed and all prompts and questions were read aloud. Each question was awarded one or zero points depending on the answer provided. Answers were analyzed for

knowledge of the prefix used in the sentence. For example, one prompt read: *Elijah needed to buy new clothes due to the subzero weather conditions*. The question analyzed the students' understanding of the prefix *sub*, by asking the following question: *What kind of clothes did Elijah need to buy*? If the student understood that *sub* meant under or below, they could discern that Elijah needed to buy warm winter clothing. In order for the answers to be counted as correct, the student needed to address the prefixed word used within the prompt (e.g., prompt: *The men took a transatlantic flight*. Question: *What kinds of things did the men see out the window during the transatlantic flight?*) To answer this question correctly, the student must mention seeing water, fish, or dolphins, for example, to prove their understanding of the prefix, *trans* when attached to the word Atlantic (Transatlantic: Across the Atlantic Ocean). If the student did not list anything related to the ocean, then the question would be marked incorrect.

To ensure that the data collection was accurate and reliable, the researcher collected pre and post assessment data results for the Comprehension Measure. Pre assessment data presented in Table Four was collected to gauge student understanding of prefixes when used within context. Pre assessment outcomes indicated a range of 2-16 resulting in a difference of 14 points. The average for the Comprehension Measure pre-assessment was: $M=11$ or $M=56\%$ and the standard deviation was SDpre$=3.80$. Post assessment data indicated that the mean increased from 11 points ($M=56\%$) on the pre assessment to 17 points ($M=83\%$) on the post assessment. The range also decreased from a 14 point difference on the pre assessment to a ten point difference on the post assessment (Range = 10-20). Likewise, the standard deviation decreased to SDpost$=2.53$ indicating that the scores on the post assessment was closer to the mean then that of the pre-assessment (SDpre=3.80). A one tailed, dependent *t*-test was administered to analyze the effect of the morphologic awareness intervention on a student's ability to comprehend

sentences in which contained a prefixed word. Statistics demonstrated that the differences were

significant from the Comprehension Measure pre assessment to the Comprehension Measure

post assessment, $t(28)$, $p= 0.000057771$, $p<.01$. These results suggested that the intervention

aided in students' ability to comprehend sentence level text when a prefixed word was contained

within the sentence.

Table 4

Comprehension Measure Data

	Comprehension Measure	
Student ID	Pre Assessment	Post Assessment
1	7	15
2	11	17
3	15	17
4	7	10
5	8	15
6	14	18
7	13	19
8	10	16
9	12	18
10	13	17
11	13	17
12	16	20
13	2	13
14	15	19
15	11	17

Note. All data represented raw scores. The maximum score for the
Comprehension Measure was 20 points.

To analyze the students' ability to apply their newly learned morphologic knowledge to comprehend unknown vocabulary within text, the researcher utilized the STAR Reading (2014) assessment. The STAR Reading (2014) assessment is a computer adaptive assessment designed by Renaissance Learning (2014) and was used to analyze student reading achievement in a variety of ways (literature, informational text, vocabulary acquisition/use). Scaled scores on the STAR reading (2014) assessment ranged from 0-1400, while domain scores ranged from 0-100. For the purposes of this study, the researcher analyzed student growth through domain scores in structural analysis, a subcategory of vocabulary acquisition and use. Pre and post assessment scores, illustrated in Table Five, indicated that the mean of the pre assessment (*M*=76) increased slightly on the post assessment (*M*=78). The range on the pre assessment was 49-99, which resulted in a difference of 54 points and the range of the post-assessment was 44-97 which resulted in a difference of 53 points. The standard deviation also increased from pre (*SD*pre=14.58) to post assessment (*SD*post=16.27). Because the items on the STAR (2014) assessment were unknown to the researcher, a two tailed dependent *t*-test was administered. Results indicated that the differences between the structural analysis subcategory on the STAR (2014) pre assessment and the structural analysis subcategory on the STAR (2014) post assessment were not significant at $t(28)$, $p= 0.6653$, $p<.01$. Although there were many improvements in student scores, results indicated that the intervention was not successful in demonstrating significant growth on this measure.

Table 5

STAR Reading Assessment Data for Structural Analysis

STAR Reading Assessment (Structural Analysis)		
Student ID	Pre Assessment	Post Assessment
1	52	50
2	76	91
3	93	86
4	72	57
5	81	86
6	78	83
7	70	84
8	68	81
9	86	94
10	68	71
11	78	71
12	99	97
13	45	44
14	92	92
15	78	85

The STAR Reading assessment (2014) was also used to analyze the students' ability to apply morphologic knowledge to better comprehend fourth grade level text. The STAR Reading assessment (2014) measured the students' ability to comprehend Literature and Informational Text through the following domains: key ideas and details, craft and structure, range of reading/text complexity. The domains of literature are further divided into a variety of skill areas including: character, inference/evidence, plot, setting, theme, authors' choice/figurative language, point of view, range of reading, structure, and word meaning. Likewise, the measure

also divided the three domains of Informational Text into the following skill areas: cause and

effect, compare and contrast, inference/evidence, main idea and details, prediction, sequence,

authors' purpose/perspective, author's word choice/figurative language, organization, word

meaning, range of reading, and argumentation. Domain scores in both literature and

informational text are an average of all Skill Area Scores within each domain. For the purposes

of this study, domain scores were analyzed in effort to measure the impact of the morphological

intervention on students' comprehension in both areas. Results, as illustrated in Table Six

indicated that the mean increased ten points from the pre-assessment (M=204) to post assessment

(M=214). Results also demonstrated that five of the six students who were below the mean on

the pre assessment increased his/her score on the post assessment following the six week

intervention. Of the ten students who scored above the mean however, only half of the scores

increased. Data also revealed that the standard deviation remained similar from pre assessment

(SDpre=51.62) to post assessment (SDpost=52.96). A two-tailed dependent t-test was

administered to assess the impact of the intervention on the students' ability to comprehend

Literature at the fourth grade level.   Results suggested that the difference between the STAR

(2014) Comprehension pre assessment in Literature was not significant, t(28), p= .60, p<.01, and

the intervention was not successful in showing significant growth on this measure.

Table Six also represents the data derived from the Informational Text domain of the

STAR Reading assessment (2014). Results indicated that the mean of the pre assessment

(M=253) was slightly higher than the mean of the Literature pre assessment. The mean also

increased 15 points from pre to post assessment (M=268). Similar to the previous measure, five

of the six students below the mean of the pre assessment, increased their score on the post

assessment following the six week intervention. Unique to scores obtained in the Informational

Text domain however, six of the nine students above the mean on the pre assessment also increased their scores on the post assessment. Results also suggested that the standard deviation increased slightly from pre-assessment (SDpre=72.18) to post assessment (SDpost=73.43). A two tailed dependent t-test was administered to assess the impact of the morphologic intervention on the students' ability to comprehend Informational Text. Although many students were able to improve their scores, results suggested that the difference between the pre assessment and post assessment was not significantly different, $t(28)$, $p= .2902$, $p<.01$.

Table 6

Standard Scores for STAR Reading (2014)—Literature and Informational Text Domains

	Literature		Informational Text	
Student ID	Pre Assessment	Post Assessment	Pre Assessment	Post Assessment
1	120	124	141	145
2	216	256	266	326
3	268	259	345	330
4	188	151	228	187
5	219	235	270	295
6	210	228	258	283
7	181	216	217	266
8	174	210	208	257
9	239	267	300	342
10	172	175	207	211
11	208	193	256	235
12	294	291	390	383
13	103	118	120	138
14	263	266	335	342
15	208	225	254	278

Conclusion

Throughout this chapter, the data that was collected and analyzed supported the following research questions: What strategies were most effective to help improve vocabulary acquisition at the primary level? What effect does morphological analysis instruction have on students' vocabulary acquisition? What types of morphologic strategies were most effective in helping to improve students' vocabulary knowledge? Through the collection of pre and post assessment data of the Vocabulary Measure-1 and the Vocabulary Measure-2 assessments, it can be

concluded that the explicit and systematic morphologic intervention of prefixes was successful in improving students' vocabulary of words which contained the 20 most frequently used prefixes. Likewise, the data collected from the Comprehension Measure also suggested that the six week intervention was successful in improving students' sentence level comprehension. Conversely, data derived from the STAR Reading assessment (2014) revealed that the intervention was not successful in helping to raise vocabulary and comprehension skills regarding this type of assessment. The final chapter of this action research project examines the data reported within existing research, discusses important connections to the Common Core State Standards, describes a detailed explanation of the results described in chapter four, and identifies various strengths, limitations, and recommendations for future research.

CHAPTER FIVE: CONCLUSIONS

The research conducted during this nine-week study determined the effects of an explicit and systematic morphologic awareness intervention focused on increasing students' vocabulary acquisition and comprehension. Fifteen fourth grade students were randomly selected to participate in this study and ranged in reading ability from level E to level X on the Fountas and Pinnell Reading Assessment (2008; see Table 1). A variety of measures were administered and data was collected and analyzed. Pre assessment and post assessment data from the Comprehension Measure (Christian, 2016) and the Vocabulary Measures (Christian, 2016) suggested significant growth in students' ability to use prefixes to improve vocabulary and comprehension. Data from the STAR assessments (2014), however, revealed opposite results suggesting that the intervention did not demonstrate significant results. Chapter Five discussed the results in greater depth as well as connected this study to existing research and The Common Core State Standards (2010). Strengths, limitations, and recommendations for further study were also discussed.

Connection to Existing Research

Much of the current research in literacy has continued to reiterate the critical impact that vocabulary knowledge has on reading achievement. Anderson and Freebody (1981) stressed that vocabulary knowledge was instrumental in successful reading comprehension. Maynard, Pullen, and Coyne (2010) argued that increasing vocabulary knowledge helped mold prior knowledge and improved the ability to make inferences. With the increased importance placed on improving vocabulary acquisition, researchers dedicated more time to finding the most effective strategies to improve vocabulary knowledge. This research project focused on morphological awareness instruction, which current research has proved to be an effective method to increase

lexical knowledge of young children, especially those who are linguistically disadvantaged (Katz & Carlisle, 2009).   The results of this research project resembled many of the outcomes delineated in existing research. This study also demonstrated that a systematic and explicit intervention was necessary to ensure students were grasped, applied, and retained the information being taught. Through the use of this intervention, students demonstrated valuable progress in their ability to manipulate and understand multi-morphemic words.

Schwiebert, Green, and McCutchen (2002) and Ramirez, Walton, and Roberts (2013) confirmed that there was an important connection between morphological awareness and improved reading and vocabulary achievement of young students. Both research teams concluded that by heightening children's morphological awareness, improvement in reading and vocabulary occured. Similarly, the results of this action research study demonstrated this significant connection. Data suggested notable improvement, signifying the importance of effective morphologic instruction within literacy curriculum.

Similar to Schwiebert et al. (2002), Good, Lance and Rainey (2015) proved an important connection between morphological awareness and improved reading, spelling, and vocabulary skills of young children. Good et al. (2015) however, focused much of their study on the impact of explicit morphologic instruction. Findings suggested that linguistically explicit instruction in morphemic awareness was an integral component to improved reading, spelling, and vocabulary achievement. The intervention included within this research project aligned with existing research as it too included explicit morphologic instruction. Participants received explicit instruction for six weeks and focused on the most common prefixes. Results suggested that explicit instruction proved to be beneficial in improving vocabulary and reading comprehension skills of the fourth grade participants.

Similar to the study above, Bowers and Kirby (2009) investigated the impact of an effective morphologic intervention on participants' ability to better understand morphologically complex vocabulary. Unique to this study however, the research team explored the impact of a morphologic intervention on students' ability to transfer knowledge to unknown and complex vocabulary. Similar to the results presented in this study, data from the Vocabulary Measure-1 and Vocabulary Measure-2 of the current study proved that the participants were able to use morphologic analysis strategies to identify and define terms containing base words that were previously known or taught. Similar to this existing research, data from the STAR assessments (2014) proved that participants were less successful in using morphological analysis strategies with vocabulary terms that contained unknown or untaught base words.

Connection to the Common Core State Standards

This research project supported the Common Core Standards for English Language Arts (National Governors Association Center for Best Practices [NGA Center] & Council of Chief State School Officers [CCSSO], 2010), which focused on phonics, Word Recognition, and Vocabulary. The vocabulary acquisition standards of the CCSS required Kindergarten through fifth grade students to be able to determine the meaning of general and academic vocabulary when reading grade level texts. Furthermore, Phonics and Word Recognition standards addressed in second through fifth grade focused on the concepts of morphology requiring instruction of affixes (prefixes and suffixes) and roots to help read unfamiliar multisyllabic words. Starting in second grade students were required to decode common prefixes and suffixes. Third grade students were required to identify and determine the meaning of the most common prefixes and derivational suffixes. Fourth grade students, in turn, were required to use this knowledge to decode and decipher the meaning of words containing common affixes and roots

(both in and out of context). This research project supported these standards through explicit and systematic morphologic instruction of the 20 most common prefixes. The researcher used explicit morphologic instruction of prefixes to improve vocabulary and comprehension of the fourth grade participants.

Explanation of Results

The data that was collected for this action research project through the use of pre and post assessments, demonstrated that the explicit and systematic morphologic intervention focused on teaching the most common prefixes had mixed results. Results from the Vocabulary Measure-1 suggested that after the six week intervention, participants' ability to define words that contained the prefixes, increased significantly. Words were presented in isolation and contained one of the prefixes explicitly taught in the intervention. All base words were also explicitly taught. From pre assessment ($M=12$) to post assessment ($M=29$), data revealed that the mean increased by 17 points. These results revealed the significant impact of explicit and systematic instruction on students' ability to identify and define words that contained these target prefixes.

Likewise, results from the Vocabulary Measure-2 revealed similar gains. The Vocabulary Measure-2 used the same 20 prefixes as the Vocabulary Measure-1, however, it was used to assess whether or not the students could transfer their knowledge to untaught base words. Words were presented in isolation and contained one of the prefixes explicitly taught in the intervention. Vocabulary Measure-2 was administered in Week 9, exactly one week post intervention. Results indicated the average increased by 14 points from pre assessment ($M=12$) to post assessment ($M=26$). This data suggested that the intervention was significant in helping students transfer knowledge to unknown words.

The Comprehension Measure was administered to assess the participants' ability to comprehend sentence level text with words that contain the 20 most common prefixes. All base words contained in the measure were taught in the intervention. The Comprehension Measure pre assessment results indicated an average of 11 points. Post assessment measures increased an average of six points (*M*=17). These results suggested that students were able to use their newly learned knowledge of the common prefixes to better understand sentence level text when the base words were explicitly taught.

The STAR Reading assessment (2014) assessed the impact of an explicit six week morphological intervention on students' vocabulary knowledge. The STAR assessment (2014) was a computer adaptive measure devised to include a large item bank to avoid overexposure to test questions. The researcher was unable to view the questions prior to administration. The number of questions dedicated to prefixes was also unknown. Through the subcategory of Vocabulary Acquisition and Use, participants were presented a variety of questions related to their understanding of specific vocabulary terms. Results from this assessment indicated a slight increase in the mean from the pre assessment (*M*=76) to the post assessment (*M*=78), however *t*-test results suggested that the intervention was not successful in providing significant differences on this measure.

The STAR reading assessment (2014) also assessed the impact of the explicit and systematic six week morphologic intervention on students' comprehension of narrative and expository text. Students read short paragraphs and answered related questions. The researcher was unable to view the questions prior to administration and was unaware of the specific questions asked. The number of questions dedicated to students' knowledge of prefixes was also unknown to the researcher. Data from the Literature subcategory demonstrated an increase of 10

points from pre assessment (*M*=204) to post assessment (*M*=214). Likewise, the mean of the

Informational subcategory increased 15 points from pre assessment (*M*=253) to post assessment

(*M*=268). Although there were improvements following the six week intervention, the data

suggested that the intervention was not successful in providing significant differences on this

measure.

Strengths

Several strengths of the study contributed to the growth of the participants. One strength

was that the study used a systematic and predictable weekly structure. Every Monday was

dedicated to explicit instruction of the three or four new prefixes. The prefixes were all

presented in the same format. Tuesdays and Wednesdays were dedicated to application, practice,

and review. The systematic structure and explicit instruction helped make this intervention

successful.

A second strength of this study was the implementation of interactive and engaging

activities that addressed a variety of learning styles. Kinesthetic learning styles were addressed

through activities such as fly swatter swat, ball review, and muffin tin review. Visual learning

styles were addressed through the use of graphic organizers, playdough, and opportunities to

show understanding through drawing. Interpersonal learning styles were addressed through

group activities such as *I Have, Who Has*?. Verbal-Linguistic styles were included through the

use of word games, read alouds, and opportunities for silent reading. The variety of engaging and

interactive activities helped this intervention to be a success.

A third strength of this intervention was the inclusion of the weekly review.

Incorporating a session dedicated to review of previously learned prefixes, helped the students

commit them to memory. As the intervention progressed, the participants became more

comfortable and confident in their understanding of the prefixes. With support, participants were

more successfully able to apply the knowledge to unknown words encountered during group and

independent reading.

<div align="center">**Limitations**</div>

There were a few limitations that may have had a potential impact on the results and

conclusions of this study. The use of the STAR Reading (2014) assessment was a limitation

impacting the results of this study. Due to the nature of this assessment, the researcher did not

have access to the number or type of questions pertaining to prefixes within the assessment.

Therefore, it was challenging to determine if the data on this assessment was directly impacted

by the content learned in the intervention.

A second limitation to this study was the time dedicated to the intervention. Although

there was significant growth in the students understanding of prefixes within the six week

intervention, there were many other areas of morphology that needed to be addressed for

students to develop stronger vocabulary and comprehension skills. For example, a lack of prior

knowledge that students had of various base and root words greatly decreased participants'

ability to use their knowledge of prefixes to morphologically analyze unknown words. This

overall lack of time may have potentially impacted the vocabulary and comprehension data on

the STAR Reading (2014) assessment as well.

<div align="center">**Recommendations for Further Study**</div>

Based on the results, strengths and limitations of this research, there were several

recommendations the researcher would implement to enhance the study. One recommendation

for further study would be to develop or locate a measure that more directly assesses the students' morphologic application of prefixes in paragraph level text.   Another recommendation would be to increase the number of days dedicated to the intervention per week. Because the minutes in each session were limited, it may have been beneficial to include another day of explicit instruction to ensure that the students' learning was not rushed. Likewise, adding an additional week to the intervention would allow the researcher to limit new prefixes taught to three or fewer each week. A fourth recommendation for further study would be to include a control group and require that this group is implicitly taught the prefixes. By doing so, the researcher would gain a better understanding of the impact of the intervention.

Conclusion

This research study demonstrated that an explicit and systematic morphologic intervention focused on prefixes positively impacted students' understanding of prefixed words. Further, this study suggested that this intervention also positively impacted students' ability to understand sentences that contain prefixed words. The results of this study exhibited similar results reflected in existing research in morphology.   The current study also aligned with the Common Core State Standards (2010) in language, vocabulary, and comprehension. Fourth grade students were required to possess the skills needed to use affixes as clues to discovering meaning in unknown words.

The effectiveness of this systematic and explicit intervention was measured through several informal assessments. Although all the data did not demonstrate significant differences from pre assessment to post assessment, the data suggested strong improvements were made in students understanding of the most common prefixes. Students also demonstrated that they better understood prefixed vocabulary both in isolation and within context at the sentence level.

While this study produced numerous strengths, there were also several limitations that needed to be considered. Results presented in this study, reflected the need for continued morphological investigation in effort to help children develop strong vocabulary and comprehension skills required in the twenty-first century.

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Appendix A

Most Common Prefixes in Printed School English (Stahl, 1999)

Rank	Prefix	Percent of all prefixed word
1	un	26
2	re	14
3	in, im, il	11
4	dis	7
5	en, em	4
6	non	4
7	in, im	3
8	over	3
9	mis	3
10	sub	3
11	pre	3
12	inter	3
13	fore	3
14	de	2
15	trans	2
16	super	1
17	semi	1
18	anti	1
19	mid	1
20	under	1

Note. adapted from: Stahl, S.A. (1999). *Vocabulary development: From reading research to practice*. Cambridge, MA: Brookline Books.

Appendix B

Vocabulary Measure-1: Defining Words with Prefixes

1. What is the meaning of the word *unhappy*?
2. What is the meaning of the word *return*?
3. What is the meaning of the word *invisible*?
4. What is the meaning of the word *dislike*?
5. What is the meaning of the word *enjoy*?
6. What is the meaning of the word *nonfiction*?
7. What is the meaning of the word *impolite*?
8. What is the meaning of the word *overpriced*?
9. What is the meaning of the word *misbehave*?
10. What is the meaning of the word *subsoil*?
11. What is the meaning of the word *prewrite*?
12. What is the meaning of the word *internet*?
13. What is the meaning of the word *foretell*?
14. What is the meaning of the word *deform*?
15. What is the meaning of the word *transatlantic*?
16. What is the meaning of the word *superman*?
17. What is the meaning of the word *semicircle*?
18. What is the meaning of the word *antiwar*?
19. What is the meaning of the word *midnight*?
20. What is the meaning of the word *underpaid*?

0 points will be awarded for no response or incorrect answer
1 point will be rewarded for partial response
2 points will be rewarded for correct response
Example: superman
0 points: no response
1 point: a man who is awesome.
2 points: a man who is above other men.

Appendix C

Vocabulary Measure-2: Defining Words with Prefixes

1. What is the meaning of the word unfriendly?
2. What is the meaning of the word rewind?
3. What is the meaning of the word inedible?
4. What is the meaning of the word disloyal?
5. What is the meaning of the word encourage?
6. What is the meaning of the word nonsmoking?
7. What is the meaning of the word impatient?
8. What is the meaning of the word overthink?
9. What is the meaning of the word misunderstand?
10. What is the meaning of the word subfreezing?
11. What is the meaning of the word pretest?
12. What is the meaning of the word international?
13. What is the meaning of the word forenoon?
14. What is the meaning of the word defrost?
15. What is the meaning of the word transcontinental?
16. What is the meaning of the word superhero?
17. What is the meaning of the word semisweet?
18. What is the meaning of the word anitbullying?
19. What is the meaning of the word midsummer?
20. What is the meaning of the word underestimate?

Appendix D

Comprehension Measure: Defining Words with Prefixes (sentence comprehension)

1. The man was unkind to the dog.
Prompt: How might have the man treated the dog?

2. After school, Adrien had to remake the cake because he burned it in the oven the night before.
Prompt: What is Adrien going to do after school?

3. Penny had a tea party with her invisible friend Patty.
Prompt: Tell me what Penny's friend patty looked like?

4. The boy distrusted his little brother with his delicate and expensive toy rocket.
Prompt: Tell me what the boy thinks will happen when his little brother has his toy rocket?

5. Johnny enjoys building snowmen with his big sister.
Prompt: How might Johnny look when he is building a snowman with his sister?

6. The Bakers were on a nonstop flight to Hawaii.
Prompt: How many times did the Bakers have to switch planes on their way to Hawaii?

7. My mother was sad because the Christmas tree my dad cut down was imperfect.
Prompt: describe how the Christmas tree may have looked?

8. The book was overdue and my mom had to pay a late fee.
Prompt: When did mom bring the book back to the library?

9. Daniel misunderstood the directions to get to the movie theater.
Prompt: What might have happened as Daniel was driving to the movie theater?

10. Elijah needed to buy new clothes due to the subzero weather conditions.
Prompt: What kind of clothes did Elijah need to buy?

11. Carley was the only person to have had the chance to preview the show.
Prompt: Describe some things that Carley may have known about the show that no one else knew.

12. Allison loved to be interactive with the children at the school.
Prompt: what did Allison love to do with the children?

13. Ethan thought the man could foretell his future.
Prompt: What kinds of things could the man tell Ethan?

14. Grandma detangled Mia's hair before braiding it.
Prompt: What did grandma have to do to detangle Mia's hair?

15. The men took a transatlantic flight for a vacation.
Prompt: What kinds of things might the men see out the window during the transatlantic flight?

16. Brian thought his dad was superman.
   Prompt: What kinds of things did Brian think about his dad?

17. The students made a semicircle in art class yesterday.
   Prompt: Draw or describe what the students looked like in art class yesterday.

18. My grandfather was very antiwar.
   Prompt: Describe how grandfather felt about war.

19. There were 10 questions on the test and Peter was midway through, when the fire alarm
   went off.
   Prompt: What question was Peter on when the fire alarm went off?

20. The stray cat was underfed.
   Prompt: What might the stray cat have looked like as a result of being underfed?
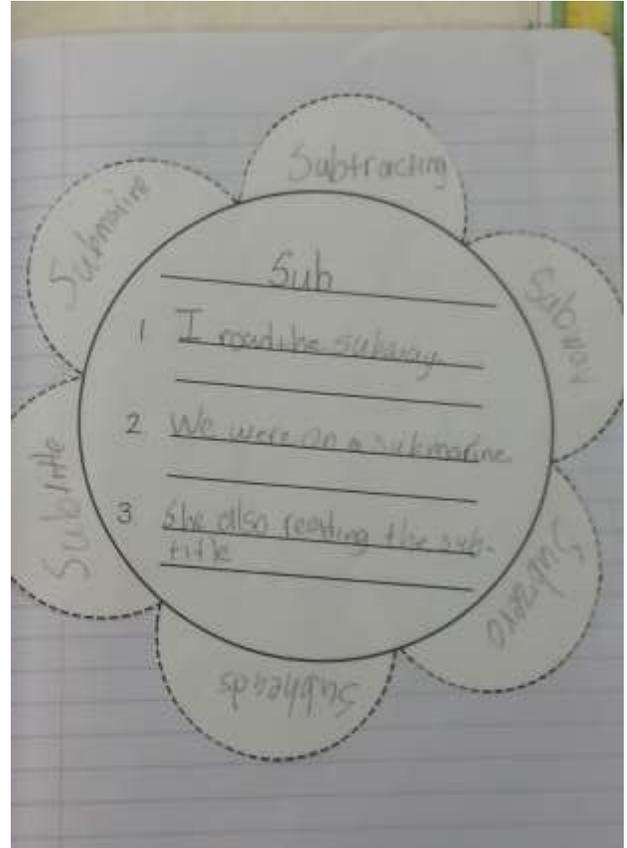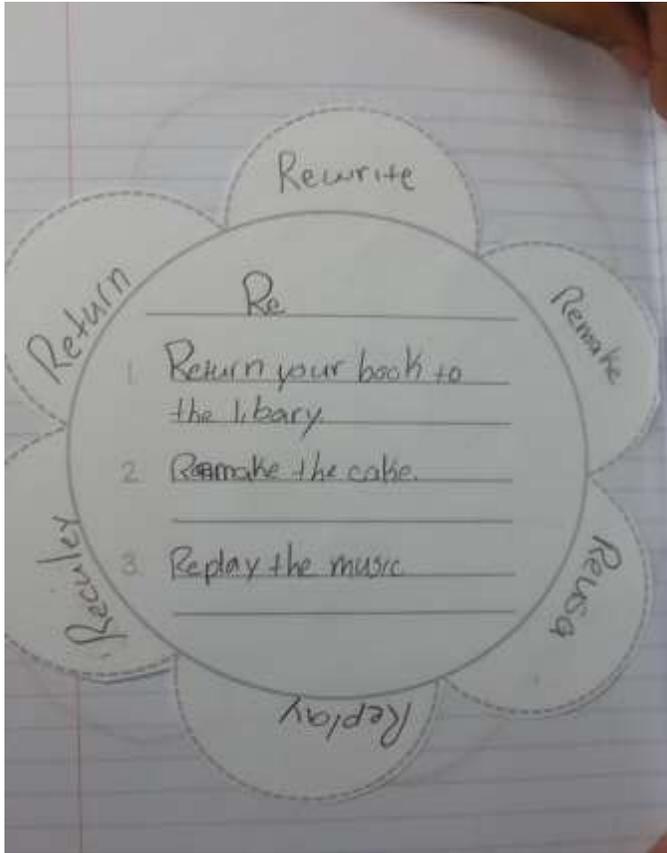
Appendix E

Graphic Organizer Example

Figure E1. **Flower graphic organizer used to organize prefixes**

Appendix F

Review Activity

1. I have remake	Who has a word that means build again?
2. I have rebuild	Who has a word that means to not happy?
3. I have unhappy	Who has a word that means not legal?
4. I have illegal	Who has a word that means not kind?
5. I have unkind	Who has a word that means not possible?
6. I have impossible	Who has a word that means not intelligent?
7. I have unintelligent	Who has a word that means to turn back again?
8. I have return	Who has the word that means not capable?
9. I have incapable	Who has the word that means not fair?
10. I have unfair	Who has the word that means not perfect?
11. I have imperfect	Who has the word that means to write again?
12. I have rewrite	Who has the word that means not true?
13. I have untrue	Who has the word that means not patient?
14. I have impatient	Who has the word that means not active?
15. I have inactive	Who has the word that means to make again?

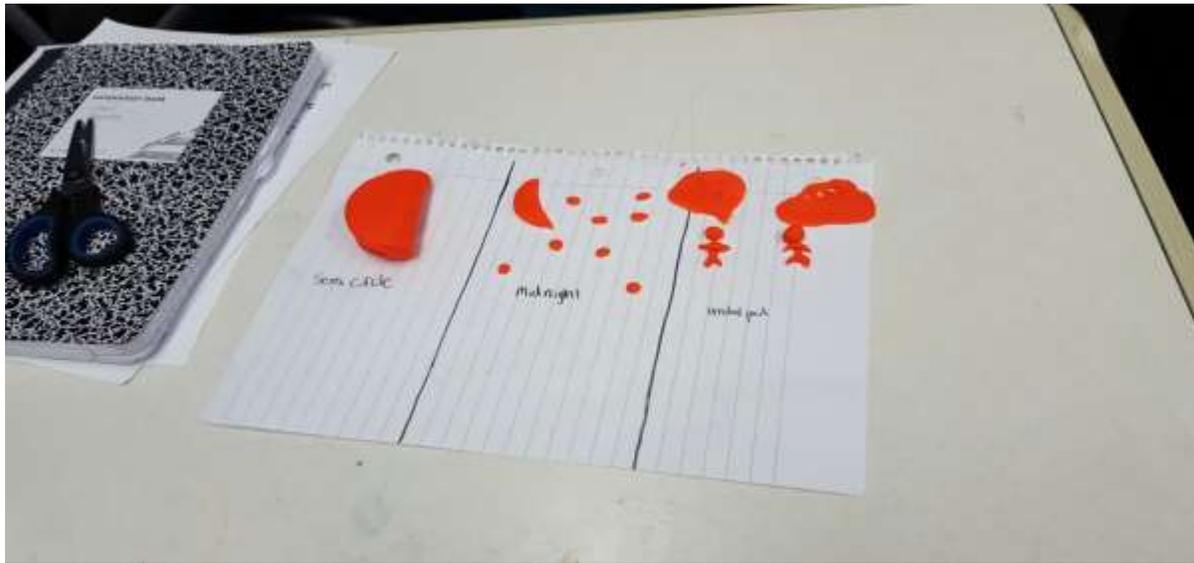*Figure F1.* I have? who has? review activity

Appendix G

Review Activity

Figure G1. Fly swatter swat

Appendix H

Review Activity

Figure H1. Playdough prefix representations

Figure I1. Muffin tin review game

Appendix J

Review Activity

Figure J1. Slam and jam review activity using shaving cream
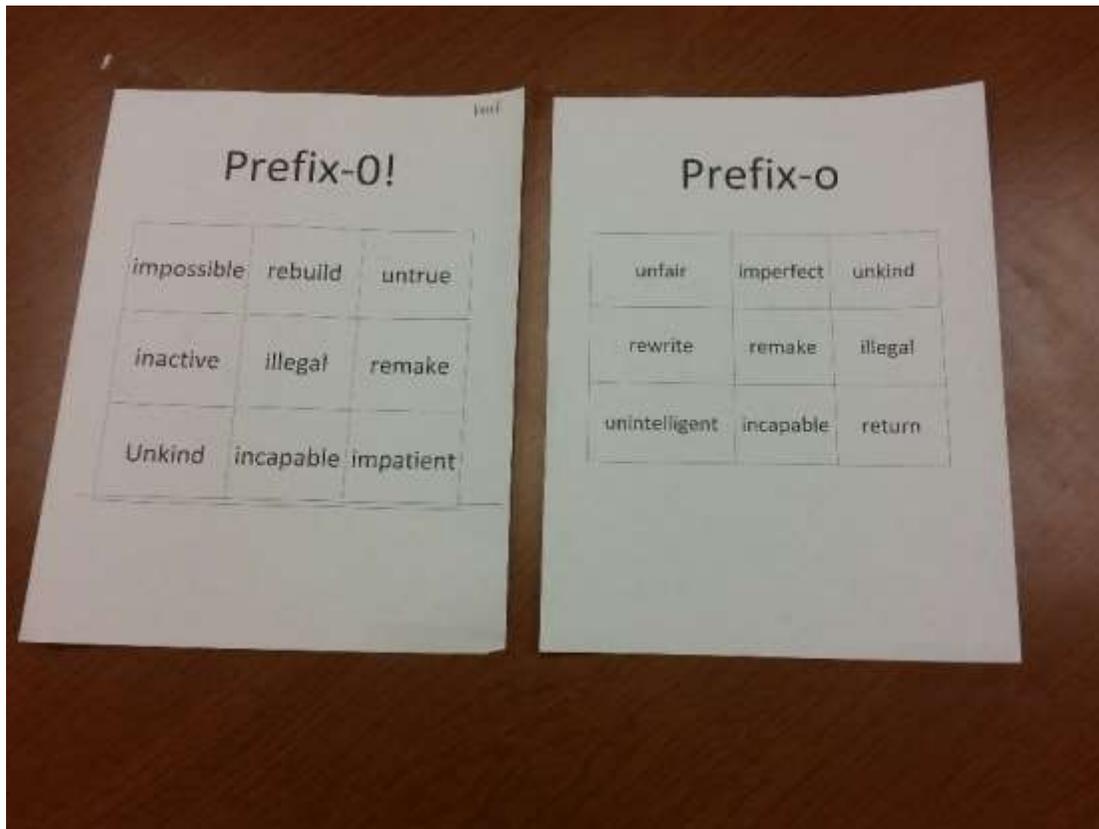
Appendix K

Review Activity

Figure K1. Prefix-O – BINGO like review activity

Appendix L

Review Activity

Figure L1. Review ball
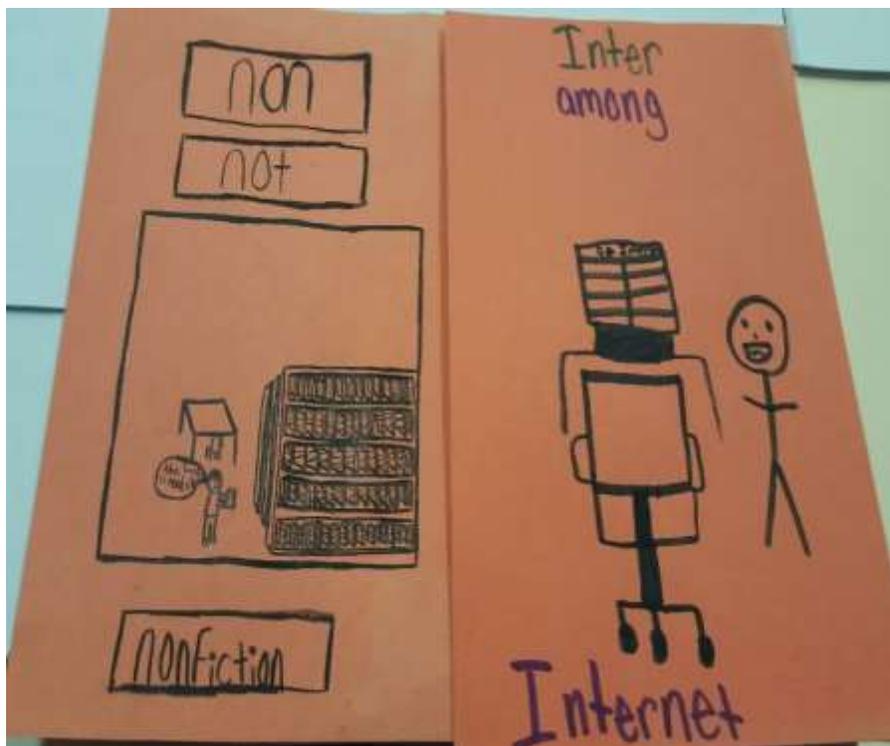
Appendix M

Review Activity

Figure M1. Prefix posters