A COMPARISON OF MORPHEMIC ANALYSIS AND WHOLE WORD MEANING INSTRUCTION ON SIXTH-GRADE STUDENTS' KNOWLEDGE OF PREFIXES, TAUGHT WORDS, AND TRANSFER WORDS

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Donna M. Talerico, Ph.D.

An eight-day instructional vocabulary study was conducted to evaluate two methods of instruction for prefixed words for two methods, Morphemic Analysis and Whole Word Meaning. Seventy-five sixth-grade students from a rural middle school were part of this study.

The Morphemic Analysis and Whole Word Meaning approaches were similar in a number of ways. Instruction consisted of eight lessons, six instructional lessons and two review lessons. Methods were similar in the specific prefixed words taught (24), duration (8 days/8-9 minutes per word), number of exposures (9), and inclusion of the following activities: Example and/or Non-example, Student Examples, Word/Meaning Match, and Word/Example Match.

The major differences between the two methods occurred during the introduction of the prefixed words. Morphemic Analysis included a prefix component that focused on grouping prefixes by families, introducing each prefix meaning, and then analyzing the prefixed word by morphemes: root, prefix, and suffix (as needed). The meaning of the prefixed word was derived by combining the meanings of the parts: root, prefix, and suffix. Whole Word Meaning instruction focused on the prefixed word as a whole unit. Meaning for the prefixed word was developed from a Scenario and Question activity. This activity placed the lesson word into a meaningful written context, and a question followed that guided students to infer the word's meaning. Also, a Prompt activity was used to extend the word's meaning beyond the written passage.

Analysis of data on the following three measures: 24 prefixes, 24 prefixed lesson words, and 24 untaught prefixed words, revealed students' performance for the two conditions, Morphemic Analysis and Whole Word Meaning. The data revealed that students made a greater gain in prefix knowledge (17%) from Morphemic Analysis instruction. This gain could be attributed to the direct instruction of prefixes, a major component of the Morphemic Analysis method. On prefixed lesson words, Morphemic Analysis and Whole Word Meaning each showed large gains; thus, they could be considered equally effective methods of vocabulary instruction. The data on untaught prefixed words indicated that the Morphemic Analysis group outperformed the Whole Word Meaning group, by an advantage of two mean points (8%).

The present study points to the benefits of prefix knowledge and transfer word knowledge for the Morphemic Analysis group. The similar performance by both methods on taught prefixed words was equally interesting and warrants further investigation into the components of effective vocabulary instruction.

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PREFACE

I would like to thank my family for their patience and endurance throughout this adventure.

1.0   INTRODUCTION

The size of a person's vocabulary is one of the strongest predictors of how well they can understand what they read (Anderson & Freebody, 1981; Stahl & Nagy, 2006). Our vocabulary gives away our social and educational background, and it can open or close access to domain-specific knowledge (e.g., professional journals, law, medicine, etc.). Importantly, vocabulary knowledge is cumulative and highly correlates with general achievement (Mezynski, 1983; Stahl, 1999; Stahl & Nagy, 2006).   Yet, there is evidence that little emphasis is placed on vocabulary instruction in the schools (Beck, McKeown, Kucan, 2002; Biemiller, 2001; Blachowicz & Fisher, 2000; Scott, Jamieson, & Asselin, 1998; Watts, 1995). As such, positive benefits could result if teachers placed an emphasis on effective vocabulary instruction. With different kinds of words to learn and different reasons for learning words, research and theory point to vocabulary instruction that uses various strategies, activities, and number of exposures to increase vocabulary knowledge (Edwards, Font, Baumann, & Boland, 2004; Graves, 2000, 2004; Stahl, 1985, 1986, 1999; Stahl & Fairbanks, 1986).

Vocabulary size varies among individuals (i.e., from toddlers to adults) with different abilities and from different socioeconomic groups (Hart & Risley, 1995). Because vocabulary knowledge has been shown to be cumulative, children who lack general intellectual ability or a language rich environment face obstacles as the vocabulary gap continues to widen. According to the "Matthew Effects" by Stanovich (1986), the rich get richer while the poor get poorer.

Words are the tools used to access background knowledge, express new ideas, and learn new concepts; therefore, a child's vocabulary size and ability to acquire vocabulary knowledge impacts upon his or her academic success (Beck, et al., 2002; Biemiller, 1999; Graves, 2004; Petty, Herold, & Stoll, 1967).

Engaging students in effective vocabulary instruction strategies and activities is important in developing vocabulary knowledge and aiding in academic success. Therefore, the purpose of this study was to compare the effects of two effective methods of vocabulary instruction, Morphemic Analysis and Whole Word Meaning, on sixth-grade students' vocabulary knowledge of prefixes, taught prefixed words, and untaught prefixed words.

Morphemic Analysis, analyzing word structure, is a well-known strategy used to unlock the meanings of many polymorphemic words, words composed of two or more morphemes. Of the estimated 88,700 word families found in books up to 12th grade, many of the words in each family were derived by adding prefixes (Nagy & Anderson, 1984). Morphemic Analysis is a vocabulary strategy that examines the structural parts of the English language, morphemes (i.e., prefixes, roots, and suffixes). Morphemes carry the majority of a word's meaning. Morphemic Analysis instruction teaches the students to identify the meanings of the parts, morphemes, from which the students can then derive the meaning of the word. Also, morphemic information has the potential to transfer to other polymorphemic words containing the learned morphemes.

Whole Word Meaning, introducing a word through context and teaching the meaning of the whole word, is another well-known strategy. Whole Word Meaning is a vocabulary strategy that includes a word in a written context with definitional information as well as multiple exposures to the word by incorporating three levels of word processing activities: association, comprehension, and generation (Stahl, 1986; Stahl & Fairbanks, 1986). Whole Word Meaning

instruction teaches a word's meaning from which the students could possibly then derive the meaning of the parts, morphemes.

There is evidence that both strategies facilitate effective vocabulary instruction (Mezynski, 1983; Stahl, 1986; Stahl & Fairbanks, 1986; Reichle & Perfetti, 2003; Baumann, Edwards, Font, Tereshinski, Kame'enui, & Olejnik, 2002; Baumann, Edwards, Boland, Olejnik, Kameenui, 2003). There is a clear distinction between these two strategies, and the interest of this study lies in the extent to which they are effective on the same taught prefixed words, prefixes, and untaught prefixed words. Morphemic Analysis looks at the meaningful units of a word to derive the word's meaning. Whole Word Meaning looks at the meaning of the whole word to possibly derive the meaning of the parts. It has been hypothesized that students who look at the meaningful units of words, Morphemic Analysis, will be better able to learn the meaning of the word and possibly others from the same word family.

The investigator has been particularly interested as to whether students require instruction in Morphemic Analysis to assist in understanding polymorphemic words, or whether Whole Word Meaning instruction would be equally or more effective to the extent that students derive the meaning of the parts. This interest has developed through years of working with middle school readers.

2.0   REVIEW OF THE LITERATURE

According to the National Reading Panel Report (2000), vocabulary knowledge occupies an important role in reading. Some researchers suggest that too many words are found in printed school English to instruct directly; therefore, students must learn strategies to apply as they are in the act of reading (Nagy & Anderson, 1984). The purpose of this study is to compare the effects of two vocabulary methods, Morphemic Analysis and Whole Word Meaning, on students' vocabulary knowledge of instructed and uninstructed prefixed words.

The first area of research considers current views of theory and research on the role of Morphemic Analysis in unlocking a word's meaning by examining its morphemes, or meaningful parts, such as roots, prefixes, and suffixes. The second area of research considers current views of theory and research on the factors and components of effective vocabulary instruction and the role of whole word meaning as an instructional strategy. Both methods, Morphemic Analysis and Whole Word Meaning, are well-known strategies for vocabulary instruction. Throughout this review, research and theory on vocabulary instruction in the classroom is presented.

2.1   MORPHEMIC ANALYSIS

To discuss the role of Morphemic Analysis in the acquisition of vocabulary, it is first necessary to acknowledge the importance of morphemes in the English language and discuss what theory and research say about the role of morphemes in printed school English. Next, a discussion will follow about what theory and research say about students' morphological knowledge.   Lastly, what does theory and research say about Morphemic Analysis instruction based on a comparison of Morphemic Analysis studies? The following review of research and theory on Morphemic Analysis provides information about what can and can not be said.

2.1.1   Morphemes in the English Language

A morpheme is the smallest meaningful unit in a language; it is the basis of the English language (Blachowicz & Fisher, 2002; Harris & Hodges, 1995). According to linguists (e.g., Koutsoudas, 1963), morphemes are represented by phonemes and consist of one grapheme/phoneme or more (e.g., I, is), and words consist of one morpheme or many. Three main types of morphemes, roots, prefixes, and suffixes, belong to one of two categories, free morphemes or bound morphemes. Often, a root can stand alone as an independent word and is referred to as a free morpheme (Harris & Hodges, 1995). In fact, beginning reading instruction focuses on words that are a single, free morpheme, known as monomorphemic words (e.g., run or sun), and then progresses to polymorphemic words (e.g., runs or suns) (Reichle & Perfetti, 2003). Polymorphemic words consist of at least one root and various combinations of roots, prefixes, and/or suffixes (e.g., copy, copyright, copyrighted, recopy). Any morpheme that can not stand alone as an independent word is considered a bound morpheme; many roots (e.g., -tain from

retainer) as well as all prefixes and suffixes (e.g., re- and -er) belong to this category (Harris & Hodges, 1995).

Many English roots that are bound morphemes come from Greek or Latin roots (Edwards et al., 2004). Combinations of morphemes, free and bound, generate complex polymorphemic words that are responsible for more than half of the words in English (Anglin, 1993; Nation, 2001; Nagy & Anderson, 1984). Of the three types of morphemes, roots and prefixes play the major role in generating meaning for complex polymorphemic words. Roots, also known as base words, root words or stems, carry the major component of meaning and can not be further analyzed (Harris & Hodges, 1995). Prefixes are always added before a root and alter meaning, often significantly (e.g., unsure), but do not change part of speech. Suffixes which are always added after the root, either control grammatical agreement (i.e. run/runs) or change the word's part of speech (e.g., speech/noun, speechless/adjective); however, suffixes do very little to alter meaning (Stahl & Nagy, 2006). Studying morphemes, the meaningful units of words, is referred to as morphology (Nagy, Berninger, Abbott, Vaughan, & Vermeulen, 2003), and the knowledge gained from exposure to morphemes and their meanings is referred to as morphological knowledge (Blachowicz & Fisher, 2002). The following section will further discuss morphology and morphological knowledge.

2.1.2   Assessing Students' Morphological Knowledge

Nagy et al. (2003) suggests that morphological knowledge is accessible in unconscious working memory but not necessarily in conscious working memory. For example, young children might apply their unconscious morphological knowledge to come up with plurals for nouns (i.e. cat/cats), but they can't explain the process. Morphological knowledge increases through

exposure and some degree of conscious analysis known as morphological awareness. Nagy et al. (2003) suggests that morphological knowledge impacts phonology, orthography, reading fluency, reading comprehension, and writing.

According to Nagy et al. (2003) and White, Power, & White (1989), an estimated 60% of the words in printed school English can be predicted on the basis of their component morphemes; these words are referred to as semantically transparent derivatives (e.g., polychromatic = chrom/color, poly-/many, atic/having). This suggests an important role for morphological knowledge and morphological awareness in vocabulary development.

White et al. (1989) conducted an analysis by testing third and fourth grade students on their knowledge of roots, prefixes, and suffixes. Results indicated that third graders had limited morphological knowledge; fourth graders had high knowledge of meanings for inflectional suffixes (e.g., -s, -ed), knew about half of the root meanings sampled, but had limited derivational suffix (e.g., -able, -ment) and prefix knowledge. With the number of semantically transparent derived words in printed school English and the impact that prefixes have on word meaning, the issue arises as to when and how students acquire knowledge of prefixes and their meanings.

A study by Nagy, Berninger, & Abbott (2006) grouped students by grades 4-5, 6-7, and 8-9 to investigate the effects of morphological knowledge and morphological awareness on reading vocabulary, reading comprehension, and spelling for all three groups. Results indicated that morphological awareness made a significant direct contribution in all areas for grades 4-9. According to Nagy et al. (2006), further research is needed on the most effective instructional techniques for teaching these grade levels about morphology.

An example of a current sixth-grade literature textbook, *Elements of Literature: Introductory Course* (Mongello, 2005) by Holt, Rinehart and Winston was analyzed for vocabulary instruction. In the area of morphology, a total of 11 lessons were presented: four suffix lessons, five prefix lessons, and two root lessons. Four suffix lessons covered 16 suffixes with no suffixes receiving more than two exposures. Five prefix lessons covered a total of twelve different prefixes with only *dis-* and *re-* receiving more than two exposures. The two root lessons, *cent* meaning hundred and *ject* meaning to throw or cast, received only one instructional exposure. All morphemic lessons included the morpheme, its meaning, and derived words that served as examples for morphemic analysis, i.e., decomposing a word into morphemes to unlock the word's meaning. This current literature textbook suggests that vocabulary development in literature textbooks places minimal emphasis on the area of morphology.

2.1.3   Morphemic Analysis Instruction

Morphemic Analysis involves unlocking a word's meaning by examining its morphemes (Baumann et al., 2002). It is suggested that suffixes minimally alter the meaning of the root and are not necessary to teach. In contrast, according to White et al. (1989), prefixes are small in number, found in a large number of words, easy to identify, consistent in spelling and meaning; therefore, instruction in prefixes should benefit vocabulary knowledge.

The state of research is such that it is difficult to determine the extent to which instructional studies to teach Morphemic Analysis have been successful. Instructional studies that involve Morphemic Analysis differ in grade levels, morphemes taught and measured, duration of instruction, and types of assessments. Often, studies assessed Morphemic Analysis in addition to other literary skills, e.g., MC (Morphemic Analysis and Context Clues) vs. TV

(Textbook Vocabulary), and the individual effects of Morphemic Analysis and Context Clues were difficult to identify. Table 1 presents Morphemic Analysis studies that involved prefix instruction.

Table 1. Studies Involving Prefix Instruction

Study	Gr	Method	Morphemic Instruction	Time	Results
Baumann, Edwards, Boland, Olejnik, & Kameenui (2003)	5	MC TV	5 Prefix Families Not = dis, un, im, in Before, During, After = pre, mid, post Excess = out, over, super Number = uni, mono, bi, semi Again/Back = re 3 Suffix Families Direction = ward State/Quality of = ship, ness, ment Full of/Characterized by = ful	6 ¼ hr. (25/15 min. lessons)	Significant effect only for MC group to infer meanings of unfamiliar derived words. No effect for comprehension.
Baumann, Edwards, Font, Tereshinski, Kameenui, & Olejnik (2002)	5	MO CO MC IC	8 Prefix Families Not = dis, un, im, in Before, After = pre, post Excess = over, super, out Number = mono, bi, semi Again, Remove = re, de Below = sub, under Against = anti, counter Bad = mis, mal	10 hr. (12/50 min. lessons) *3 Review lessons	Significant effect equally for MO and MC groups to infer meanings of unfamiliar derived words on immediate assessment. Strong immediate and delayed effect for MO and MC on morphemic lesson words.

Study	Grade	Condition	Content	Time	Results
White, Sowell, & Yanagihara (1989)	3	MO UC	9 Prefixes (Not Listed) 10 Suffixes *Teacher Instruction	Not stated (14-16 lessons)	Substantially higher scores for MO group on test: root identification, prefix meanings, meanings of derived words. *No statistical tests reported. No effect for comprehension
Nicol, Graves, & Slater (1984) Unpublished	4 5 6	MO UC	8 Prefixes (Not Listed)	1½hr. (3/30 min. lessons)	Effect only for MO group to infer meanings of unfamiliar derived words.
Graves & Hammond (1980)	7	MO IC UC	9 Prefixes (Not Listed)	1-1 ¼ hr. (3/20-25 min. lessons)	Effect only for MO group to infer meanings of unfamiliar derived words.
Nicol (1980) Unpublished *Referenced: Graves, 2004	4 5 6	MO UC	8 Prefixes (Not Listed)	1 ½ hr. (3/30 min. lessons)	No group differences on pretest. Significantly higher scores for MO group on prefixes taught, instructed vocabulary, and unfamiliar derived words on posttest and 3-week delayed posttest. All ability levels profited from prefix instruction.
Ess Unpublished Thesis (1978)	7	MO WW UC	9 Prefixes (Not Listed) *Teacher Instruction	1-1¼ hr. (3/20-25 min. lessons)	Significantly higher scores for MO group on prefixes taught and unfamiliar derived words on posttest and 3-week delayed posttest.

| Thompson (1958) | C NC | MO | 20 Prefixes 14 Roots (Not Listed) | Not stated (14 lessons) | Significant effect only for MO group to identify meanings of prefixes and roots. Significant effect only for MO group to infer meanings of unfamiliar derived words. |
| Otterman (1955) | 7 UC | MO | Prefixes Roots (Not Listed) | 5 hrs. (30/10 min. lessons) | Significant effect only for high mental ability subjects in MO group to interpret meanings of unfamiliar derived words. Superiority only for MO group to identify prefix and root meanings on a delayed test. No effect on Gates Vocabulary Test. No effect for comprehension. |

Types of Instruction:
MO= Morphemic Only   MC= Morphemic & Context Clues   CO= Context Clues Only   TV= Social Studies Voc.
IC= Instructed Control   UC= Uninstructed Control   NC= No Control   WW= Whole Word

As indicated on Table 1, Morphemic Analysis studies vary greatly in the type and amount of instructional time, one to ten hours. Assessments vary from five-option multiple-choice tests to production tests, tests in which the student must write their own definition, and many of the assessments are experimenter-constructed. Information on these assessments is limited, and they would be difficult to replicate. Limited numbers and different types of morphemes are addressed in the same studies. For example, the 2002 study of Baumann et al. indicated a strong effect for identifying meanings for semantically transparent words when instructed in Morphemic Analysis. The 2003 study of Baumann et al. provided classroom teacher instruction based on vocabulary contained in the social studies textbook; thereby restricting the ability to generalize

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measurements beyond fifth grade. Students instructed in Morphemic Analysis indicated a large effect in identifying the meanings of semantically transparent words; however, context clues blurred the amount of morphological knowledge used to infer vocabulary meaning.

From the prefix studies listed in Table 1, it can be seen that the many different variables and methodologies added to the complexity of making comparisons. No present studies have simply compared instructional strategies for teaching the same polymorphemic words with a focus on equalizing time, exposures, and quality of instructional activities. In addition to Morphemic Analysis as an instructional strategy for teaching polymorphemic words, theory suggests another well-known strategy for effective vocabulary instruction, teaching the whole word and meaning, Whole Word Meaning instruction. The notion here is that students will derive the meaning of the prefix from effective whole word instruction.

2.2   VOCABULARY INSTRUCTION

A resurgence of interest in vocabulary research began in the 1970's and 1980's (Beck & McKeown, 1991; Blachowicz & Fisher, 2000). A major reason for this resurgence was a shift in focus, now viewing vocabulary development as a complex information process that emphasizes relationships between concepts, organizes concepts, and expands and refines the meaning of individual words (Beck & McKeown, 1991). The following discussion will identify and describe the major differences in traditional vocabulary instruction, the term identifying vocabulary instruction before the 1980's and continuing even today, and what research and theory suggest represents effective vocabulary instruction. Most vocabulary instruction, except

for Morphemic Analysis, focuses on the whole word; this strategy will be referred to as Whole Word Meaning instruction within this study.

2.2.1   Traditional Vocabulary Instruction

Traditional vocabulary instruction is often thought about as "requiring only associations between words and definitions" (McKeown, Beck, Omanson, & Pople, 1985, p. 522). Traditional vocabulary instruction occurs through situations involving direct instruction where word-meaning information is intentionally made available to the student through either a definition or use of a dictionary. This teacher-directed instruction is in its weakest form when students are directed to use a dictionary for a word's meaning. Generally, traditional vocabulary instruction occurs during reading and language arts instruction, is associated with a specific text selection, and occurs prior to reading as a prereading activity (Beck & McKeown, 1991; Blachowicz & Fisher, 2000). According to Blachowicz and Fisher (2000), traditional vocabulary instruction is primarily skill and text based. This instruction involves using words from the text that have been identified by commercial companies as useful for instruction. Instruction usually occurs when the words are presented in the specific text or when sentences from the text were paraphrased. No apparent regard as to whether these words were new to the students or had been previously learned was addressed. Knowing this, a discussion of vocabulary instruction in the classroom follows.

2.2.2   Classroom Vocabulary Instruction

Blachowicz and Fisher (2000) suggest that teachers depend heavily on commercially prepared materials for vocabulary instruction; from the 1980's and earlier, these materials have been documented with the following features. The "best case" involves a teacher presented definition followed by a worksheet. The "worst case" is that no words are identified for vocabulary instruction. According to Blachowicz and Fisher (2000), teachers still depend heavily on commercially prepared materials that focus on simply a word and a text-related definition as vocabulary instruction. During this form of traditional vocabulary instruction, a minimal amount of practice and degree of processing on the part of the student occurs.

According to Konopak and Williams (1994), teachers reported that their instructional approach was still primarily skill and text based and used a single definition. Also, Ryder and Graves (1994) suggested that more recent commercial materials provided more research-suggested instructional practices; however, these activities are still located predominantly in the prereading activities. According to Blachowicz and Fisher (2000), observational studies indicated that classroom vocabulary instruction was primarily skill and text based (definitional), primarily in the prereading part of the lesson, and teacher-directed. This information warranted a closer look into the vocabulary instruction found within a current sixth-grade literature textbook.

The current sixth-grade literature textbook, *Elements of Literature: Introductory Course* (Mongello, 2005) by Holt, Rinehart and Winston, which was used earlier as an example of the limited number of prefix lessons, was also analyzed to explore statements made in research literature about textbooks in regard to vocabulary instruction. The focus of this analysis was the number of words selected for any kind of vocabulary instruction, time of instruction in relationship to the reading of the selection, number of exposures, and types of activities. Almost

half (46%) of the selections found in this text identified no words for instruction. The remaining selections (54%) identified between three to ten words for instruction with more than half of these selections providing only one instructional exposure during reading. The remaining selections provided between two and four instructional exposures that primarily occurred before reading and involved reading the word and its definition.

The analysis of vocabulary instruction in this current sixth-grade literature textbook, *Elements of Literature: Introductory Course*, provided support for the following: vocabulary instruction was primarily skill and text based (definitional), occurred primarily in the before reading part of the lesson, and often selections provided no vocabulary instructional activities or at best one activity during reading. Neither deep processing nor multiple exposures were a major focus of this textbook. Research points to these as ineffective approaches to vocabulary instruction (Beck & McKeown, 1991; Blachowicz & Fisher, 2000; McKeown et al., 1985; Ryder & Graves, 1994).

2.2.3   Factors Influencing Effective Vocabulary Instruction

Reviews by Mezynski (1983), Stahl (1985), and Stahl and Fairbanks (1986) of vocabulary instruction studies, suggested that there are specific factors that influence the effectiveness of a vocabulary method. Three specific factors include whether examples are contextually developed, types of activities for word learning, and the number of exposures to information about each word (Stahl & Fairbanks, 1986). Two general setting factors include the amount of time allotted for vocabulary instruction and group versus individual instruction. The following discusses what research and theory suggest concerning these specific factors and their influence on the effectiveness of any vocabulary method.

During initial vocabulary instruction, Stahl (1985; Stahl & Fairbanks, 1986) reported that "mixed methods", teaching methods that used both definitional and contextual information, provided significantly better vocabulary achievement than either one by itself. Another factor that appeared to affect learning involved the types of activities used in word learning. For example, rote memorization requires almost no processing and does little to facilitate recall (Stahl, 1986). The following three levels of activities successively deepen processing from low to high: associations (e.g., synonyms), comprehension (e.g., classifying words), and generation (e.g., paraphrase a definition). These three levels provide a greater number of connections to the word by using a greater amount of semantic information, cognitive resources, and active participation by the students (Mezynski, 1983; Stahl & Fairbanks, 1986). Another factor, repetition, has been suggested to help students to improve their speed of accessing the word's meaning (Beck, Perfetti, & McKeown, 1982; Stahl & Fairbanks, 1986). Repetition provides additional exposures; however, multiple exposures to different meaningful information about a word by using examples of concepts in different contexts would most nearly replicate natural word learning (Carroll, 1964; Stahl & Fairbanks, 1986). Combining these factors into a vocabulary method would most likely foster effective vocabulary instruction.

According to Stahl and Fairbanks (1986), two general setting factors, amount of time and grouping, may influence a method's effectiveness. The amount of instructional time has been suggested as one of the most powerful predictors of effective instruction. Stahl and Fairbanks' analysis of vocabulary studies indicated that no information on instructional time was given in some studies and that others ranged from a fraction of a minute to approximately 22 minutes per word, with 22 minutes per word found only in the studies of McKeown, Beck, Omanson, & Perfetti (1983) and Beck et al. (1982) where more elaborate processing and vocabulary activities

occurred. The majority of the studies indicated instructional time most often ranged between a fraction of a minute and two minutes per word.

The second setting factor compares group and individualized instruction. Group discussion and the anticipation of being called upon should lead to more active processing of information about a word's meaning, resulting in higher retention. Group discussion also allows for teacher feedback on misconceptions. Most vocabulary research studies include a predetermined pace; therefore, an important advantage of individualized instruction, self-pacing, would not be applicable. Stahl and Fairbanks' (1986) meta-analysis of 52 vocabulary studies supported that any vocabulary instruction is better than no instruction and that no strong differences existed for individual or group lessons.

2.2.4   Components of Effective Vocabulary Instruction

A closer look into the components of effective vocabulary instruction indicated that instruction should include a number of features, i.e., direct instruction, repetition, multiple exposures in rich contexts, active engagement in the learning task, and motivation. When providing vocabulary instruction, studies tend to focus on the whole word as a meaningful unit; however, Morphemic Analysis as an instructional strategy has also gained the interest of research. Stahl (1986) proposed three principles of effective vocabulary instruction, and these principles were supported by research concerning the components of effective vocabulary instruction. The following discussion provides information concerning these three principles and how they represent effective vocabulary instruction.

Principle 1, give both context and definitions, provides initial introduction to a word. Stahl   and   Fairbanks   (1986)   defined   definitional   information   as   knowledge   of   logical

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relationships between a word and other known words using a dictionary definition, synonyms, antonyms, classification, prefixes, suffixes, roots, etc., and contextual information as knowledge of the core concept the word represents and how it changes in different contexts. Contextual information can take the form of a word in the context of a sentence, the form used most often; however, more developed contexts e.g., scenarios that place a word in a setting and event, could enhance word learning. For some words such as concrete words, pictures or demonstrations could provide contextual information. Stahl (1986) suggested that the strongest effects were found when a balanced emphasis existed between definitional and contextual information and when a number of different activities or examples used the word in context.

Principle 2, encourage "deep" processing, focuses beyond the materials to what students do with the information. Deep processing was defined by Stahl (1986) as "either making more connections between new and known information (or relating the word to more information than the student already knows) or spending more of one's mental effort on learning" (p. 664). Three different levels of processing from low to high are association, comprehension, and generation. Association occurs, e.g. between a word and synonym, a word and a single context; therefore, the student learns simply the association. Comprehension occurs when the student applies the association to demonstrate understanding of the word, e.g., finding an antonym, fitting the word into a sentence blank (cloze sentences), classifying the word with other words, etc. The highest level of processing is generation. Generation involves the students using the comprehended association to generate a novel product, e.g., restatement of the definition using one's own words, comparing the word's meaning to one's own experiences, or making up a novel sentence, oral or written, that clearly demonstrates the word's meaning. When students actively process

word information from one level to the next, this interaction helps them to make the word their own.

Principle 3, give multiple exposures, refers to number and types of information. Multiple repetition of the same information and exposures in different contexts, provide about the same effect on learning if only one or two exposures are presented. However, if more than two exposures are presented, theory and research literature suggest that different contexts and amount of instructional time play a more significant role in vocabulary learning (Stahl, 1986).

The three principles by Stahl (1986) serve as a framework for effective vocabulary instruction to be incorporated into any instructional strategy, Whole Word Meaning or Morphemic Analysis. The instructor now must make the important decisions concerning vocabulary instruction i.e., which words to instruct, number and types of activities to be used, and amount of instructional time per word.

2.3   STATEMENT OF PURPOSE

The purpose of this study was to compare the effects of the two types of vocabulary instruction, Morphemic Analysis and Whole Word Meaning, to promote vocabulary learning of prefixed words and the ability to infer the meaning of uninstructed prefixed words. Morphemic Analysis instruction "involves deriving the meaning of a word by examining its meaningful parts (morphemes), such as word roots, prefixes and suffixes" (Edwards et al., 2004, p. 160). Whole Word Meaning instruction involves looking at the whole word, learning the meaning, and using that information to infer the meaning of other derivationally related words. In this study, both strategies, Morphemic Analysis and Whole Word Meaning, were based on information collected

by Stahl and Fairbanks (1986) from their meta-analysis of 52 vocabulary studies, and Stahl's (1986) three principles of effective vocabulary instruction: definitional and contextual information, deep processing, and multiple exposures. No studies have simply compared the effects of two types of vocabulary instruction on the same prefixed words and incorporated principles of effective vocabulary instruction into both conditions. In this study the following three research questions were posed:

1. What are the effects of Morphemic Analysis and Whole Word Meaning instruction on students' learning the meanings of prefixes?

2. What are the effects of Morphemic Analysis and Whole Word Meaning instruction on students' learning the meanings of instructed prefixed words?

3. What are the effects of Morphemic Analysis and Whole Word Meaning instruction on students' ability to infer the meanings of uninstructed prefixed words?

3.0 RESEARCH METHODOLOGY

The purpose of this study was to compare the effects of two instructional conditions, morphemic analysis and whole word meaning, on students' ability to learn the meanings of prefixes, instructed prefixed words (lesson words), and to generalize to uninstructed prefixed words (transfer words). One condition, Morphemic Analysis, decomposed words into their meaningful units, identified the meanings of these units, and used this information to develop knowledge of prefixed words. The second condition, Whole Word Meaning, involved introducing a prefixed word through context and being taught the meaning of the whole word. These two conditions are well-known and used in instructional practices.

3.1 METHODS

In the present study, two conditions, Morphemic Analysis and Whole Word Meaning, each contain an overview, six instructional lessons, and two review lessons. The same prefixed words were used in both instructional conditions. In the Morphemic Analysis condition, words were presented by prefixed families. The words and sequence used in the six lessons to exemplify the families are found in Table 2.

Table 2. Sequence of Words and Prefix Families Used in Six Morphemic Analysis Lessons

Lesson	Prefix Family	Prefixes	Lesson Words
1	Number	quadr- (four)	quadrilateral
		penta- (five)	pentadactyl
		centi- (hundredth/hundred),	centimeter,
		kilo- (thousand)	kilowatt
2	Time	ante- (before)	antedate
		pre- (before)	precaution
		epi- (after)	epilogue
		post- (after)	postscript
3	Amount	hyper- (excessive)	hyperactive
		poly- (many)	polychrome,
		ultra- (beyond)	ultraconservative
		hypo- (under, too little)	hypoallergenic
4	Judgment	counter- (against)	counteract
		anti- (against)	antinuclear
		mal- (bad)	maladjusted
		dys- (bad)	dysfunction
5	Direction	peri- (around)	periscope
		circu- (around)	circumnavigate
		trans- (across)	transcribe
		dia- (across)	dialogue
6	Placement	para- (beside)	paraphrase
		inter- (between/among)	international
		intra- (within)	intramural
		syn- (together)	synchronize

In the Whole Word Meaning condition, the same words as those in the Morphemic Analysis condition were used, but they were not sequenced to exemplify the prefix families. Table 3 shows the sequence of the Whole Word Meaning examples. Notice that only one word from any family (e.g., number, time) was used in any Whole Word Meaning lesson.

Table 3. Sequence of Words Used in Six Whole Word Meaning Lessons

Lesson	Lesson Words
1	quadrilateral, postscript, counteract, paraphrase
2	pentadactyl, antedate, circumnavigate, synchronize
3	hyperactive, antinuclear, transcribe, centimeter
4	precaution, ultraconservative, dysfunction, international
5	kilowatt, hypoallergenic, epilogue, periscope
6	polychrome, intramural, dialogue, maladjusted

Students were assigned to one of the two conditions, and a comparison was made concerning the effectiveness of the two conditions. The researcher investigating the study was the sixth-grade reading teacher who provided instruction for both conditions.

3.2   PARTICIPANTS

Participants in this study were sixth-grade students from a public school district in rural southwestern Pennsylvania. Permission was granted from the district's superintendent to conduct the study in the sixth-grade reading classes of the middle school (A copy of the letter granting permission and the University of Pittsburgh Human Subjects Form can be found in Appendix A). The district has one campus that includes three buildings, an elementary school, a middle school,

and a high school, with a total population of 1,381 students, 629 students in the elementary school, 331 students in the middle school, and 421 students in the high school. This school district is considered economically disadvantaged on the basis of 44% eligible for free or reduce-priced lunch. The district is 98% Caucasian.

Four sixth-grade reading classes were nested into two treatment groups by using each class's pretest scores for prefixes, lesson words, and transfer words. A pretest total score was calculated for each student; next, a mean total score was calculated for each class. Mean total scores and absolute mean differences were calculated for all possible combinations for two treatment groups. The combination with the lowest absolute mean difference (C1, 3; C2, 4 = 0.35) was identified for grouping within this study. The treatments were randomly assigned to the two groups by tossing a coin.

To further investigate the similarity of the two groups, the students' 2006 PSSA reading scores (Range = 1751 – 947 = 804) were analyzed using an independent t-test. Three students were not included in this analysis because they had not taken the 2006 PSSA assessments. Comparing the means of the 2006 PSSA reading scores for the Morphemic Analysis subjects (M = 1380, SD = 150.4) and the Whole Word Meaning subjects (M = 1391, SD = 160.8), no significant difference was found between the two groups (t(70) = -.316, p = .753).

Two classes, 1 and 3, participated in data collection for the Morphemic Analysis method, and two classes, 2 and 4, participated in data collection for the Whole Word Meaning method. The Morphemic Analysis method consisted of 39 students, and the Whole Word Meaning method consisted of 39 students; however, because of missed instruction, the data analysis was calculated on 38 students in the Morphemic Analysis condition and 37 students in the Whole

Word Meaning condition. A total of 75 students were included in final data collection and analysis.

3.3   VOCABULARY

The following discussion covers the prefixes and prefixed words chosen for this study. A great effort was made to choose prefixes and prefixed words that would be challenging to students in sixth-grade.

3.3.1   Prefixes

Twenty-four prefixes that were chosen for inclusion in this study were previously shown in Table 2. Several sources were used to identify prefixes, and the final selection was based on two factors. First, the majority of the prefixes were categorized as intermediate or advanced prefixes (Fry, Kress, Fountoukidis, 2000); therefore, the chance of familiarity should be less likely by grade six. Second, prefixes could be grouped into prefix families, specifically the following: number, time, amount, judgment, direction, and placement. Recent vocabulary studies grouped instruction by prefix families (Baumann et al., 2002; Baumann et al., 2003). According to Nation (2001), grouping information has the advantage of connecting related information in the mental lexicon and perhaps reduces processing time. Therefore, arranging prefixes by families was a feature of the Morphemic Analysis method in this study.

3.3.2 Prefixed Words

As indicated in Tables 2 and 3, 24 words represented the 24 prefixes selected for use in this study. Sources for the prefixed words were *The Reading Teacher's Book of Lists, Fourth Edition* (Fry et al., 2000), *Merriam-Webster's Intermediate Dictionary* (2004), and *Merriam Webster's Collegiate Dictionary* (1995). Prefixed words were chosen based on the following factors: contained the prefixes chosen for Morphemic Analysis instruction and could be decomposed into the following units: root, prefix, and suffix (if needed).

Additionally, for pretest and posttest purposes, 24 transfer words, uninstructed prefixed words, were identified. The transfer words are shown in Table 4. Transfer words chosen were based on the same factors as the lesson words: contained the prefixes chosen for Morphemic Analysis instruction and could be decomposed into the following units: root, prefix, and suffix (if needed). The purpose for using transfer words in the assessment was to identify whether one method was more effective in generalizing to unknown prefixed words than the other. In the posttest measure, the transfer words measured the ability of the students in the two conditions to generalize instructed information to uninstructed prefixed words.

Table 4. Transfer Words in Pretest/Posttest

Prefix Family	Transfer Words
Number family	quadriplegic, pentagon, centennial, kilogram
Time family	antebellum, prejudice, epidermis, postwar
Amount family	hypercritical, polysyllabic, ultramodern, hypodermic
Judgment family	counterproposal, antisocial, malfunction, dysgenics
Direction family	perimeter, translate, circumspect, diagonal
Placement family	perimeter, translate, circumspect, diagonal

3.4   INSTRUCTIONAL CONDITIONS

In the followings sections, descriptions of two instructional conditions, Morphemic Analysis and Whole Word Meaning, provide detailed information on the types of lessons, lesson content, instructional activities, and procedures followed.

3.4.1   Morphemic Analysis Condition

Morphemic Analysis (See Appendix B for overview and first lesson.) was referred to as Word Analysis in the instructional lessons, as it was an easier term for sixth-grade students to use.

Morphemic Analysis instruction consisted of an overview, six instructional lessons, and two review lessons. Each Morphemic Analysis lesson provided seven exposures to each lesson word, and two additional exposures occurred in a review lesson for a total of nine exposures as shown in Table 5.

Table 5. Exposures for Each Lesson Word during Morphemic Analysis Instruction

Location	Activity
Instruction	1. Prefix introduced & Word Analysis
	2. Word Meaning
	3. Example and/or Non-example
	4. Student Examples
Practice Worksheet	5. Prefix Match
	6. Silly Words
	7. Word/Meaning Match
Review Lesson	8. Word/Meaning Match
	9. Word/Example Match

3.4.1.1 Morphemic Analysis Overview and Lesson Activities

An overview served as an introduction to Morphemic Analysis. This overview first used a chart (see Figure 1), "Basic Units of Words," to introduce students to the terms: root, prefix, and suffix.

Basic Units of Words

ROOT = Basic unit of a word that carries the major part of the meaning.

PREFIX = Unit that is added to the <u>beginning</u> of a "ROOT" to change its meaning.

SUFFIX = Unit that is added to the <u>end</u> of a "ROOT" to change the meaning,
                    part of speech, or tense of a verb.

Figure 1. Basic Units of Words Chart used in Morphemic Analysis

Second, a "Word Analysis Chart" (see Figure 2) was displayed, and students were informed that the chart would help them analyze words into their meaningful units.

Word Analysis Chart

Word: _____

      Root: _____ = _____
      Prefix: _____= _____
      Suffix: _____= _____

Meaning of word: _____

Figure 2. Word Analysis Chart used in Morphemic Analysis

During the overview, the instructor modeled the Word Analysis process using the demonstration word, *unties*.   The steps for "Word Analysis" were as follows:

1. Prefix Family Card: A card containing the prefixes and meanings for the lesson was displayed and reviewed.

2. Introduce Lesson Word: The lesson word was introduced by writing the word on a "Word Analysis Chart" and having the word pronounced.

3. Word Analysis: The Word Analysis process included decomposing the word in the following order: root and meaning, prefix and meaning, and suffix and meaning. Information was recorded onto the "Word Analysis Chart."   Suffixes were only addressed when they occurred in a lesson word, because according to Stahl and Nagy (2006), suffixes should not be a problem for middle school children.

4. Example or Non-example: The instructor read two situations and students confirmed as an example or rejected (non-example).

5. Student Examples: Students provided additional examples and explanations.

3.4.1.2 Morphemic Analysis Practice Worksheet

After completion of Word Analysis on the four lesson words used in each Morphemic Analysis lesson, a practice worksheet provided students with additional practice (Lesson 1 Worksheet appears in Appendix B).   Each worksheet contained three parts: Part A: matching prefixes and meanings, Part B: applying Word Analysis to silly words (pseudo words), and Part C: matching lesson words and meanings.   This three-part format was intended to reinforce three goals of Morphemic Analysis. First, students must learn the meanings of prefixes in order to apply the knowledge to unfamiliar prefixed words.   Second, students need to practice the Morphemic Analysis process on unfamiliar derived words or pseudo words to support future use.   Third,

students need numerous exposures with derived words and meanings to promote recall. The procedures for completing the worksheet were as follows:

1. Prefix/Meaning Match (Part A): Students completed matching the prefix and meaning independently (approximately 30 seconds) followed by a review to provide students with feedback on their progress.

2. Silly Words (Part B): Students completed Morphemic Analysis of silly words cooperatively with teacher direction. This activity reinforced the meaning of the prefix, the Morphemic Analysis process, and generalizing to unknown prefixed words, in this case silly words. Silly words (pseudo words) used in this Morphemic Analysis condition provided practice without providing additional vocabulary instruction beyond what was found in the Whole Word Meaning condition.

3. Lesson Word and Meaning (Part C): Students independently matched lesson words and their meanings (approximately 1 minute). A review followed to provide feedback to the students on their performance.

These activities provided additional exposures with prefixes, lesson words, and the Morphemic Analysis process. The practice worksheet was followed by a closing activity, a "World of Words" puzzle.

To motivate students and demonstrate that prefixed words are important to the "World of Words," each student received a puzzle outline that was shaped like a circle. This puzzle titled "World of Words" (See Appendix B for puzzle and answer label) was provided at the end of the first lesson. Each Morphemic Analysis lesson concluded with students receiving a puzzle piece label that included prefixes/meanings and lesson words/meanings. Each piece was attached to the puzzle outline under the correct prefix family title. After the final lesson, parts of the circle

were not covered, and students were guided to realize that there were many other prefixes and prefixed words.

3.4.1.3 Morphemic Analysis Review Lessons

Two review lessons, one after the third instructional lesson and one after the sixth instructional lesson, were included to provide additional exposures. After lesson three, Morphemic Analysis Review 1 (See Appendix C for review lesson) covered number, time, and amount prefix families and the 12 lesson words that had been presented. After lesson 6, Morphemic Analysis Review 2 covered judgment, direction, and placement prefix families and the 12 lesson words. Each review lesson consisted of two activities, classifying/defining prefixes and matching lesson words with examples as indicated below.

1. Classifying/defining prefixes: Using a three-column chart and prefix cards, the students classified each prefix by placing each card beneath the correct prefix family title and identifying the meaning of the prefix.

2. Matching lesson words and examples: After displaying a slide, the students read the twelve lesson words that were placed alphabetically in a word box. Next, twelve examples were displayed. Students verbally matched each lesson word with an example and explained why; the instructor confirmed or corrected. Correct responses were displayed by the instructor on the slide.

The same procedures identified in Morphemic Analysis Review 1 were followed for Morphemic Analysis Review 2.

3.4.2 Whole Word Meaning Condition

Whole Word Meaning (See Appendix D for overview and first lesson.) were based on Stahl's (1986) principles of effective vocabulary instruction identified from Stahl and Fairbanks' (1986) meta-analysis of fifty-two vocabulary studies. Principle 1 included providing definitional and contextual information. Principle 2 encouraged deep processing through a sequence of activities beginning with associations, comprehension activities, and generative activities. Principle 3 promoted multiple exposures. These guidelines were used in the Whole Word Meaning condition that consisted of an overview, six instructional lessons, and two review lessons. As shown in Table 6, the Whole Word Meaning lessons provided seven exposures to each lesson word, and two additional exposures occurred in a review lesson for a total of nine exposures.

Table 6. Exposures for Each Lesson Word During Whole Word Meaning Instruction

Location	Activity
Instruction	1. Word introduced with Scenario and Question
	2. Word Meaning
	3. Example and/or Non-example
	4. Prompt
Practice Worksheet	5. Student Examples
	6. Sentence Completion (sentence stems)
	7. Word/Meaning Match
Review Lesson	8. Word/Meaning Match
	9. Word/Example Match

3.4.2.1 Whole Word Meaning Overview and Lesson 1

First, an overview served as an introduction to Whole Word Meaning. The instructor introduced the steps for Whole Word Meaning by using the demonstration word, *unties*. The steps for "Whole Word Meaning" were as follows:

1. Read Scenario: During "Read Scenario," the instructor read the lesson word and an experimenter-constructed passage containing the lesson word. The purpose of this activity was to provide contextual information that makes inferences to the meaning of the lesson word.

2. Ask Question: This activity used a teacher-initiated question to confirm or clarify students' understanding of the lesson word as represented in the passage.

3. Example or Non-Example: The instructor read two situations and students confirmed as an example or rejected (non-example). (Same as those found in the Morphemic Analysis lessons.)

4. Prompt and Discussion: In this activity, the instructor read an experimenter-constructed prompt that required students to make a judgment about the lesson word. For example, "When would a table top be a quadrilateral, and when would it not?"

5. Writing a Definition: In this activity, the students worked in groups of two to four, generated a meaning for the lesson word, wrote the meaning on sentence strip, and displayed the sentence strip for comparison and instructor evaluation.

After a review and discussion of the meanings and the lesson word, an agreed upon definition was written by the instructor onto a large "Day Trip Map" on the location that matched the lesson word scenario. The purpose of this activity was to motivate students and demonstrate

that words take us to many destinations. The students then copied the lesson word and definition onto their individual "Day Trip Map" in the same location (See Appendix D for a student copy). This procedure was conducted for each of the four lesson words. Each Whole Word Meaning instructional lesson was represented by a new "Day Trip Map," for a total of six "Day Trip Maps." By copying the meaning onto their individual maps, students practiced writing each lesson word and meaning.

The steps for the Whole Word Meaning condition combined to promote students' active participation in processing and developing vocabulary meaning. These steps incorporated the three principles identified by Stahl (1986) and noted earlier. Principle 1, providing contextual and definitional information, and Principle 2, encouraging deep processing through a sequence of activities beginning with association, comprehension, and generative activities were all combined in the whole word meaning lesson. Additionally, these activities provided multiple exposures for the lesson words, Stahl's Principle 3.

3.4.2.2 Whole Word Meaning Practice Worksheet

After Whole Word Meaning instruction was completed on the four lesson words, a worksheet provided students with additional practice (Worksheet for Lesson 1 found in Appendix D). The structure of the worksheet materials in Whole Word Meaning mirrored the worksheet for Morphemic Analysis. Each Whole Word Meaning worksheet contained three parts: Part A: matching lesson words and meanings, Part B: naming examples for lesson words, and Part C: completing a sentence stem for each lesson word. This three-part format reviewed the lesson words and provided similar instructional exposures equal to the Morphemic Analysis condition as shown previously in Table 5. Procedures for completing the worksheets were as follows:

1. Matching lesson words and meanings (Part A): Students completed the matching activity independently (approximately 1 minute). A review followed to provide feedback on correct responses.

2. Naming examples for lesson words (Part B): Students verbally provided examples along with explanations for each lesson word. The instructor confirmed or corrected student responses and explanations. The students recorded correct responses onto their worksheets.

3. Sentence Stems (Part C): Students completed four sentences independently (about 3 minutes). Afterwards, students shared their sentences, and the instructor confirmed or corrected student responses.

3.4.2.3 Whole Word Meaning Review Lessons

Similar to the Morphemic Analysis review lessons, two Whole Word Meaning review lessons, one after the third lesson and one after the sixth lesson, were designed to review lesson words from the three previously instructed lessons. After lesson 3, Whole Word Meaning Review 1 (See Appendix E for review lesson) covered the 12 prefixed lesson words presented in the previous three lessons. After lesson 6, Whole Word Meaning Review 2 covered lesson words from lessons 4-6.

Each review lesson contained two activities, matching lesson words and meanings and matching lesson words and examples. These activities corresponded to the Morphemic Analysis review activities in the following manner: categorizing prefixes into families and identifying meanings corresponded to matching lessons words and meanings; matching lesson words and examples was an identical activity used in both conditions.

1. Matching lesson words and meanings: After displaying a slide, the students read the 12 lesson words that were placed alphabetically in a word box. Next, 12 meanings were displayed. Students matched each lesson word to a meaning that was either confirmed or corrected by the instructor. Correct responses were displayed by the instructor on the slide.

2. Matching lesson words and examples: Using a slide with the same lesson words, 12 examples were displayed. Students matched each lesson word with an example and provided an explanation that was either confirmed or corrected by the instructor. Correct responses were displayed by the instructor on the slide.

3.5   SUMMARY OF INSTRUCTIONAL CONDITIONS

A concerted effort was made to equalize the two conditions. As shown in Table 7, the number of exposures was the same for both conditions. Both conditions used instructional activities that provided instructor modeling, student participation and practice, and a sequencing of activities to encourage deep processing. Both conditions covered the same number of lessons and lesson words. By equalizing the two conditions, Morphemic Analysis and Whole Word Meaning, this study attempted to answer the following questions:

1. What were the effects of Morphemic Analysis and Whole Word Meaning instruction on students' learning the meanings of prefixes?

2. What were the effects of Morphemic Analysis and Whole Word Meaning instruction on students' learning the meanings of instructed prefixed words?

3. What were the effects of Morphemic Analysis and Whole Word Meaning instruction on students' ability to infer the meanings of uninstructed prefixed words?

No previous studies simply compared the effects of these two types of vocabulary instruction on the same prefixed words.

Table 7. Comparison of Exposures for Each Lesson Word

Location	Morphemic Analysis Activity	Whole Word Meaning Activity
Instruction	1.Prefix & Word Analysis	1. Word and Scenario
	2. Word Meaning	2. Word Meaning
	3. Example and/or Non-example	3. Example and/or Non-example
	4. Student Examples	4. Prompt
Practice Worksheet	5. Prefix Match	5. Student Examples
	6. Silly Words	6. Sentence Stems
	7. Word/Meaning Match	7. Word/Meaning Match
Review Lesson	8. Categorizing Prefixes	8. Word/Meaning Match
	9. Word/Example Match	9. Word/Example Match

3.6   PRETEST/POSTTEST

An experimenter designed three-part pretest/posttest measure that covered prefixes, lesson words, and transfer words is found in Appendix E. Prefixes assessed were the 24 prefixes chosen for inclusion in this study. Lesson words were the 24 instructed prefixed words used in both conditions, and transfer words were the 24 uninstructed prefixed words that contained the same prefixes as the lesson words.

For analysis purposes, the pretest/posttest was disaggregated into three parts, Part A: Prefixes, Part B: Lesson Words, and Part C: Transfer Words. Each part was a 24 item, 5-option, multiple-choice test that examined students' knowledge of either prefixes and meanings, lesson words and meanings, or transfer words and meanings. Five options reduced the chances for guessing to 20% and was a manageable number that could be used in the construction of all three parts, Part A, Part B, and Part C. All test items were presented in isolation (i.e. no context provided to prevent information clues). This three-part pretest/posttest measure was administered at the beginning of the study and at the end of the study on three separate days as shown in Table 8. One day was spaced between tests to reduce the chances that overlapping information could influence results. The testing order for the pretest and posttest was reversed as shown in Table 8. First, the testing order of the pretest attempted to determine if the knowledge of transfer words and lesson words influenced prefix knowledge. Next, the testing order of the posttest attempted to determine if prefix knowledge influenced lesson word knowledge, and if prefix and lesson word knowledge influenced knowledge of transfer words.

On each day of testing, directions were read to the students by the instructor; after which, the students completed a five-option multiple choice test consisting of 24 items. Each test administration took approximately 30 minutes. Three weeks lapsed after administering the three-part pretest before instruction began for both conditions. The purpose for this delay was to allow enough time to lapse so testing would be less likely to influence instruction.

3.7   SCHEDULE OF PROCEDURES

The Morphemic Analysis and Whole Word Meaning conditions followed the same schedule for lessons and testing.   After administering the pretests, instruction was delayed for three weeks.

Table 8. Schedule of Activities for Both Conditions

Week	Activity	Sequence
1	Three- Part Pretest	Day 1: Part C (Transfer Word Test)
		Day 3: Part B (Lesson Word Test)
		Day 5: Part A (Prefix Test)
5	Instruction	Day 1: Overview and Lesson 1
		Day 2: Lesson 2
		Day 3: Lesson 3
		Day 4: Review Lesson 1
6	Instruction	Day 1: Lesson 4
		Day 2: Lesson 5
		Day 3: Lesson 6
		Day 4: Review Lesson 2
7	Three-Part Posttest	Day 1: Part A (Prefix Test)
		Day 3: Part B (Lesson Word Test)
		Day 5: Part C (Transfer Word Test)

Instruction in each condition was scheduled for a four-day period each week for two weeks. Both conditions followed the same lesson schedule. After the last review lesson, the posttest measures were immediately administered in the order shown in Table 8.

The duration for each lesson is shown in Table 9. The first lesson for both groups included an introduction; therefore, time for this lesson was increased for all groups.

Instructional lessons for the Morphemic Analysis condition ranged from 24-30 minutes, and the Whole Word Meaning condition ranged from 25-38 minutes. Differences in lesson duration appeared to be a result of student participation. Review lessons for Morphemic Analysis ranged from 13-16 minutes and Whole Word Meaning ranged from 13-15 minutes. Overall, the total instructional time for both conditions varied minimally over the length of the study.

Table 9. Instructional Time

Lesson	MA (Class 1)	MA (Class 3)	WW (Class 2)	WW (Class 4)
Overview & L1	35	40	40	36
L2	25	25	25	30
L3	25	25	25	28
Review L1	13	14	15	15
L4	25	24	32	30
L5	30	25	35	37
L6	27	30	32	38
Review L2	14	16	15	13
TOTAL	194 m (3h15m)	199m (3h20m)	219m (3h39m)	207 (3h27m)
Average m/word	8.1	8.3	9.1	8.6

4.0   RESULTS

The purpose of this study was to assess the effects of Morphemic Analysis (MA) and Whole Word Meaning (WW) methods on students' learning the meanings of prefixes, meanings of instructed prefixed words, and the ability to transfer this knowledge to untaught prefixed words.

Data from pretest and posttest assessments on each measure, prefixes, lesson words, and transfer words, were statistically analyzed to compare students in the two methods. Also, relationships among the three measures, prefixes, lesson words, and transfer words, were investigated for each method. The purpose was to identify any relationships among measures within each method. Next, comparisons between the two methods investigated whether one method was more effective in generalizing to untaught prefixed words.

An item analysis was conducted on the three measures in this study, 24 prefixes, 24 lesson words, and 24 transfer words. The purpose was to first analyze students' performance on each item, then look for similarities among related items (i.e. quadr-, quadrilateral, and quadriplegic), and finally make comparisons as a function of method.

4.1 STATISTICAL ANALYSIS OF DATA

A two-way (time x condition) mixed ANOVA was performed on each measure, prefixes, lesson words, and transfer words. The ANOVA examined the effects of method (MA, WW) and time (pretest, posttest) on the three measures in this study.

4.1.1 Prefix Knowledge

To determine whether there were differences in the amount of prefix knowledge gained as a function of the two methods of instruction, a 2 x 2 mixed analysis of variance was performed on prefix scores as a function of method (MA, WW) and time (pretest, posttest). The assumption of normality was met (see Appendix G).

Results of the ANOVA for the prefix measure, as shown below in Table 10, indicated that everyone improved significantly on prefixes after instruction ($F(1, 73) = 149.06$, $p < .001$, partial $\eta^2 = .671$).

Table 10. Prefix Means and Standard Deviation Scores for MA and WW

Method	Pretest		Posttest	
	M	SD	M	SD
MA	10.34	3.850	16.68	4.231
WW	10.32	3.473	12.51	4.519

When turning to each condition, it can be seen in Table 10 that the MA means increased approximately 6 points from pretest to posttest, compared to the WW score that increased approximately 2 points. That difference between the amount of increase in the two methods was

significant ($F(1, 73) = 35.32$, $p < .001$, partial $\eta^2 = .326$). A graph of this interaction can be seen

in Figure 3. The MA group made a significantly greater gain than the WW group. It can also be

seen in this figure that pretest means were virtually equal for the two groups; therefore, the data

suggested that the gain for the MA group was a result of the direct instruction of prefixes that

was a major component of MA instruction.
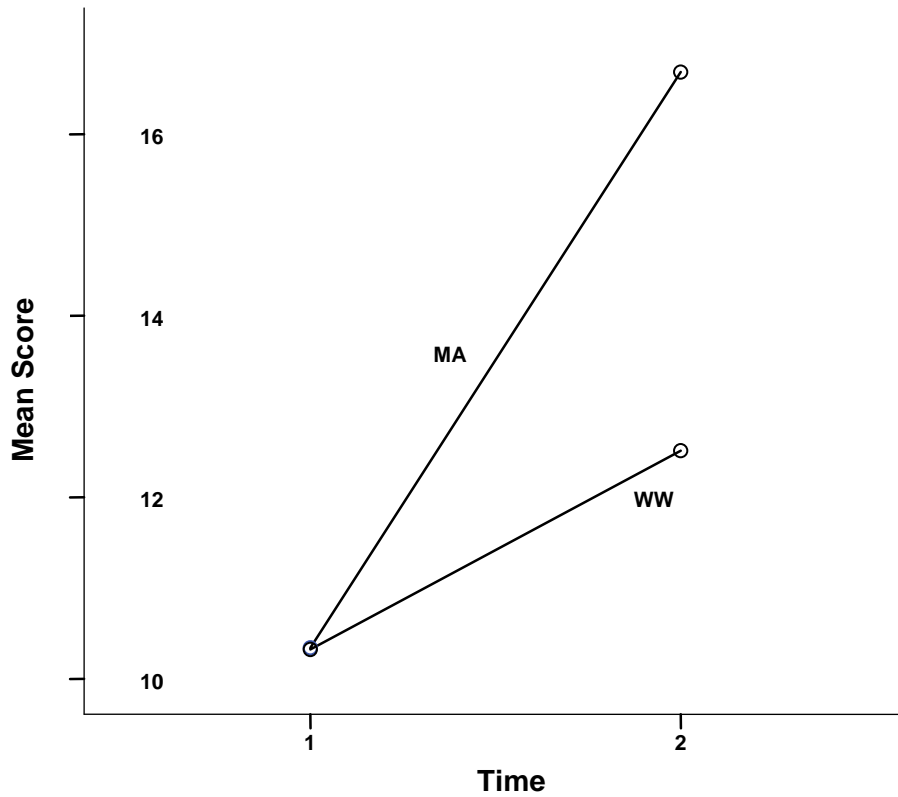
Figure 3. Graph of Interaction of Prefix Results between MA and WW

4.1.2 Lesson Words

Lesson words were assessed to determine whether one of the methods, MA or WW, was more effective in producing gains in lesson word knowledge over time, pretest to posttest. Next, prefix and lesson word measures were compared by method to investigate possible relationships between the prefix and lesson word measures.

A 2 x 2 mixed analysis of variance (ANOVA) was performed on lesson word scores as a function of method (MA, WW) and time (pretest, posttest). Results of the Shapiro-Wilk test of normality were significant for post lesson words (see Appendix G). Data for post lesson words indicated the possibility of a ceiling effect; therefore, the data were negatively skewed. However, departure from normality was not extreme and the results were robust.

Results of the ANOVA for lesson words, as shown below in Table 11, indicated that everyone improved significantly on lesson words after instruction ($F(1, 73) = 585.28$, $p < .001$, partial $\eta^2 = .889$).

Table 11. Lesson Word Means and Standard Deviation Scores for MA and WW

Method	Pretest		Posttest	
	M	SD	M	SD
MA	9.50	3.160	18.87	3.871
WW	9.51	2.893	19.05	4.123

Also, as shown in Table 11, both groups, MA and WW, made large gains from pretest to posttest and increased in mean scores by approximately 9 points. Therefore, when comparing the two methods, virtually no difference was found ($F(1, 73) = .048$, $p = .826$, partial $\eta^2 = .001$).

The similar lesson word mean scores for the MA and WW groups suggested the following conclusions. Pretest mean scores indicated that both groups were similar on lesson word knowledge before instruction. Posttest mean scores indicated that the design of both vocabulary methods were extremely effective and balanced. However, from a comparison of prefix and lesson word data, it can be suggested that the WW group was not as successful in deriving the meaning of the prefix from learning the meaning of the whole word, i.e. lesson word. After direct instruction of lesson words through the WW method, the question had been posed as to whether the students might be able to extract the meanings of the prefixes from the definitional information that they had acquired on the lesson words. The posttest prefix means, 16.68 for MA and 12.51 for WW, suggested that the direct instruction of prefixes in the MA method was more productive for learning the meanings of prefixes.

4.1.3   Transfer Words

Transfer words, untaught prefixed words, were assessed to determine the effect of MA and WW instruction on students' ability to derive meaning for untaught prefixed words that contained prefixes similar to those found in the lesson words. Also, this data made it possible to investigate which method of instruction provided a stronger foundation for deriving meaning from instructed prefixed words to untaught prefixed words.

A 2 x 2 mixed analysis of variance was performed on transfer word scores as a function of method (MA, WW) and time (pretest, posttest). The assumption of normality was met (see Appendix G).

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Results of the ANOVA for transfer words, as shown below in Table 12, indicated that everyone improved on transfer words after instruction (F(1, 73) = 72.54, p < .001, partial η^2 = .498).

Table 12. Transfer Word Means and Standard Deviation Scores for MA and WW

Method	Pretest		Posttest	
	M	SD	M	SD
MA	10.61	3.000	14.82	4.904
WW	9.86	3.809	12.24	4.518

When turning to each method, it can be seen in Table 12 that the MA mean increased approximately 4 points from pretest to posttest, compared to the WW mean that increased approximately 2 points. That difference between the increase was significant (F(1, 73) = 5.61, p = .021, partial η^2 = .071). As shown in Figure 4, a graph of this interaction indicates that the MA group made greater gains than the WW group.
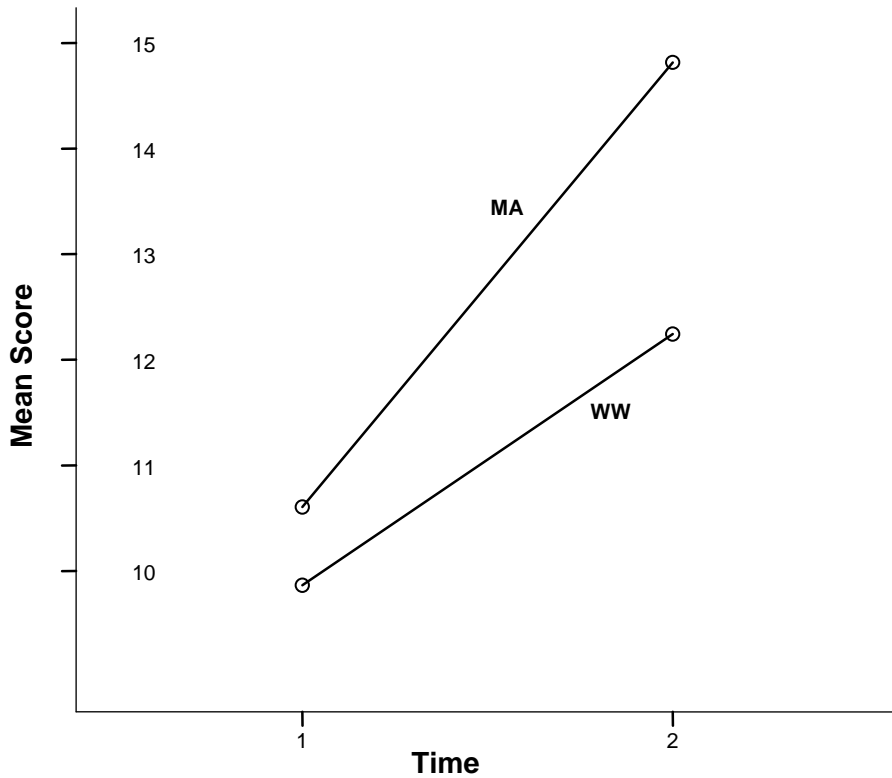
Figure 4. Graph of Interaction of Transfer Word Results between MA and WW

When comparing the relationship of the three measures, prefixes, lesson words, and transfer words, the data suggested that of the two methods, MA was more successful in generalizing instructed information from prefixed words to untaught prefixed words. The MA and WW groups differed primarily in data from the prefix measure; therefore, it can be hypothesized that the direct instruction of prefixes, a component of MA instruction, was responsible for the greater gain in mean scores for transfer words, 14.82 for MA compared to 12.24 for WW.

4.1.4 Summary of Statistical Results

The statistical results suggested that the MA and WW groups were similar at the beginning of the study. Therefore, gains that occurred over the time of the study, pretests to posttests, could reasonably be attributed to the MA or WW instruction from this study.

The MA group performed significantly better than the WW group on the prefix measure, and this suggested that the direct instruction of prefixes that was a component of the MA method affected the outcome of the prefix measure. Both groups made significant gains on the lesson word measure, suggesting that instruction of lesson words through both methods was balanced and equally effective. On the transfer word measure, both groups gained over time; however, the MA group made twice the amount of gain. The greater increase of the MA group suggested that the direct instruction of prefixes found in this method may have contributed to the increased gain on transfer words.

In summation, the data results suggested that the MA method was more effective in students learning prefixes and meanings, equally as effective as WW in learning instructed prefixed words, and more effective in determining the meanings of untaught prefixed words that contained similar prefixes.

4.2   ITEM ANALYSIS

In order to show student performance on each item measured in the pretest and posttest measures, an item analysis was conducted as a function of method, MA and WW. The following discussion focuses on comparing the items that were most commonly known, least commonly

known, and those items that differed to a large degree between the two instructional methods. The item analysis was used to evaluate performance on 24 prefixes, 24 lesson words, and 24 transfer words measured in the pretests and posttests of this study. The percentages of correct responses were calculated for each item as a function of method, MA and WW.

4.2.1 Item Analysis of Prefixes

Shown in Table 13 are the percentages of students with correct responses for each of the 24 prefixes from the pretest and posttest measures for each method, MA and WW. As can be seen for both groups, some prefixes showed high percentages before any instruction (e.g., *penti-*), some showed high gains after instruction (e.g., *inter-*), and some showed minimal or no gains after instruction (e.g., *anti-*).

Table 13. Percentage of Correct Responses on Prefix Items for Pretest and Posttest

	penti-	hyper-	pre-	qua-	kilo-	circum-	mal-	centi-	counter-	poly-	inter-	ultra-	post-	dys-	intra-	anti-	syn-	epi-	trans-	dia-	hypo-	para-	peri-	ante-
MA Post	100	100	97	95	84	84	84	82	82	79	79	74	71	68	68	63	63	63	58	45	37	37	29	26
MA Pre	97	66	95	68	63	45	37	55	50	55	47	34	50	34	24	58	24	11	24	39	21	13	18	5
WW Post	86	89	95	81	62	59	35	43	65	81	78	70	54	43	49	62	32	22	32	41	8	14	24	24
WW Pre	84	81	89	84	65	43	38	49	54	54	46	51	35	27	35	57	19	16	19	22	16	16	16	16

As seen next in Figures 5 and 6, line graphs display comparisons of the percentages of correct responses for each of the 24 prefix items from the pretest and posttest measures for each method.
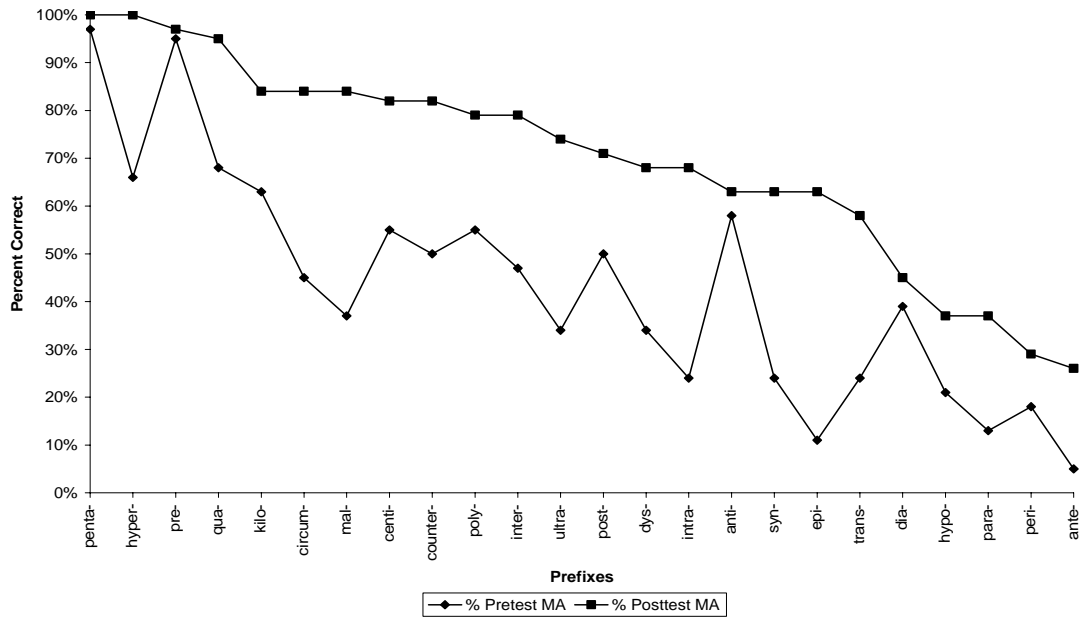
Figure 5. Graph of Prefix Items on Pretest and Posttest – MA
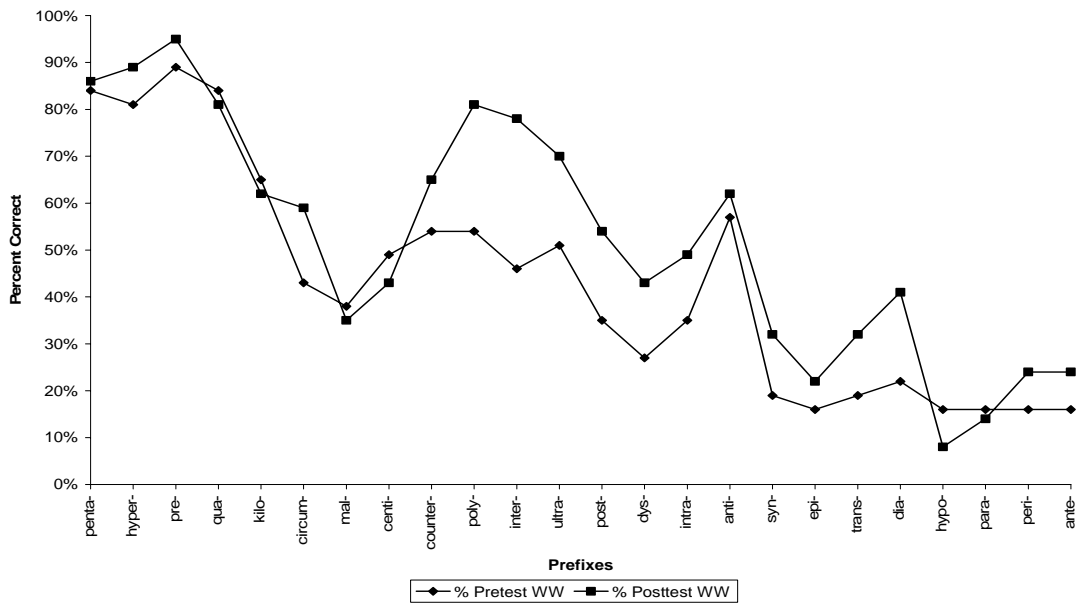
Figure 6. Graph of Prefix Items on Pretest and Posttest – WW

From looking at Figures 5 and 6, four prefixes, *penta-*, *hyper-*, *pre-*, and *qua-*, appear to be the most commonly known by subjects on the pretest and posttest measures for both methods. The least commonly known for both methods were four prefixes, *hypo-*, *para-*, *peri-*, and *ante-*. Here, it appears that even the direct instruction of prefixes in the MA method required a different or greater amount of instructional exposure to cause a substantial gain.

In the MA method, all prefix items improved on the posttest. However, in the WW method, very little improvement occurred between the pretest and posttest measures, except for two prefix items, *poly-* and *inter-*. Also, six items showed losses of between 2-8 percent. What can be said is that the direct instruction of prefixes in the MA method did affect greater gains in prefix knowledge than the WW method.

4.2.2   Item Analysis of Lesson Words

Shown in Table 14 are the percentages of students with correct responses for each of the 24 lesson words from the pretest and posttest measures for each method, MA and WW. As can be seen for both groups, some lesson words appeared to have been well-known before instruction (e.g., *quadrilateral*) and some lesson words indicated significant gains after instruction (e.g., *polychrome*). Also, a few lesson words (e.g., *intramural*) could be identified as the least known by students before and after instruction.

	quadrilateral	hyperactive	centimeter	pentadactyl	dysfunction	counteract	circumnavigate	kilowatt	ultraconservative	paraphrase	precaution	antinuclear	periscope	antedate	epilogue	polychrome	transcribe	hypoallergenic	maladjusted	international	synchronize	postscript	dialogue	intramural
MA Post	100	100	95	92	89	89	89	87	87	87	84	82	82	79	79	79	68	68	68	63	63	58	53	45
MA Pre	92	84	87	32	63	45	34	61	39	32	42	45	29	32	18	11	29	21	21	39	34	26	18	16
WW Post	97	97	89	97	89	70	76	78	86	73	92	76	95	78	76	92	65	78	70	68	76	86	57	43
WW Pre	92	73	89	35	68	49	24	62	43	46	57	46	24	43	24	11	22	22	22	22	30	32	5	11

As seen below in Figures 7 and 8, line graphs display comparisons of the percentages of correct responses for each of the 24 lesson word items from the pretest and posttest measures for each method, MA and WW.
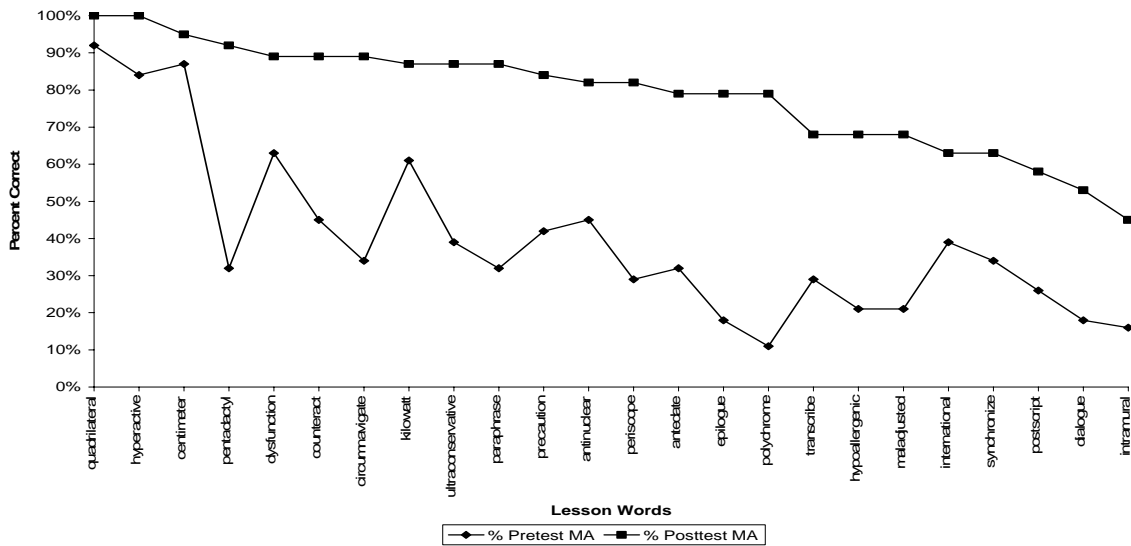

Figure 7. Graph of Lesson Word Items on Pretest and Posttest - MA
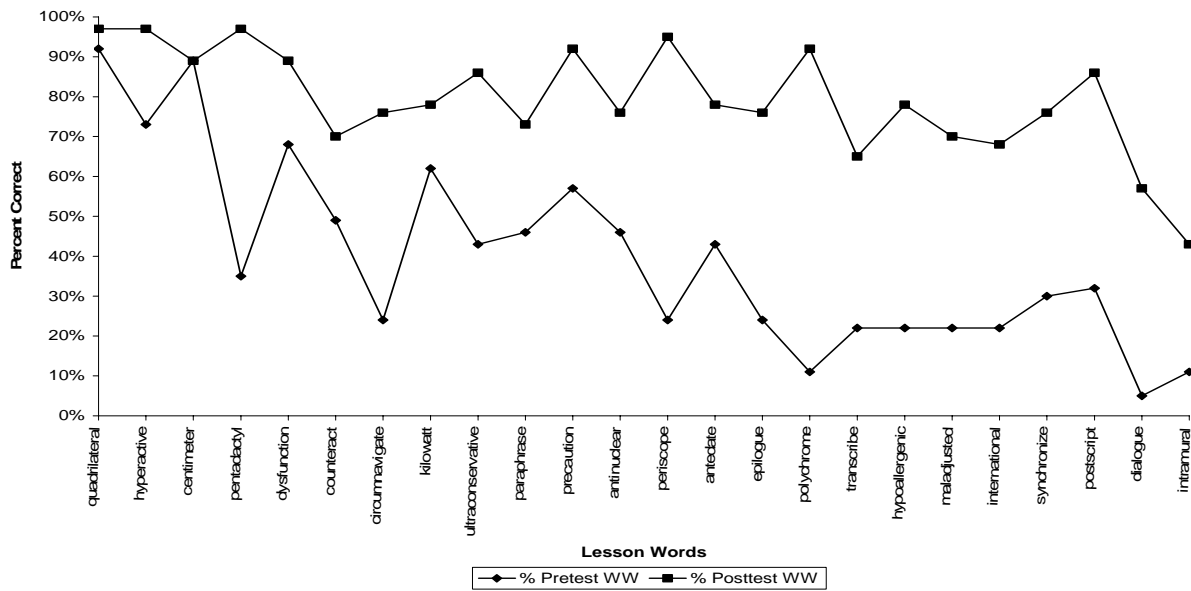
Figure 8. Graph of Lesson Word Items on Pretest and Posttest - WW

Shown above in Figures 7 and 8, three lesson words, *quadrilateral*, *hyperactive*, and *centimeter*, appeared to be the most commonly known by students in the pretest and posttest measures for both methods. The majority of the lesson words indicated substantial improvement after instruction for both methods. Two of the least commonly known lesson words in the pretest and posttest measures for MA and WW methods appeared to be *intramural* and *dialogue*; however, their percentages of gain were significant, ranging form 29-52 percent. The question remains as to whether some lesson words required additional or different instruction to reach a high percentage of correct responses. Overall, both methods appeared to have been equally successful for students learning lesson words from instruction.

4.2.3 Item Analysis of Transfer Words

Shown in Table 15 are the percentages of students with correct responses for each of the 24 transfer words from the pretest and posttest measures for each method, MA and WW.

Table 15. Percentage of Correct Responses on Transfer Word Items

	pentagon	translate	kilogram	malfunction	quadriplegic	circumspect	diagonal	perimeter	antisocial	counterproposal	centennial	ultramodern	intervene	hypercritical	postwar	prejudice	intramuscular	polysyllabic	antebellum	dysgenics	synthesis	epidermis	paradigm	hypodermic
MA Post	89	89	89	89	82	76	74	66	66	63	63	63	61	61	58	58	53	50	47	45	42	37	34	26
MA Pre	92	74	71	68	66	26	76	89	66	34	26	21	53	32	45	45	29	24	8	26	26	24	16	24
WW Post	89	78	76	84	76	59	78	81	68	49	41	38	41	49	46	41	59	49	16	30	24	27	24	3
WW Pre	86	65	70	73	65	41	65	81	46	30	14	27	49	24	24	32	49	27	8	27	24	14	35	11

As seen next in Figures 9 and 10, line graphs display comparisons of the percentages of correct student responses for the 24 transfer word items from the pretest and posttest measures for each method.
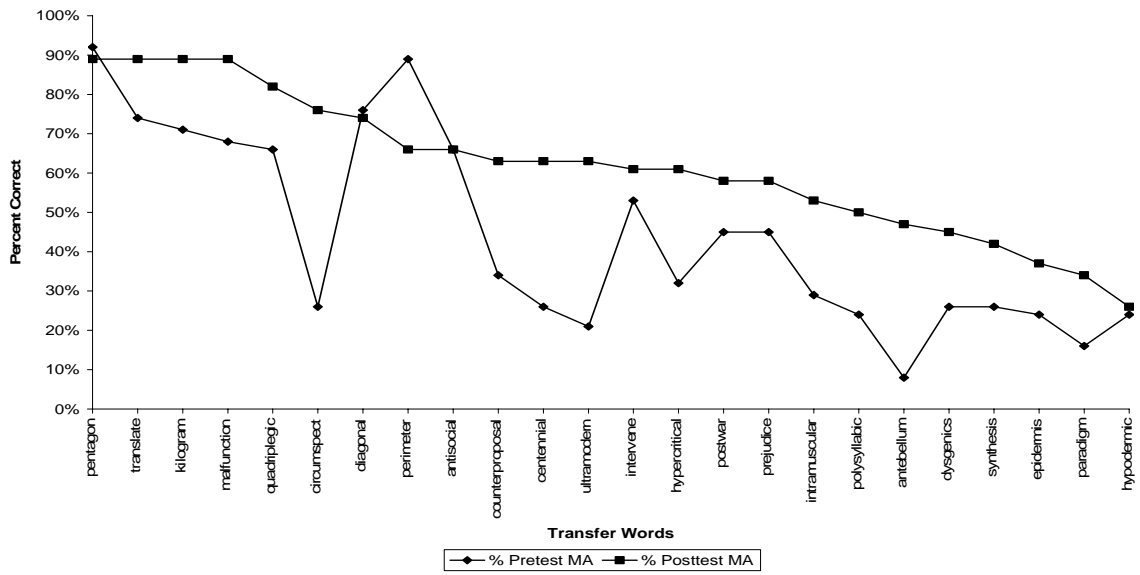
Figure 9. Graph of Transfer Word Items on Pretest and Posttest - MA
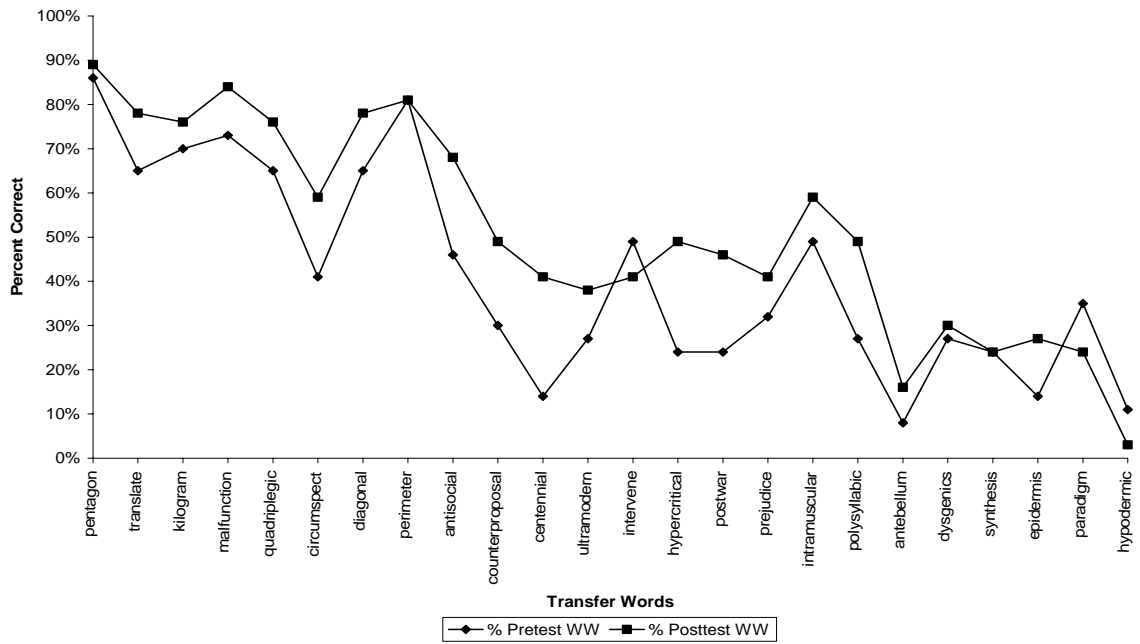
**Figure 10. Graph of Transfer Word Items on Pretest and Posttest - WW**

55

Figures 9 and 10 indicated that for both groups the transfer word, *pentagon*, was a commonly known item, and the transfer word, *hypodermic*, was a least commonly known item. Also shown in Figure 9, the MA method indicated improvement on 19 of the 24 transfer words, almost no change on 4 transfer words, *pentagon*, *diagonal*, *antisocial*, and *hypodermic*, and a marked decrease on the transfer word, *perimeter*. Also shown in Figure 10, the WW method indicated improvement on 17 of the 24 transfer words, almost no change on 4 transfer words, *pentagon*, *perimeter*, *dysgenics*, and *synthesis*, and a slight decrease on 3 transfer words, *intervene*, *paradigm*, and *hypodermic*. Overall, the MA method improved more than the WW method. The question remains as to why there was not greater improvement for transfer words?

4.2.4   Summary of Item Analysis

The item analysis provided detailed information on the three areas identified for assessment in this study: prefixes, lesson words, and transfer words. Also, the item analysis made it possible to look for similarities among items across the three measures, i.e. *penta-, pentadactyl, pentagon*. To verify item difficulty in the three measures, a point-biserial correlation was performed on each item (range .965 – 1.000); the correlation analysis supported the item proportions that were represented in the tables for each measure.

The item analysis indicated that gains in prefix knowledge were greater and affected more consistently across prefix items by the MA method compared to the WW method of instruction. All prefix items in the MA condition improved; however, six items in the WW indicated no improvement. Also, the item analysis of the pretests indicated that many students from both groups had previous knowledge of some prefixes, i.e. *pre-*, *penta-, hyper-, qua-*; this data was supported by similar high scores on the posttests. It can be concluded that students are

gaining some prefix knowledge by the time they reach sixth grade, but the question is how? Even though the MA group made substantial gains in prefix knowledge, why did some prefixes (e.g., *ante-*) not reach high percentages of correct responses even after the direct instruction of prefixes, a major component of the MA method?

Lesson word knowledge appeared to improve similarly from MA and WW instruction. The MA condition improved on all items, and the WW condition improved on 23 of the 24 items. Pretest and posttest scores indicated that the lesson words, *pentadactyl, hyperactive, precaution,* and *quadrilateral,* were commonly known as were their prefixes in both groups. However, some lesson words (e.g., *intramural*) did not reach a high percentage of correct responses for either group. The question remains as to what changes in instruction would be necessary for all lesson words to reach high percentages of correct responses?

On transfer words the MA method indicated greater gains than the WW method. The MA condition improved on 20 items, and the WW condition improved on 19 items. Transfer words, *pentagon* and *quadriplegic*, received similarly high scores for both groups as did their prefixes and lesson words mentioned above (e.g., *penta-, pentadactyl, pentagon*). The question here remains as to why there were not greater gains on transfer words, especially for the MA method that contained direct instruction of prefixes?

In conclusion, the item analysis suggested that prefix items improved more consistently in the MA method, lesson word items improved similarly in both methods, and transfer words improved more for the MA than the WW method. However, many questions remain to be answered in future research.

5.0   CONCLUSION

This chapter summarizes the findings of this study on the effects of two methods of vocabulary instruction, Morphemic Analysis and Whole Word Meaning, on students' vocabulary knowledge of prefixes, instructed prefixed words, and untaught prefixed words. The chapter also discusses implications for these two methods of vocabulary instruction.   Finally, it presents recommendations for future research in vocabulary instruction.

5.1   RESEARCH QUESTIONS

5.1.1   Research Question 1: What are the effects of Morphemic Analysis and Whole Word Meaning instruction on students' learning the meanings of prefixes?

The data from this study indicate that students performed significantly better in learning prefixes when presented with the MA method (means: pre 10.34, post 16.68) compared to the WW method (means: pre 10.32, post 12.51). The direct instruction of prefixes, a component in the MA method, appeared to be responsible for the prefix knowledge gained by students in this group, a mean gain of six points. It is also of interest that without direct instruction, the WW group gained prefix knowledge, a mean gain of about two points.

It is not surprising that if you are directly taught prefixes, you will learn them. However, why did the MA group average 16.68; why didn't they learn 24? A possible answer might be that some students needed more time, number of exposures, and types of instructional activities to learn taught information. Also, some of the prefixes were more difficult than others, and those prefixes would logically require additional instruction and review.

A second possible advantage for the MA group could have been the grouping of prefixes into families. By grouping prefixes, students could have taken advantage of this added connection during assessments. As stated previously, prefixes have been grouped into families in recent studies (Baumann et al., 2002; Baumann et al., 2003), and Nation (2001) stated that grouping connects related information and reduces processing time. Therefore, it could be said that the MA group had a double advantage for learning prefixes, direct instruction of prefixes and grouping of prefixes into families. This strategy could be seen as an efficient and effective use of instructional time.

5.1.2   Research Question 2: What are the effects of Morphemic Analysis and Whole Word Meaning instruction on students' learning the meanings of instructed prefixed words?

Students from both groups made significant gains from instruction, MA (means: pre 9.50, post 18.87) and WW (means: pre 9.51, post 19.05). Interestingly, the great effort and attention to balancing the two methods suggested that effective vocabulary instruction, regardless of the method, will produce substantial gains for taught words. However, what is important to question is why they didn't learn all 24 instructed prefixed words. Again, a possible answer may be that

some words may require a greater amount or different instruction. It is of importance that according to this study, students learned an average of nine words.

5.1.3   Research Question 3: What are the effects of Morphemic Analysis and Whole Word Meaning instruction on students' ability to infer the meanings of uninstructed prefixed words?

The MA method was more effective than the WW method on uninstructed prefixed words.   The MA method increased mean score by approximately 4 points (pre 10.61, post 14.82), and the WW method mean increased by approximately 2 points (pre 9.86, post 12.24). Although the finding is significant, it is still the case that the MA group only scored 2 points more than the WW group. Thus, how far can prefix knowledge transfer to untaught words? The issue may be in the root. Not knowing the meaning of the root could greatly hinder the word analysis process and the ability to infer meaning. Therefore, it is likely that knowledge of the prefix is not enough to aid in determining the meaning of an unfamiliar prefixed word.

5.2   LIMITATIONS

The findings of this study need to be placed in the context of several limitations. One limitation addresses the prefixes, lesson words, and transfer words chosen for this study.   Another limitation concerns the design of the study and allotment of time. The last limitation focuses on the grade level targeted for instruction, instructor, and assessments.

First, results were limited to the morphemic elements (prefixes) that were taught. Only 24 prefixes were chosen for inclusion in this study. By placing these prefixes into six families, other possible choices were not considered. Also, many additional prefixes could have been placed into any of these six prefix families: number, time, amount, judgment, direction, and placement.

Instructional time was limited to approximately 8-9 minutes per lesson word over the course of the study. Instruction focused on only four prefixes and four prefixed words per lesson as found in the MA condition or on four prefixed words per lesson as found in the WW condition.

Results were limited to the 24 lesson words and 24 transfer words chosen for this study. The design of the study was such that for each selected prefix, one prefixed lesson word and one prefixed transfer word were coordinated. Additionally, the selection of a lesson word and a transfer word for each prefix was more limited for some prefixes than others, i.e. *ante-*.

Results were limited to the experimenter-constructed measures used for data analysis. The three pretest-posttest measures used for data analysis were experimenter-constructed and may have limited validity. It remains to be determined whether results could be replicated by another teacher in a sixth-grade classroom.

5.3   FINAL COMMENTS

With consideration of the limitations noted above, the present study points to the benefit on prefix knowledge (four points) for the MA group, as well as a two point advantage for transfer words.

This research study made a great effort to balance the two methods of instruction by using the same prefixed words, number of lessons, number of exposures, and amount of instructional time. Also, great attention was given to the types of activities chosen for the MA and WW conditions as a means of developing word meaning and in an attempt to achieve what was mentioned previously in this study as effective vocabulary instruction. The following will be a discussion of the strengths identified for each vocabulary method, Morphemic Analysis and Whole Word Meaning.

Both methods of instruction, MA and WW, were equally effective in the learning of lesson words. The reason for this outcome was that the design of each method included activities that extended vocabulary instruction beyond what had been identified previously in this study as traditional vocabulary instruction. In traditional vocabulary instruction, most often words receive attention before reading by reading the word and definition. Next, the word is read in a specific text. Instruction often lasts less than a minute and rarely goes beyond the single text. However, MA and WW methods provided 8-9 minutes of instructional time per word, multiple exposures to each lesson word, a review lesson, and a variety of activities that extended the meaning of the word beyond one context.

Now, the next step is to consider how instruction can be improved to produce high performance scores on all taught prefixed words. What would result from a combination of the key components from both methods? One consideration would be to combine the components of both methods by adding two activities from the WW method, Scenario/Question and Prompt, to the MA method. Thus, instructional time and number of exposures would be increased. Also, students could be questioned as to words that they know containing the selected prefix. This discussion would connect new information with the students' prior knowledge. Finally, more

than one lesson word could be taught with each prefix as a means of providing additional practice with the prefix and meaning.

The remaining variable in prefixed words is the base or root. Would students be better able to derive the meanings of prefixed words if they were familiar with the meaning of the root? Student performance on untaught prefixed words could have been influenced by their lack of knowledge of the root. Therefore, could benefits come from instruction in the meanings of common roots? The root carries the majority of a word's meaning that is then altered by the meaning of the prefix. Consequently, it would seem logical that learning the meanings of common roots would be beneficial to students' vocabulary knowledge and inferring meanings of unfamiliar prefixed words (e.g., *polychrome* = poly- = many, chrom = color).

5.4   RECOMMENDATIONS FOR FUTURE RESEARCH

Further research is clearly needed. First, further experimental research is needed to establish a standardized model for MA instruction and possibly add key components from the WW method. Also, further research is needed to explore what prefixes to teach, how many prefixes to teach, and at what grade levels.

Further extending the possibilities for MA instruction, a natural progression would be to incorporate Greek and Latin roots into MA instruction. Future studies should include classroom teachers as instructors and incorporate MA instruction into language arts as well as other subject curriculums. This challenge would require a universal set of procedures for MA instruction that

could be used across subject areas, on different grade levels, and on numerous unknown polymorphemic words.

Another area for future research would be to explore the role of the prefix family in gaining prefix knowledge. How much gain for the MA group was caused by grouping prefixes into families? One possibility, the same study could be conducted without grouping prefixes into families. Another possibility, two MA groups could receive instruction on prefixed words; one group instruction would not include the grouping of prefixes into families.

What this study does suggest is that there is a place for Morphemic Analysis in vocabulary instruction. A clearer picture needs to be determined through future research.

APPENDIX A

APPROVAL LETTERS

University of Pittsburgh
Institutional Review Board

Exempt and Expedited Reviews

3500 Fifth Avenue
Suite 100
Pittsburgh, PA 15213
Phone: 412.383.1480
Fax: 412.383.1508

University of Pittsburgh FWA: 00006790
University of Pittsburgh Medical Center: FWA 00006735
Children's Hospital of Pittsburgh: FWA 00000600

TO: Ms. Donna Talerico,

FROM: Christopher M. Ryan, PhD, Vice Chair

DATE: February 2, 2007

PROTOCOL: Comparison of Two Vocabulary Instruction Conditions: Morphemic
Analysis and Whole Word Meaning

IRB Number: 0701094

The above-referenced protocol has been reviewed by the University of Pittsburgh
Institutional Review Board. Based on the information provided in the IRB protocol, this
project meets all the necessary criteria for an exemption, and is hereby designated as
"exempt" under section 45 CFR 46.101(b)(1).

- If any modifications are made to this project, please submit an 'exempt
  modification' form to the IRB.

- Please advise the IRB when your project has been completed so that it may be
  officially terminated in the IRB database.

- This research study may be audited by the University of Pittsburgh Research
  Conduct and Compliance Office.

Approval Date: February 2, 2007

CR:kh

BETHLEHEM-CENTER SCHOOL DISTRICT

194 CRAWFORD ROAD, FREDERICKTOWN, PENNSYLVANIA 15333
PHONE: (724) 267-4910 • FAX: (724) 267-4904

KAREN S. DOWNIE, D.Ed.
Superintendent of Schools

JOSEPH A. NEPA
Business Manager

January 19, 2007

Mrs. Donna M. Talerico
2520 Chapelwood Drive
Pittsburgh, PA 15241

Dear Mrs. Talerico:

I am writing this letter in reference to your request to conduct an eight-day instructional study concerning several teaching strategies that reading literature and research suggest will improve students' vocabulary knowledge. Please be advised that I am approving your request according to the conditions as stated in your letter.

I wish you success in your endeavors and if you have any questions or concerns, please feel free to contact me.

Sincerely,

Karen S. Downie, D.Ed.
Superintendent

KSD/blr

Enclosure

APPENDIX B

MORPHEMIC ANALYSIS OVERVIEW AND LESSON 1

This section contains the following:

B.1: Overview lesson

B2: Lesson 1 Instruction

B3: Lesson 1 Practice Worksheet

B4: World of Words Puzzle Sheet and answer label.

B.1   MORPHEMIC ANALYSIS OVERVIEW

Morphemic Analysis Overview
<u>**Overview of "Word Analysis"**</u>

Write "Word Analysis" on the board.
Engage the students in a discussion concerning what "word analysis" is.
Ask: "What can you analyze about words?"   (Discuss the letters, syllables, units: roots, prefixes, and suffixes.)
Question students concerning these terms: **root, prefix, and suffix**.

Display Chart: Ask any student to read the chart, "Basic Units of Words."

Basic Units of Words

ROOT = Basic unit of a word that carries the major part of the meaning.

PREFIX = Unit that is added to the <u>beginning</u> of a "ROOT" to change its meaning.

SUFFIX = Unit that is added to the <u>end</u> of a "ROOT" to change the meaning, part of speech, or tense of a verb.

Display Chart: "Word Analysis Chart." This chart will serve as a template for all future lessons.

Word Analysis Chart
Word: _____

         Root: _____ = _____
         Prefix: _____=_____
         Suffix: _____=_____

Meaning of word: _____

---

*Use the steps for "Word Analysis" for the demonstration word and every lesson word.

<u>**Steps for "Word Analysis":**</u>
All lesson words will be introduced with the same five activities.
1. **Prefix Family Card:** Display and review.

2. **Introduce Lesson word:** Write on "Word Analysis Chart" and have word pronounced.
3. **Complete Word Analysis Chart:** Prompt students as needed by confirming or correcting responses and record on the chart:
   root and meaning
   prefix and meaning
   suffix and meaning (when applicable)
   meaning of word
4. **Example or Non-Example:** Question students concerning examples and/or non-examples.
5. **Student Examples:** Have students name examples and explain. Teacher will confirm or correct as needed. If no examples are suggested, move on to the next activity.

Demonstration Word: **unties**

1. Prefix Family Card: Not/Opposite Prefix Family:

> **Not/Opposite Prefix Family**
>
> un- = not or opposite

2-3.   Word Analysis Chart:
   Word: unties
          Root :   tie = fasten, attach, or bind together
          Prefix: un = not or opposite
          Suffix: s = added to mean third person singular tense
   Meaning of Word: not fastened, attached, or bound together.

4. "Explain the difference between these two sentences." Display and read.
          Bob <u>unties</u> his shoelaces.
          I <u>unties</u> my shoelaces.
       (Answer: I unties my shoelaces is incorrect because "I" is first person singular; therefore, untie does not need an "s" added.)

5. Student examples.

B.2   MORPHEMIC ANALYSIS LESSON 1 (INSTRUCTION)

Morphemic Analysis Lesson 1

Lesson 1: Number Prefixes: qua- (4), pent- (5), cent- (1/100 or 100), kilo- (1,000)
Lesson Words: quadrilateral, pentadactyl, centimeter, kilowatt

Introduction: Number prefixes
Say: "Words are like puzzles because you can put the pieces together and take the pieces apart.
Today, we are going to look at Number Prefixes. Once you learn what they mean, you will be
able to solve the puzzle of many new words."

*Follow the 5 steps for "Word Analysis" (See Overview Lesson).

1. Display Card: "Number Prefixes Family" and review.

> Number Prefixes Family
> qua- (quad-, quadr-, or quadri-)= four
> pent- (penta-) = five
> cent- (centi-) = hundredth 1/100) or hundred
> kilo- = thousand

Explain to the students that sometimes the prefix is spelled with additional letters when added to
certain roots.

Lesson Word 1:   quadrilateral
2-3.   Word Analysis Chart:
        Word: quadrilateral
                Root: lateral = sides
                Prefix: quadri- = four
                Suffix: (NONE)
        Meaning of Word: figure having four sides.

4. Example or Non-example:
"Are the following considered a <u>quadrilateral</u>? Why or Why not?"
- Display a trapezoid, shape with 4 unequal parallel sides. (Answer: Example, it
  has four sides.)
- Display a box. (Answer: Non-example, it would have more than four sides.)

5. Students examples.

Lesson Word 2: pentadactyl
2-3.   Word Analysis Chart:
        Word: pentadactyl
                Root: dactyl = fingers or toes, also called digits
                Prefix: penta- = five
                Suffix: (NONE)
        Meaning of Word: having five fingers or toes.

4. Example or Non-example:
"Are the following considered <u>pentadactyl</u>? Why or Why not?"
- A dog born with five legs   (Answer: Non-example, a dog does not have five toes on each foot, it only has four. Having five legs or feet is not relevant.)
- Chimpanzees   (Answer: Example, it has five toes on each foot and five fingers on each hand.)

5. Student examples.

Lesson Word 3:   centimeter
2-3.   Word Analysis Chart:
        Word: centimeter
                Root: meter = unit of metric measurement
                Prefix: centi- = hundredth (1/100)
                Suffix: (NONE)
        Meaning of Word: a hundredth of a unit of metric measurement.

4. Example or Non-example:
"Would it be practical to measure the following in <u>centimeters</u>? Why or Why not?"
- A paperclip (Answer: Example, a paperclip is a very small object.)
- A table (Answer: Non-example, a table should be measured using a larger measurement.)

5. Student examples.

Lesson Word 4:   kilowatt
2-3.   Word Analysis Chart:
        Word: kilowatt
                Root: watt = unit of electrical power
                Prefix: kilo- = thousand
                Suffix: (NONE)
        Meaning of Word: a thousand units of electrical power.

4. Example or Non-example:
"Which is a better example of using a <u>kilowatt</u>?
- One light bulb (Answer: Non-example, a light bulb usually goes up to 100 or so watts.)

- Electricity for your entire home for a day. (Answer: Example, most homes use between 10-20 kilowatts per day.)

5. Students examples.

Practice Worksheet:
   1. Remove: Prefix Family Card and Word Analysis Charts.
   2. Distribute practice worksheets to the students.
   3. In Part A, tell students to match the prefix to its correct meaning by writing the correct letter on the line." Time them for 30 seconds; then ask for any student to share their answers.
   4. In Part B, tell students that we will work together to figure out the meaning of silly words, words that are made up.
   5. In Part C, tell students to write the lesson word on the line before its correct meaning. Time them for 1 minute; then ask any student to share their answers.
   6. Collect worksheets.

Conclusion
   Distribute a puzzle sheet titled "Word Analysis". Tell the students that they did a great job and have earned their first piece to the puzzle of word analysis. Distribute a puzzle piece labeled "Number Prefixes." Instruct the students to find and glue the piece onto their puzzle, "World of Words." Inform the students that they can earn a puzzle piece each day.

Practice Worksheet Answers:

Part A:
   1. b, 2. c, 3. a, 4. d

Part B:
   1. quad- = four   quadmuket = having four tails
   2. kilo- = thousand   kilosoppa = thousand (1,000) beams of solar energy
   3. centi- = hundred   centimikeps = hundred (100) wheeled vehicles
   4. penta- = five   pentagoop = having five stomachs

Part C:
   1. quadrilateral
   2. centimeter
   3. pentadactyl
   4. kilowatt

B.3   MORPHEMIC ANALYSIS LESSON 1 PRACTICE WORKSHEET

Practice Worksheet (M: L1): Prefixes expressing numbers

Part A: Prefixes
Directions: Match the prefix to the correct meaning.
Prefixes:
    a. kilo-
    b. cent- or centi-
    c. qua-, quad-, quadr-, quadri-
    d. pent- or penta-

_____ 1. Which prefix means hundred(100) or hundredth (1/100)?

_____ 2. Which prefix means four (4)?

_____ 3. Which prefix means thousand (1,000)?

_____ 4. Which prefix means five (5)?

Part B: Silly Words
Directions: Use word analysis to determine the meanings of these silly words.

1. quadmuket
        Root: muket = tail
        Prefix: _____= _____
        Suffix: _____= _____

quadmuket = _____

2. kilosoppa
        Root: soppa = beam of solar energy
        Prefix: _____= _____
        Suffix: _____=_____

kilosoppa =   _____

3. centimikeps

      Root: mikep = vehicle with wheels

      Prefix: _____ = _____

      Suffix: _____ = _____

centimikep = _____

4. pentagoop

      Root: goop = a stomach

      Prefix: _____ = _____

      Suffix: _____ = _____

pentagoop = _____

Part C: Lesson Words

Directions: Match the lesson words with their correct meaning. Write the word on the line provided.

    centimeter
    kilowatt
    quadrilateral
    pentadactyl

_____1. A figure having four sides and four angles.

_____2. A hundredth (1/100) of a unit of measure.

_____3. Having five fingers or toes.

_____4. A thousand units of electrical power.

WORLD OF WORDS PUZZLE

Number

quadr- (four)	quadrilateral
penta- (five)	pentadactyl
centi- (hundredth/hundred)	centimeter
kilo- (thousand)	kilometer

Placement

Amount

Direction

Judgment
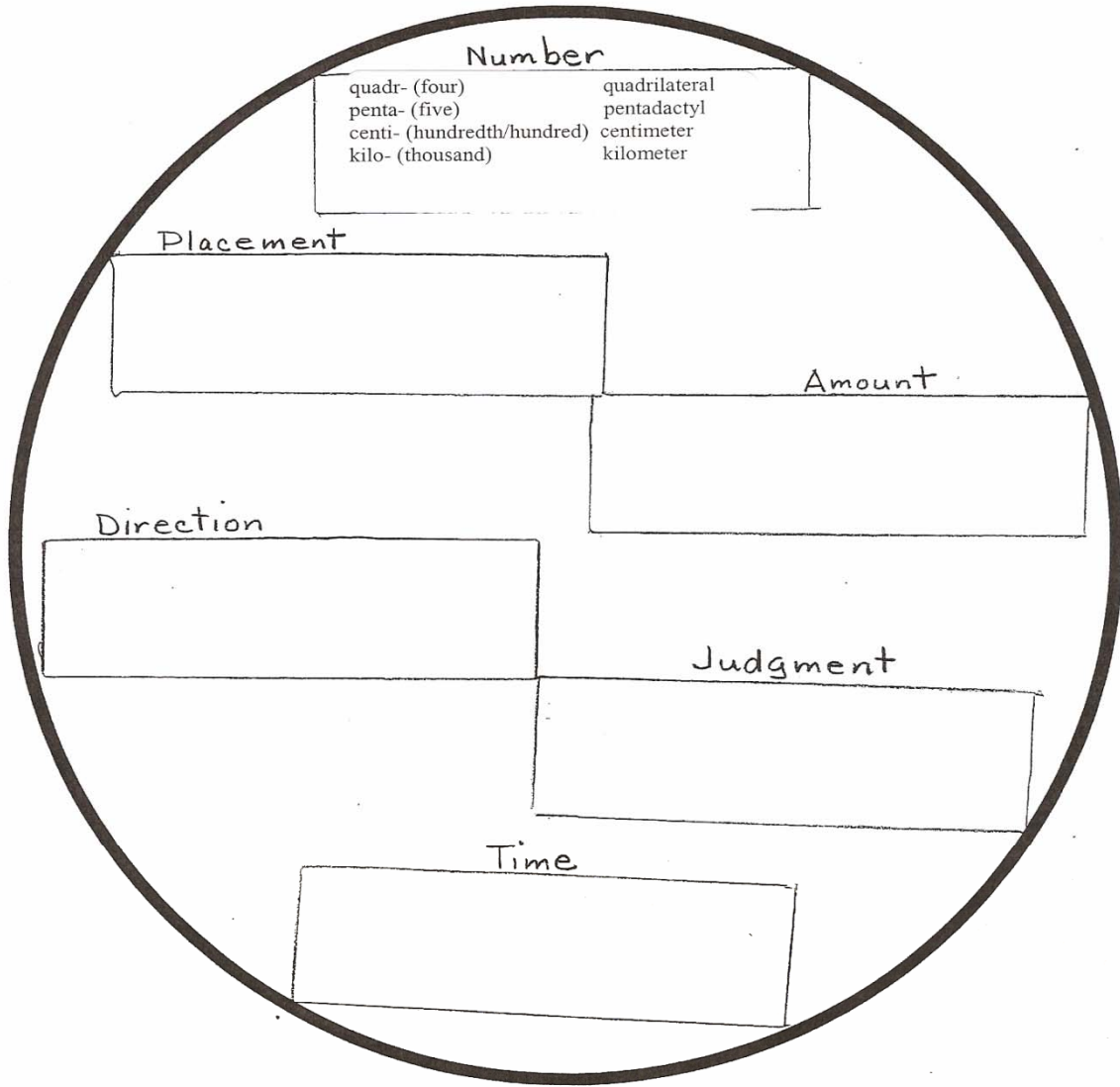
Time

MORPHEMIC ANALYSIS REVIEW LESSON 1

Morphemic Analysis Review Lesson 1

<u>**Word Analysis Review of Lessons 1-3**</u>
                Lesson 1: Number Prefixes Family
                Lesson 2: Time Prefixes Family
                Lesson 3: Amount Prefixes Family

Activity 1: Categorizing Prefixes/Meanings
<u>**Materials:**</u>
    Use a chart with the headings listed below: Place Velcro strips on the chart. Make prefix cards for all prefixes in lessons 1, 2, and 3. Place Velcro on the back of each card.
    Chart:

Number Prefixes Family	Time Prefixes Family	Amount Prefixes Family

<u>**Procedures:**</u>
Students will place the prefix under the correct heading and explain why. Teacher will confirm or correct responses.

[Answers:
Number Prefixes: quadr- (4), penta- (5), centi- (100 or 1/100), kilo- (1,000);
Time Prefixes: ante- (before), pre- (before), epi- (after), post- (after);

Amount Prefixes: hyper- (excessive), poly- (many), ultra- (beyond), hypo- (under, too little)]

*Inform the students that they are learning only some of the prefixes that belong to these families.

Activity 2: Matching Lesson Words and Examples
Materials:
    A slide will be displayed with the following information.
    Lesson Words listed alphabetically in a word box.
    Numbered examples, one for each lesson word, will be presented.

Procedures:
Students identify the correct lesson word that represents the example. Teacher will confirm or correct responses. Teacher will display the correct answer on the slide.

[Answers: 1. pentadactyl, 2. epilogue, 3. quadrilateral, 4. postscript, 5. hypoallergenic, 6. precaution, 7. polychrome, 8. centimeter, 9. hyperactive, 10. kilowatt, 11. antedate, 12. ultraconservative**]**

Lesson Words:

antedate
centimeter
epilogue
hyperactive
hypoallergenic
kilowatt
pentadactyl
polychrome
postscript
precaution
quadrilateral
ultraconservative

Activity 2: Matching lesson words and examples.

_____1. Chimpanzee's foot

_____2. A commentary on a book "after the end"

_____3. Rectangular mirror

_____4. P. S. on a letter

_____5. Fragrance-free soap

_____6. Flu shot

_____7. Rainbow

_____8. Measuring a paperclip

_____9. Fidgeting constantly

_____10. Electric bill

_____11. Check that indicates a time before it was written

_____12. Amish

APPENDIX D

WHOLE WORD MEANING OVERVIEW AND LESSON 1

This section contains the following:

D.1: Overview lesson

D2: Day Trip Map

D3: Lesson 1 Instruction

D4: Lesson 1 Practice Worksheet.

D.1   WHOLE WORD MEANING OVERVIEW LESSON

WHOLE WORD MEANING OVERVIEW

Introduction
Say: "Words are all around us. Everywhere we go, we run into new and interesting words. We will be taking a Word Trip. For each lesson, we will stop at different locations to meet new and interesting words. When a travel agency plans your trip, they give you a trip map. We will use a day trip map for each lesson of our Word Trip."

Display a large trip map with pages for each day of our trip.

Distribute student copies at the beginning of each lesson. **Collect** at the end of each lesson.
Say: "Let's begin by going to a familiar location."

*Use the steps for "Whole Word Meaning" for the demonstration word and every lesson word.

Steps for "Whole Word Meaning":
All lesson words will be introduced with the same five activities.
1. **Read Scenario**: The teacher will display and read a lesson word slide containing the lesson word and a passage.
2. **Ask Question**: Teacher will question students about the lesson word. Students will use the passage context to help them answer and explain. Teacher will either confirm or correct meaning.
3. **Example or Non-Example:** Teacher will present examples and/or non-examples of the lesson word. Students will raise their hand to identify an example of the lesson word. Any student will explain why or why not.
4. **Prompt and Discussion:** Teacher will read a prompt concerning the lesson word. Any student will answer and explain.
5. **Writing a Definition:** Teacher will direct students to work together (groups of 2-4) to generate a meaning for the lesson word and write the definition on a sentence strip. Definitions will be posted, discussed, and an agreed upon definition and lesson word will be written onto the large model day trip map by the teacher. Students will copy the word and definition onto their day trip map on the assigned location.

Demonstration Word: **unties**
1. Scenario: We are visiting Jimmy's home early in the morning as he is getting ready for school. Before leaving for school, Jimmy must find his tennis shoes. Finally, he finds them under his bed with double knots in his shoelaces. He <u>unties</u> his shoes.

2. Question: "What happens when Jimmy <u>unties</u> his shoes?" (Answer: He loosens the shoelaces so they are not fastened together.)

3. Example or non-example:
   "Would you <u>untie</u> if you did the following? Why or Why not?"
   - "loosen a necktie" (Answer: Example, the knot is not bound tight.)
   - "resolve a traffic jam" (Answer: Example, the traffic is no longer tangled or bound together.)

4. Prompt: "When you untie something, do you always completely unfasten a knot?" (Answer: No, you can loosen the knot, or you can untangle a bound situation.)

5. Writing a definition: Complete writing a definition process and copy demonstration word and definition on location #0, Jimmy's house.
   (Answer: unties = become loosened or unbound.)

D.2   DAY TRIP MAP

DAY TRIP # 1

0. Jimmy's Home

START

1. Mr. Harry's Math Class

2. Elle's Home

3. Local Library

4. Julie's Third Grade Class

STOP

82
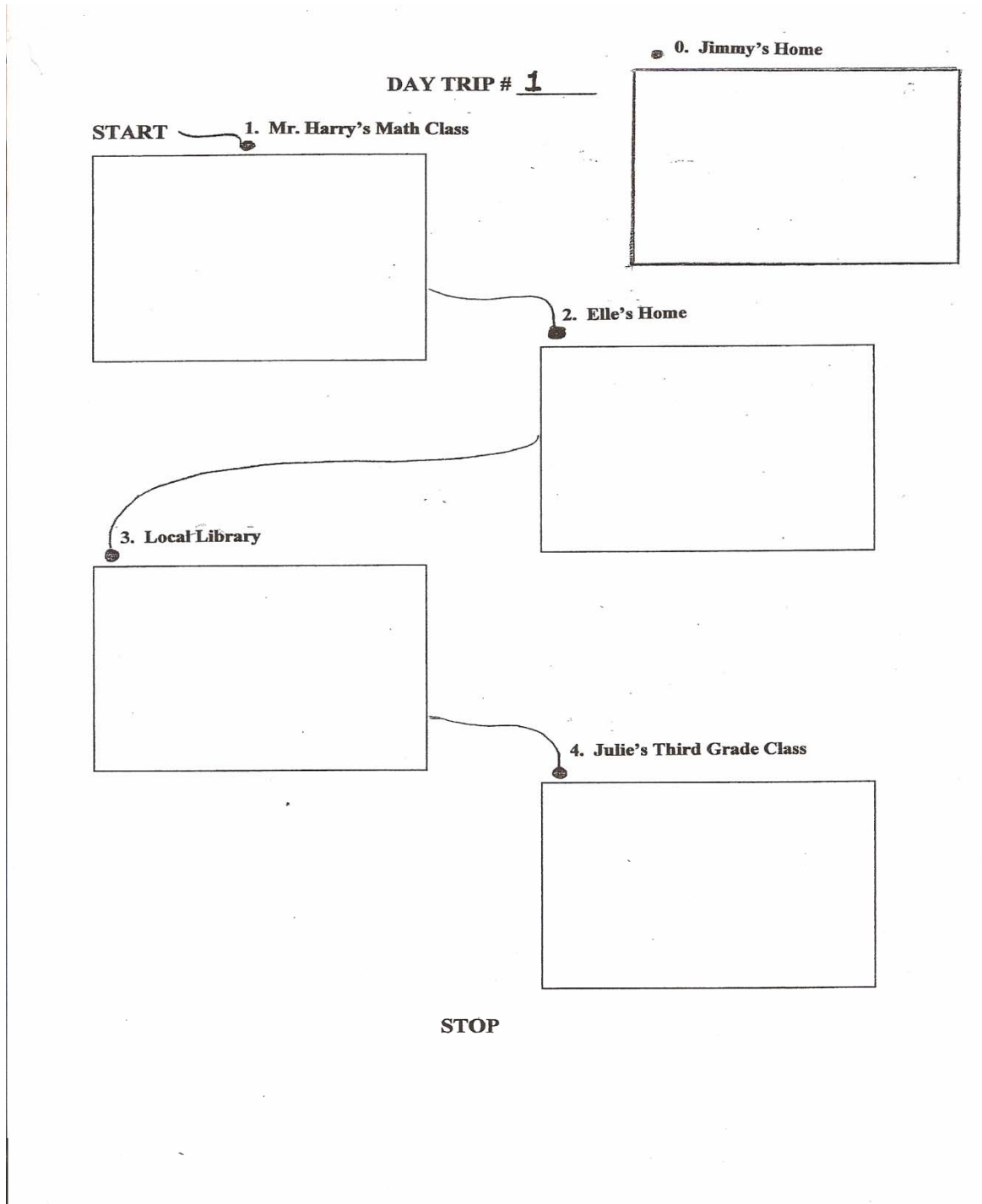
WHOLE WORD MEANING LESSON 1

Lesson 1: Lesson Words: quadrilateral, postscript, counteract, paraphrase

Introduction:
Say: Today, we will be visiting Mr. Harry's math class, Elle's home, the local library, and Julie's third grade class.

Lesson Word 1: quadrilateral
1. Scenario: We have finally arrived at our first destination.   We are visiting Mr. Harry's sixth grade math class. On the wall are all types of shapes like ovals, circles, triangles, squares, and rectangles. Mr. Harry says to the students, "I see two shapes that belong to a group called quadrilaterals, they are the square and rectangle."

2. Question: "What do squares and rectangles have in common?" (Answer: shapes that have only 4 sides)

3. Example or Non-Example:
    "Are the following considered a quadrilateral? Why or Why not?"
    * Display a trapezoid, shape with 4 unequal parallel sides. (Answer: Example, it has four sides.)
    * Display a box? (Answer: Non-example, it would have more than four sides.)

4. Prompt: **"**When would a table top be an example of a quadrilateral and when would it not?"
    (Answer: Example, when the top is shaped like a rectangle or a square; not when the top is shaped like an oval or circle.)

5. Writing a Definition: Complete writing a definition process and copy lesson word and definition on location #l, Mr. Harry's Math Class.
    (Answer: quadrilateral = a flat figure with four sides and angles)

Lesson Word 2: postscript
1. Scenario: Our next stop is Elle's home. As we enter her bedroom, she is sitting at her desk writing a letter to her best friend, Cara. As she is folding her letter, Elle remembers she forgot to tell Cara about her new kitten. Quickly, she unfolds the letter and adds a short note at the bottom of the page. In her postscript, Elle tells Cara that her new kitten is named Fluff, has black and white fur, and has big brown eyes.

2. Question: "Would the postscript come before or after the writer's signature?"
    (Answer: After the signature, because you always sign a letter when you think you are finished.)

3. Example or Non-Example:
   "Are the following considered <u>postscripts</u>? Why or Why not?"
   - Series of notes added to a completed letter. (Answer: Example, a letter can have more than one note in a postscript.)
   - A paragraph or many paragraphs added after the main body of an essay or book. (Answer: Example, additional information added after the end of a written literary work is considered a postscript.)

4. Prompt: "Have you ever used the letters, P. S., when writing? What do you think P. S. stands for?" (Answer: postscript)

5. Writing a definition: Complete writing a definition process and copy lesson word and definition on Location #2, Elle's home.
   (Answer: postscript = written text added after the end of a letter, book, or essay.
      *Postscript can be a sentence, paragraph, or many paragraphs.)

Lesson Word 3: counteract

1. Scenario: We are now on our way to listen to a lecture that is being held at the local library. The lecture is on the benefits of exercise and is presented by Mr. Walker, a fitness expert. He told the audience that exercise can <u>counteract</u> many effects of aging, such as obesity and limited mobility.

2. Question: "If you ran for 30 minutes every day, how could that <u>counteract</u> obesity?"
   (Answer: You could lose weight if you maintained the same calorie intake.)

3. Example and Non-Example:
   "Do you <u>counteract</u> when you are doing the following? Why or Why not?"
   - Oppose a motion made by the board. (Answer: Example, to oppose is to counteract the motion that was presented by the board.)
   - Volunteer to help make improvements in your community. (Answer: Non-example, to volunteer to make improvements is not a form of opposition or doing something against what the community wants.)

4. Prompt: "Can you <u>counteract</u> someone's mean statement by saying something nice?"
   (Answer: Yes, you are speaking against what someone has stated and are diminishing the effects by opposite actions.)

5. Writing a Definition: Complete writing a definition process and copy lesson word and definition on location #3, Local Library.
   (Answer: counteract = opposition to something that has been done.)

Lesson Word 4: paraphrase

1. Scenario: We are now on our way to Julie's third grade classroom. Julie listened closely as her teacher read an article from the newspaper to the students. The article was about a bear that was roaming around their neighborhood. Julie was unable to

remember the article word for word; however, she had listened closely enough to be able to <u>paraphrase</u> the story for her parents.

2. Question: "How can you retell a story if you don't remember every word?"
   (Answer: Tell it using your own words trying to remember the important points, paraphrase.)

3. Example or Non-example:
   "Would the following be a <u>paraphrase</u>? Why or Why not?"
   - Changing only one or two of the original written words. (Answer: Non-example, when you take information from a source, you must put it entirely into your own words to be a paraphrase.)
   - To summarize an author's ideas into your own words. (Answer: Example, you are using your own words to retell what you have read.)

4. Prompt: "Are you <u>paraphrasing</u> if you recite a poem?"
   (Answer: No, you are not using your own words.)

6. Writing a Definition: Complete the definition process and copy lesson word and definition on location #4, Julie's Third Grade Class.
   (Answer: paraphrase = expressing the same message using different words.)

Closure
Ask the students to retell where they have visited today and the words they have met. The teacher will point to the places on the large trip ticket. Date stamp students' trip maps and collect.

Practice Worksheet:
1. Remove large trip map model.
2. Distribute practice worksheets to the students.
3. In Part A, tell the students to write the lesson word on the line before its correct meaning. Time them for 1 minute; then review answers.
4. In Part B, tell the students that we will work together to name and record examples for each lesson word.
5. In Part C, tell students to work in pairs for three minutes to complete each sentence. Share and discuss sentences.
6. Collect worksheets.

Practice Worksheet Answers:
Part A:
> **1. paraphrase**
> **2. quadrilateral**
> **3. counteract**
> **4. postscript**

Part B: (Examples will vary.) Part C: (Sentences will vary.)

D.4   WHOLE WORD MEANING PRACTICE WORKSHEET

Practice Worksheet (WW: L1)

Part A: Lesson Words
Directions: Match the lesson words with their correct meaning. Write the word on the line provided.

counteract
quadrilateral
paraphrase
postscript

_____1. Expressing the same message in different words.

_____2. A flat object with four straight sides.

_____3. Oppose or against something that has been done.

_____4. Textual material added after the end of a written work.

Part B: Examples
Directions: Write examples for each lesson word on the line provided.

1. Name examples of quadrilaterals.

_____

2. Name places where you could find a postscript.

_____

3. Name a situation when you might counteract another's statement or action.

_____

4. Name a situation when you would need to paraphrase.

_____

Part C: Sentence Completion
Directions: Complete the following sentences.

1. After I finished writing the last chapter of the book, I added a <u>postscript</u> to _____

_____.

2. Bob chose the topic, <u>quadrilaterals</u>, for his painting; therefore, his painting contained

_____.

3. Storytelling is a form of <u>paraphrasing</u> because _____

_____.

4. When the board made a motion to add a dress code to school policy, Bob <u>counteracted</u> by

_____.

WHOLE WORD MEANING REVIEW LESSON 1

Whole Word Meaning Review of Lessons 1-3
> Lesson 1: quadrilateral, postscript, counteract, paraphrase
> Lesson 2: pentadactyl, antedate, circumnavigate, synchronize
> Lesson 3: hyperactive, antinuclear, transcribe, centimeter

Activity 1: Matching Lesson words and Meanings
Materials:
A slide will be displayed with the following information:
> Word box with the twelve lesson words listed in alphabetical order.
> Twelve numbered word meanings, one for each lesson word.

Procedures:
Display slide with the lesson words. Students will chorally read the twelve lesson words. The instructor will then display the word meanings. Students will match each word meaning to a lesson word. The instructor will confirm or correct and then display the correct response on the slide.

[Answers: 1. synchronize, 2. postscript, 3. antedate, 4. transcribe, 5. quadrilateral, 6. hyperactive, 7. circumnavigate, 8. paraphrase, 9. centimeter, 10. antinuclear, 11. counteract, 12. pentadactyl**]**

Activity 2: Matching Lesson words and Examples
Materials:
A slide will be displayed with the following information:
> Word box with the twelve lesson words listed in alphabetical order.
> Twelve numbered examples, one for each lesson word.

Procedures:
Display slide. Students will match each example with a lesson word and provide an explanation. The instructor will confirm or correct and then display correct response on the slide.

Lesson Words:

antedate
antinuclear
centimeter
circumnavigate
counteract
hyperactive
paraphrase
pentadactyl
postscript
quadrilateral
synchronize
transcribe

Activity 1: Matching lesson words and meanings.

_____1. Events occurring together in time or in a proper sequence.

_____2. Written text added after the end of a letter, book, or essay.

_____3. Affix a time that is before text was originally written.

_____4. To write in a different form.

_____5. A flat figure with four sides and angles

_____6. Excessive movement.

_____7. Travel around an obstruction.

_____8. Expressing the same message in different words.

_____9.   Hundredth of a unit of metric linear measurement.

_____10. Opposing the use or production of energy from an atom or
                                                    cell.

_____11. Opposition to something that has been done.

_____12. Having five fingers or toes.

Activity 2: Matching lesson words and examples.

_____1. Vote "No"

_____2. Fidgeting constantly

_____3. Sing a duet

_____4. Chimpanzee's foot

_____5. Rectangular mirror

_____6. Measuring a paperclip.

_____7. P.S. on a letter

_____8. Check that indicates a time before it was written

_____9. Protest atomic energy

_____10. Making a written copy of a song

_____11. Bridge is out

_____12. Storytelling

APPENDIX F

PRETEST-POSTTEST ASSESSMENTS

The three measures, prefixes, lesson words, and transfer words, are located in the following sections:

F1: Prefix Measure

F2: Lesson Word Measure

F3: Transfer Word Measure

F.1   PREFIX MEASURE

Prefixes: Pretest – Posttest

Name: _____ Class: M1   M2   W1   W2

Part A: Prefixes

DIRECTIONS: This is a test to see how well you know the meanings of prefixes. Read the underlined prefix and then darken-in the circle in front of the letter that goes with the best meaning for the prefix. Work carefully and do not rush. You will be given as much time as you need; however, I can not help you answer the questions. Answer all of the questions. You may guess if you are not certain of an answer. Good luck and do your best.

1. <u>trans-</u> means:
      O a. over
      O b. across
      O c. under
      O d. opposite
      O e. before

2. <u>pre-</u>   means:
      O a. before
      O b. after
      O c. forward
      O d. within
      O e. through

3. <u>qua-</u> means:
      O a. eight
      O b. against
      O c. four
      O d. beneath
      O e. half

4. <u>para-</u> means:
      O a. before
      O b. within
      O c. excessive
      O d. around
      O e. beside

5. <u>counter-</u> means:
   - O a. forward
   - O b. against
   - O c. through
   - O d. beyond
   - O e. large

6. <u>penta-</u> means:
   - O a. first
   - O b. under
   - O c. together
   - O d. five
   - O e. across

7. <u>epi-</u> means:
   - O a. within
   - O b. after
   - O c. against
   - O d. equal
   - O e. opposite

8. <u>hyper-</u> means:
   - O a. excessive
   - O b. false
   - O c. under
   - O d. good
   - O e. outside

9. <u>post-</u> means:
   - O a. before
   - O b. across
   - O c. after
   - O d. among
   - O e. many

10. <u>circum-</u> means:
   - O a. around
   - O b. beyond
   - O c. within
   - O d. opposite
   - O e. forward

11. <u>centi-</u> means:
   - O a. thousand
   - O b. distant
   - O c. long
   - O d. hundred
   - O e. around

12. <u>anti-</u> means:
   - O a. before
   - O b. against
   - O c. beyond
   - O d. distant
   - O e. after

13. <u>kilo-</u> means:
   - O a. million
   - O b. throughout
   - O c. bad
   - O d. thousand
   - O e. across

14. <u>poly-</u> means:
   - O a. many
   - O b. against
   - O c. few
   - O d. good
   - O e. large

15. <u>mal-</u> means:
   - O a. former
   - O b. bad
   - O c. angry
   - O d. short
   - O e. change

16. <u>peri-</u> means:
   - O a. around
   - O b. from
   - O c. against
   - O d. partly
   - O e. beside

17. syn-   means:
    O a. together
    O b. prohibit
    O c. same
    O d. through
    O e. surprising

18. dia-   means:
    O a. beyond
    O b. after
    O c. six
    O d. across
    O e. false

19. inter-   means:
    O a. change
    O b. between
    O c. small
    O d. favor
    O e. large

20. hypo-   means:
    O a. under
    O b. false
    O c. out
    O d. equal
    O e. before

21. ante-   means:
    O a. against
    O b. prohibit
    O c. before
    O d. many
    O e. wrong

22. ultra- means:
    O a. false
    O b. beyond
    O c. under
    O d. bright
    O e. before

23. <u>dys-</u>   means:
      O a. through
      O b. distant
      O c. bad
      O d. together
      O e. near

24. <u>intra-</u>   means:
      O a. within
      O b. false
      O c. opposite
      O d. between
      O e. different

F.2   LESSON WORD MEASURE

Lesson Words: Pretest/Posttest

Name: _____   Class: M1   M2   W1   W2
Part B: Lesson Words

DIRECTIONS: This is a test to see how well you know the meanings of words. Read the word that is underlined and then darken-in the circle in front of the letter that goes with the best meaning for that word. (If you can not read a word, you may raise your hand and I will say the word for you.) However, I can not help you answer the questions. Answer all questions. You may guess if you are not certain of an answer.   Good luck and do your best.

1. quadrilateral means:
  O a. many lines going in the same direction
  O b. a type of dance
  O c. a figure having four sides
  O d. a tool for building homes
  O e. a line around the earth

2. antedate means:
  O a. prohibit from use
  O b. before the actual time that something occurs
  O c. refusal to comply
  O d. after the last possible period of time.
  O e. against the time chosen

3. hyperactive means:
  O a. excessive movement
  O b. imaginative
  O c. repetition
  O d. lazy
  O e. careless

4. paraphrase means:
  O a. repeat often
  O b. different words saying the same thing
  O c. writing about a main idea
  O d. recite from memory
  O e. rumors

5. <u>counteract</u> means:
- O a. supporting someone's actions
- O b. placed in the middle
- O c. against or opposite of an unwanted behavior
- O d. keep track of numbers
- O e. to behave appropriately in public

6. <u>periscope</u> means:
- O a. distance across the ocean
- O b. traveling into space
- O c. device to see around barriers
- O d. produce that is spoiled
- O e. instrument to detect small minerals

7. <u>intramural</u> means:
- O a. picture of a landscape
- O b. happening outside of a country
- O c. trade between nations
- O d. carried on within a specified area
- O e. occurring in current times

8. <u>centimeter</u> means:
- O a. hundredth of a linear measurement
- O b. distance across the center of an object
- O c. insect with six legs
- O d. a large amount of money
- O e. a long distance

9. <u>epilogue</u> means:
- O a. introduction to a play
- O b. formal speech
- O c. list of important events
- O d. a trip that begins and ends at the same point
- O e. spoken or written information after the end of a completed work

10. <u>ultraconservative</u> means:
- O a. formal arrangement
- O b. beyond normal resistance to change
- O c. brilliant ideas
- O d. extremely modern
- O e. non-traditionalist

11. <u>maladjusted</u> means:
- O a. suitable to a particular situation
- O b. bad working condition or fit
- O c. without any safeguards
- O d. arranged in the wrong order
- O e. adaptable to change

12. <u>transcribe</u> means:
- O a. speak in different languages
- O b. form of artwork
- O c. same information written across to another form
- O d. to engrave with initials
- O e. tracing pictures and forms

13. <u>synchronize</u> means:
- O a. occurring together in time or sequence
- O b. colors that harmonize
- O c. working together through cooperation
- O d. arranged in alphabetical order
- O e. an even distribution

14. <u>pentadactyl</u> means:
- O a. having five fingers or toes
- O b. a luxurious hotel room
- O c. geometric shapes
- O d. walking from place to place
- O e. forming seven member groups

15. <u>postscript</u> means:
- O a. sent after the due date
- O b. introduction for a written work
- O c. text written after the main text
- O d. displayed on a bulletin board
- O e. using an index card to record notes

16. <u>hypoallergenic</u> means:
- O a. substances found above the surface of the earth
- O b. causing little or no response to a substance
- O c. more energy than normal
- O d. extreme exposure to a specific substance
- O e. filled with a solution of water

17. <u>dysfunction</u> means:
- O a. bad working condition of an organ or system
- O b. changing settings for personal preference
- O c. a feeling of unhappiness
- O d. movement that creates heat energy
- O e. using non-conventional methods to repair damage

18. <u>dialogue</u> means:
- O a. a form of listing and categorizing items
- O b. recognize symptoms of a condition
- O c. written directions or instructions
- O d. regional quality of a language
- O e. to speak or exchange ideas across to another

19. <u>kilowatt</u> means:
- O a. thousand units of electrical power
- O b. measurement for solar energy
- O c. short distance
- O d. use of one hundred lights
- O e. small unit of atomic energy

20. <u>precaution</u> means:
- O a. exercising of poor judgment
- O b. refraining from additional practice
- O c. afraid to try something new
- O d. care taken before harm could occur
- O e. repairing the damage caused by an accident

21. <u>polychrome</u> means:
- O a. a geometric figure or shape
- O b. around a specific period of time
- O c. using only one pigment
- O d. a type of metal
- O e. having many colors

22. <u>antinuclear</u> means:
- O a. foreign materials found in a substance
- O b. against atomic energy
- O c. not clear or understandable
- O d. before the time of modern wars
- O e. without any interest in political affairs

23. <u>circumnavigate</u> means:
    O a. go around an obstruction or barrier
    O b. the outside boundary of an area
    O c. traveling across a vast region
    O d. retreating when met with danger
    O e. movement through a mountain range

24. <u>international</u> means:
    O a. arising from one's mental or spiritual being
    O b. occurring within a country
    O c. having to do with actions between countries
    O d. to pass through or over
    O e. to pause or hesitate between parts

F.3   TRANSFER WORDS MEASURE

Transfer Words: Pretest/Posttest

Name: _____ Class: M1   M2   W1   W2
Part C: Transfer Words

DIRECTIONS: This is a test to see how well you know the meanings of words. Read the word that is underlined and then darken-in the circle in front of the letter that goes with the best meaning for that word. (If you can not read a word, you may raise your hand and I will say the word for you.) However, I can not help you answer the questions. Answer all questions. You may guess if you are not certain of an answer.   Good luck and do your best.

1. <u>kilogram</u> means:
    O a. one hundred units of energy
    O b. type of rock or mineral
    O c. one thousand units of mass
    O d. a short linear distance
    O e. small amount of material

2. <u>epidermis</u> means:
    O a. an opening in the skin covering
    O b. category of insects
    O c. layer after the primary layer of skin
    O d. instrument used for injections
    O e. layer beneath the primary layer of skin

3. <u>polysyllabic</u> means:
    O a. a single sound
    O b. dialects that are no longer spoken
    O c. having many spoken units in a word
    O d. without distinct units or sounds
    O e. combining two or more words

4. <u>malfunction</u> means:
    O a. updating a system
    O b. manual operation
    O c. bad working condition
    O d. use of traditional procedures
    O e. good performance

5. <u>translate</u> means:
   - O a. change from one form across to another form
   - O b. to engrave with a message
   - O c. to recite for the benefit of others
   - O d. to make an exact copy of a document
   - O e. to remain in the original form

6. <u>intramuscular</u> means:
   - O a. around the contracting tissue
   - O b. above the contracting tissue
   - O c. within the contracting tissue
   - O d. outside of the contracting tissue
   - O e. between the contracting tissue

7. <u>quadriplegic</u> means:
   - O a. paralysis of four limbs
   - O b. forms of mammals walking on two legs
   - O c. any form of nerve damage
   - O d. unable to use one's arms
   - O e. type of three-wheeled vehicle

8. <u>antebellum</u> means:
   - O a. after a period of rebellion
   - O b. an uprising or protest
   - O c. a state of mental illness
   - O d. before the war
   - O e. a formal affair or party

9. <u>hypercritical</u> means:
   - O a. sensitive to the remarks of others
   - O b. excessively judgmental
   - O c. without concern, not affected
   - O d. fatal or serious condition
   - O e. finding little or no fault with others

10. <u>circumspect</u> means:
   - O a. living in the past
   - O b. look around and consider consequences
   - O c. consider only one possible solution
   - O d. behave without caution
   - O e. refusal to obey demands

11. <u>perimeter</u> means:
    O a. distance around a figure
    O b. type of geometric shape
    O c. area within an object
    O d. distance across the center
    O e. instrument used to measure volume

12. <u>intervene</u> means:
    O a. happen within a set period of time
    O b. a method of collecting data
    O c. placed before all other events
    O d. occur between other events or points
    O e.   final action or threat

13. <u>pentagon</u> means:
    O a. a star shaped form
    O b. the outside measurement of a shape
    O c. a shape with four angles
    O d. having six legs or feet
    O e. a figure with five sides

14. <u>ultramodern</u> means:
    O a. from the present time
    O b. outdated
    O c. beyond contemporary
    O d. limited in quantity
    O e. bright and shiny finish

15. <u>prejudice</u> means:
    O a. forming decisions after great debate
    O b. beyond what is normally considered fair
    O c. opinions formed before sufficient knowledge
    O d. using facts as a basis for an opinion
    O e.   a set of laws that regulate behavior

16. <u>antisocial</u> means:
    O a. friendly; interacting with others
    O b. a business meeting or conference
    O c. acting against normal standards of behavior
    O d. a large gathering or group
    O e.   preparations made before a party

17. <u>counterproposal</u> means:
- O a. offer that is against what was originally suggested
- O b. the lowest offer available for consideration
- O c. original suggestion for consideration
- O d. legal explanation for a case
- O e. formal document presented for signatures

18. <u>synthesis</u> means:
- O a. breaking substances into their separate parts
- O b. without form or shape
- O c. back to the original form or shape
- O d. primary part of a substance
- O e. combining together of parts to form a whole

19. <u>centennial</u> means:
- O a. celebration of significant events
- O b. one-hundred year period
- O c. completing a life cycle each year
- O d. happening every ten years
- O e. a linear measurement

20. <u>postwar</u> means:
- O a. before a time of hostility
- O b. beyond what is normally acceptable
- O c. after a time of conflict
- O d. during a time of unrest
- O e. under the control of military force

21. <u>hypodermic</u> means:
- O a. placed over the skin
- O b. loss of body heat
- O c. beyond normal emotions
- O d. under the skin
- O e. sensitive to cold weather

22. <u>dysgenics</u> means:
- O a. superior qualities and characteristics
- O b. production of bad qualities in offspring
- O c. form of technology used in industry
- O d. division into two separate parts
- O e. feelings of depression

23. <u>diagonal</u> means:
       O a. geometric figure or shape
       O b. reduce in size
       O c. straight line across to an opposite corner
       O d. figure having ten sides
       O e. distance around an object

24. <u>paradigm</u> means:
       O a. unusual event occurring infrequently
       O b. overused expression
       O c. used beside another as an example or pattern
       O d. type of geometric shape or form
       O e. formal evaluation of a problem

APPENDIX G

SHAPIRO-WILK TEST OF NORMALITY

Test of Normality of Prefix Scores as a Result of Method and Time

Method	Time	Shapiro-Wilk W	df	p
MA	Pre	.976	38	.584
	Post	.967	38	.318
WW	Pre	.976	37	.602
	Post	.958	37	.174

Test of Normality of Lesson Word Scores as a Result of Method and Time

Method	Time	Shapiro-Wilk W	df	p
MA	Pre	.963	38	.229
	Post	.923	38	.012
WW	Pre	.958	37	.179
	Post	.886	37	.001

Test of Normality of Transfer Word Scores as a Result of Method and Time

Method	Time	Shapiro-Wilk W	df	p
MA	Pre	.963	38	.241
	Post	.970	38	.392
WW	Pre	.980	37	.736
	Post	.985	37	.893

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