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A comparison of the effects of different methods of vocabulary instruction on vocabulary knowledge and reading comprehension

Grimason-Loewenthal, Gloria, Ph.D.

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A COMPARISON OF THE EFFECTS OF DIFFERENT METHODS OF VOCABULARY INSTRUCTION ON VOCABULARY KNOWLEDGE AND READING COMPREHENSION

by

GLORIA GRIMASON-LOEWENTHAL

A dissertation submitted to the Graduate Faculty in Educational Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1990

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Abstract

A COMPARISON OF THE EFFECTS OF DIFFERENT METHODS OF VOCABULARY INSTRUCTION ON VOCABULARY KNOWLEDGE AND READING COMPREHENSION

by

Gloria Grimason-Loewenthal

Adviser: Dr. Shirley Feldmann

The present study was conducted to examine the relationship between vocabulary and reading comprehension. More specifically, the effect of the pre-teaching of vocabulary on the reading comprehension of passages containing that vocabulary was investigated. Vocabulary training through the use of strategies for acquiring meaning from context (decontextualization) and training in the rapid recall of word meanings (speed of semantic access) were examined separately and in combination with other.

The sample consisted of 90 undergraduate students at an inner city community college who had been identified by a standardized reading test as not meeting the minimal reading competency requirement for college courses. One would expect the findings to generalize to students in similar settings.

Subjects in intact reading classes were randomly assigned to four study conditions, consisting of three treatment groups (Decontextualization, Speed of Semantic

Access, Combination) and a control group. A sequence of pretests, treatment, and posttests were used for all groups. Tests for vocabulary knowledge (VK) and reading comprehension (RCA) were developed for the present study and contain 16 targeted words.

Data was analyzed by means of a mixed model analysis of variance design. The within subjects factor was time of testing (pre/post). Group membership constituted the between subjects factor. Hypotheses requiring pre/posttest comparisons were measured by t-tests, while one-way ANOVAS on both gain and posttest scores were conducted for the appropriate treatment and control comparisons.

Results showed strong gains in vocabulary knowledge and reading comprehension following vocabulary training. No differentiation was found as to training method. This lack of differentiation may be the result of the high level of vocabulary learning demonstrated by all training groups and the subsequent strong ceiling effect found on the vocabulary knowledge test.

The results of this study reinforce the importance of providing intensive vocabulary instruction within the reading curriculum. The choice of method used for this training may depend upon the particular teaching situation and the instructional goals.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Educators and researchers have long been concerned with the relationship between vocabulary and reading comprehension. Factor analytic studies of reading comprehension (e.g., Davis, 1944; Spearitt, 1972), readability research (e.g. Chall, 1958; Klare, 1974-1975) and research in test construction (Farr, 1969) have repeatedly found a strong relationship between word knowledge and the comprehension of written text. Through extensive cross-cultural research this strong relationship has been found to hold across a wide range of language groups (Thorndike, 1973). Thorndike concluded that the results of this research indicate "how completely reading performance is determined by word knowledge at different age levels and in different countries" (p. 62).

Although research on vocabulary has spanned many decades and dates back to the early 1900's, there was a general lull in vocabulary research during the years when the Chomskian revolution in linguistics turned the attention of educators to the study of syntax. The trend of the past decade, however, has been to look again at the role of vocabulary knowledge and its high

correlation with reading comprehension (Chall, 1983).

The proposition that vocabulary knowledge is an important component of reading ability has been well supported and largely accepted by educators and researchers in the field. Johnson and Pearson (1978) stated that "since words represent concepts which reflect experience, common sense tells us that the principal contributor to reading comprehension is vocabulary knowledge" (p. 36). Wittrock, Marks and Doctorow (1975) reported that even one unknown word in a passage might render that passage incomprehensible. Adams (1980) held that vocabulary is the single best predictor of the ability to comprehend written material.

Although the recognition that vocabulary is an important component of reading comprehension has spanned many years, there has been little agreement as to why this correlation exists. This confusion has led to a general lack of direction within the field as to the best methods for teaching vocabulary.

Anderson and Freebody (1981) proposed three hypotheses to explain the high correlation between vocabulary and reading comprehension. They were called the instrumentalist, general aptitude, and general knowledge hypotheses. The second and third hypotheses are overlapping, suggesting that both vocabulary and

comprehension reflect a person's general ability or general knowledge. The instrumentalist hypothesis posits that greater word knowledge engenders greater comprehension of text by virtue of that knowledge alone. This hypothesis has the most direct application to teaching as it suggests that pre-teaching vocabulary will have a positive effect on reading comprehension (Stahl, 1983).

Several studies have investigated the effects of pre-teaching vocabulary on reading comprehension. A number of these studies have concluded that the pre-teaching of vocabulary improves reading comprehension (e.g. Kameenui, Carnine, and Freschi, 1982)

The two most commmon methods of teaching vocabulary used in these studies were a definitional method (presenting a definition from either a word list or dictionary) and a contextual method (presenting a sentence or passage using the word). A majority of these studies favored either a contextual method or a combination of both the definitional and contextual methods (e.g. Gipe, 1979; Stahl, 1983) A few studies favored the definitional method (e.g. Pany & Jenkins, 1978). The question as to what method for teaching vocabulary has the greatest effect on vocabulary acquisition and the subsequent comprehension of passages

using that vocabulary, however, remains unsettled.

Although the presentation of context was favored by a number of vocabulary studies, some researchers have raised doubts about the value of teaching vocabulary through a contextual approach (e.g. Hafner, 1967). The fact that subjects have not been trained in the use of contextual information for deciphering word meaning is one area of concern regarding the efficacy of the contextual approach. Using context efficiently is not an easy task. Sternberg, Powell and Kaye (1983) stated that vocabulary instruction through a contextual method "is incomplete if it fails to provide instruction in how to use the context" (p.129). While Sternberg's research has developed strategies to promote the acquisition of vocabulary from context, it has not studied the effect of this method on the acquisition of specific vocabulary and the comprehension of passages using that vocabulary.

Another issue raised by several vocabulary studies has been the role of the subject's speed in the recall of word meanings (speed of semantic access). Although some studies (e.g. Beck, Perfetti, & McKeown, 1982) have suggested that this speed of semantic access is necessary for vocabulary to have a positive impact on reading comprehension, there has been surprisingly little direct study of this variable. A need therefore

remains for more research to determine the effect of rapid access to word meanings on reading comprehension.

Purpose of the Study

The purpose of the present study is to investigate the relative effectiveness on vocabulary knowledge and reading comprehension of two methods of vocabulary instruction. Teaching vocabulary through the use of strategies for acquiring meaning from context (decontextualization strategies) and training in rapid recall of word meanings (speed of semantic access) will be examined separately and in combination with each other.

Rationale for the Study

It has been long documented that many students have difficulty in the area of reading comprehension (Durkin, 1979). This is an important issue because reading comprehension is central to education. One important variable that has been proposed as necessary for the efficient understanding of written text has been vocabulary knowledge. Although a strong relationship between vocabulary and reading comprehension has been established, the nature of this relationship is poorly understood. This has led to a general lack of direction within the field as to the best techniques for teaching vocabulary.

In the present study this relationship will be investigated and methods of teaching vocabulary will be examined as to their relative effectiveness on reading comprehension.

CHAPTER II

REVIEW OF THE LITERATURE

A review of the reading literature revealed that the relationship between vocabulary knowledge and reading comprehension has been the focus of much attention by researchers in the field. Various methods of vocabulary instruction have been investigated and a number of these methods have been compared as to their relative effects on vocabulary acquisition and reading comprehension.

This chapter will present a review of the literature concerning the relationship between vocabulary and reading comprehension as well as a review of various methods of vocabulary instruction. The section on methods of vocabulary instruction will include: (1) a review of studies involving the most common methods of instruction, namely, the presentation of a definition for an unknown word, and the presentation of a contextual sentence or passage using the unknown word; (2) a review of the literature dealing with the training of specific strategies for using contextual sentences or passages to determine the meaning of an unknown word (decontextualization strategies); and (3) a review of the literature related

to the effect of rapid recall of a definition for an unknown word (speed of semantic access). All of the methods will be discussed with regard to their effects on vocabulary acquisition and reading comprehension.

Vocabulary Knowledge and Reading Comprehension

One important variable that has been consistently proposed by various educators and researchers as necessary for reading comprehension is vocabulary knowledge. Factor analytic studies of reading comprehension (Thorndike, 1921; Davis, 1944; Thurstone,1946; Spearitt, 1972), research in readability (Chall, 1958; Bormuth, 1966; Coleman, 1971; Klare, 1974-75) and research in test construction (Farr, 1969) have repeatedly found a strong correlation between word knowledge and the comprehension of written text.

Davis (1944) made a thorough investigation of the components of reading comprehension. This investigation confirmed the existence of specific reading comprehension subskills, and led to the compilation of nine distinguishable categories of reading comprehension skills. A factor analysis of these nine categories led Davis to conclude that distinct comprehension subskills do exist and that the recall of word meanings was the largest single contributor to all the other comprehension subskills. Davis (1968) further concluded

from a group of multiple-choice items designed to test various comprehension subskills that word knowledge and verbal reasoning accounted for almost the entire amount of variance in comprehension. In a review of all studies on comprehension subskills done prior to that date, Davis (1972) reported that in all the studies word knowledge was the component considered as the most vital to reading comprehension.

Two important reanalyses of Davis' data were done by Thurstone (1946) and Spearitt (1972). Thurstone (1946) reported that vocabulary knowledge was the crucial factor in comprehension. Spearitt (1972) in a later reanalysis of Davis' work confirmed that word knowledge was a clearly identifiable and unique skill underlying reading comprehension. This analysis also identified three other factors that were clumped together as composing the reasoning factor in reading. Vocabulary, however, was considered to be the most differientiated of all the factors identified.

Research in readability led Chall (1958) to conclude that vocabulary was found by all quantitative investigations as well as by surveys of experts' and readers' opinions to be the best single predictor of text readability. In an analysis of readability by Bormuth (1966), the role of word knowledge was found to

be preeminent. Coleman (1971) investigated the morphological, syntactic, and semantic properties of words and sentences. Although sentence complexity was found to be a fairly important variable, word complexity accounted for about 80 percent of the predicted variance. Klare (1974-75) concluded that basically two variables are responsible for predicting text difficulty. Of these two variables, i.e., vocabulary and sentence structure, vocabulary difficulty was given the heaviest weight in devising readability formulas.

Research in test construction has consistently revealed a strong correlation between vocabulary knowledge and reading comprehension. Farr (1969) concluded that the distinction between vocabulary and comprehension, commonly made by test constructors, is not supported by research.

Researchers have expressed their findings on this strong connection between vocabulary knowledge and reading comprehension in various ways. Arlin (1976) held that word meanings serve as building blocks for paragraph meaning. After an observational study of classroom reading instruction, Durkin (1979) reasoned that training in word meanings should be called comprehension instruction because when the meaning of individual words are unknown, comprehension problems

follow. Likewise, Sorenson (1985) suggested that in the classroom, teachers must stress the vital connection between vocabulary learning and reading comprehension. From a study of comprehension in content areas, Harris and Smith (1980) concluded that vocabulary knowledge is the cornerstone of comprehension in content area reading. Stahl (1986) maintained that "over the long term, children taught word meanings significantly outperformed children not given instruction, indicating that sustained attention to vocabulary produces better comprehension" (p.663).

Thus the correlation between vocabulary and reading comprehension appears robust and well established in the literature. While vocabulary knowledge has been psychometrically established as a major factor in reading comprehension, the nature of this relationship has been poorly understood. Recent attention in the reading field has turned to investigating the cause of this relationship and the role vocabulary plays in the comprehension process.

Anderson and Freebody (1981) provided three hypotheses for this strong vocabulary/comprehension relationship. As mentioned earlier, their instrumentalist hypothesis posits that vocabulary knowledge affects reading comprehension by virtue of

that knowledge alone. It has been pointed out in the literature (e.g. Stahl, 1983) that this hypothesis has the most direct application to education because it suggests that pre-teaching vocabulary may have a positive effect on reading comprehension. Anderson and Freebody advanced the proposition that the following two conditions must be met in order to demonstrate that word knowledge plays an instrumental role in text comprehension: (a) the substitution of easier or more difficult words in a text must make that text more easy or more difficult to understand, and (b) the learning of unfamiliar words in a text must make that text more comprehensible. The first condition was supported by the work of Marks, Doctorow, and Wittrock (1974) which found that the substitution of easy or difficult words altered the comprehensibility of the text.

More specifically, the Marks et al. (1974) study hypothesized that changing 15 percent of the words in a story from low frequency (unfamiliar) to high frequency (familiar) words would significantly increase reading comprehension. The results of this study that used 222 sixth graders as subjects supported this hypothesis at the .001 level. The results were attributed to differences in subjects' knowledge of familiar and unfamiliar words. These findings were later replicated

by Wittrock, Marks and Doctorow (1975) and extended by Kameenui, Carnine and Freschi (1982).

In the Kameenui et al. study (1982), elementary students were used as subjects to investigate this comprehension issue raised by the instrumentalist hypothesis of Anderson and Freebody (1981). In two separate experiments, difficult words were substituted for easy words in a text for the purpose of determining whether this substitution would render the text more difficult to understand. In the first experiment the subjects reading the text with easy vocabulary words demonstrated superior performance over the subjects reading the text with difficult vocabulary words, $F(1,55) = 161.1$, $p < .001$, suggesting that the presence of the difficult vocabulary words limited comprehension. Results of the second experiment revealed the superior performance of the easy vocabulary group, $F(1,55) = 4.7$, $p < .05$. The findings of these two experiments supported the study's hypothesis that the presence of difficult vocabulary words in a passage limited comprehension.

In sum, Anderson and Freebody (1981) advanced the hypothesis that vocabulary knowledge improves reading comprehension by virtue of that knowledge alone. One condition considered necessary for the acceptance of this hypothesis was that the substitution of easier or

more difficult words in a text must make that text easier or more difficult to understand. The results of the studies by Marks, Doctorow and Wittrock (1974), Wittrock, Marks, and Doctorow (1975), and Kameenui, Carnine and Freschi (1982) provided evidence meeting that condition.

Thus, the instrumentalist hypothesis was supported by the vocabulary simplification studies. Anderson and Freebody (1981) also required that a second condition be fulfilled, namely, that learning unfamiliar words in a text makes that text more comprehensible. Less support for this condition has been found. Studies of the effect of vocabulary training on reading comprehension have not been plentiful and results have been mixed. The remainder of this section of the review will discuss studies in which the effect of pre-teaching vocabulary on reading comprehension has been examined.

The study by Kameenui, Carnine and Freschi (1982) supported the hypothesis that pre-teaching vocabulary improves reading comprehension. As discussed earlier, their study supported the first condition advanced by Anderson and Freebody (1981), i.e., that varying the difficulty of the vocabulary in a passage must directly affect the comprehensibility of the text. This study was also designed to examine the second condition, i.e.,

that pre-teaching vocabulary words within a passage improves the comprehension of that passage. To investigate this, one group of subjects (Group 2) read a passage with difficult vocabulary words and received no vocabulary instruction. This group was then compared to two groups (Groups 4 and 5) who read the passage after receiving instruction on these vocabulary words. The reading comprehension of Group 2 was then compared with the reading comprehension of Groups 4 and 5. The significant results, $F(1,55) = 107.0$, $p < .001$, suggested that learning the meanings of difficult vocabulary words enhanced reading comprehension, and lent support to the hypothesis proposed by Anderson and Freebody (1981) that vocabulary knowledge plays an instrumental role in reading comprehension.

Johnston (1984) examined the relationship between reading comprehension and prior knowledge using a population of 207 eighth-grade students. This study relates to the issue of the effect of vocabulary knowledge on reading comprehension since prior knowledge was considered as knowledge of vocabulary specific to the content of the comprehension passages. Johnston (1984) tested reading comprehension by having subjects read and answer questions about three 650-750 word texts from 3 content areas. Prior knowledge was assessed by

the administration of a multiple-choice vocabulary test with words selected from the three content areas from which the reading comprehension passages were chosen. One major finding of the study was that prior knowledge accounted for 3.5% of the within-subject variance, $F(1,282) = 11.72$, $p<.001$, indicating that prior knowledge significantly influences text comprehension. Since, for the purposes of the study, prior knowledge had been assessed as specific content-related vocabulary knowledge, the result may be interpreted as lending support to the instrumentalist hypothesis of Anderson and Freebody (1981) that the knowledge of vocabulary in a text makes that text more comprehensible.

Wixson (1986) investigated the effects of pre-taught vocabulary on the reading comprehension of 120 fifth-grade students. This study lent support to the fulfillment of Anderson and Freebody's (1981) condition that pre-teaching unfamiliar vocabulary words within a passage must improve the comprehension of that passage. In this study one group of subjects received training on vocabulary central to the content of passages while another group of subjects received vocabulary training on words not central to the content of the passages. Questions measuring the comprehension of passage ideas related to central and noncentral vocabulary were then

administered. Results showed that students who received instruction on central words understood more passage ideas related to central than noncentral words, $F(1,112) = 9.41$, $p<.01$, and that students who received instruction on noncentral words understood more passage ideas related to noncentral vocabulary than students who had been trained on central words, $F(1,111) = 6.76$, $p<.01$. The results thus indicate that pre-teaching unfamiliar vocabulary can enhance the comprehension of passages related to the instructed vocabulary and lends support to the instrumentalist hypothesis of Anderson and Freebody (1981).

Four other important studies supporting the correlation between vocabulary knowledge and reading comprehension will be presented briefly at this point in the review. These studies (Beck, Perfetti & McKeown, 1982; McKeown, Beck, Omanson & Perfetti, 1983; McKeown, Beck, Omanson & Pople, 1985; Stahl, 1983) will be thoroughly discussed in the later section of the review dealing with methods of vocabulary instruction.

Beck, Perfetti and McKeown (1982) examined the relationship between knowledge of word meanings and reading comprehension and found that vocabulary instruction caused an improvement in text comprehension. After vocabulary instruction, subjects

performed tasks requiring semantic processing ranging from single word semantic decisions to story recall at a significantly higher level than control subjects.

The above study was replicated and extended by the investigation of McKeown, Beck, Omanson and Perfetti (1983) who found that pre-taught vocabulary positively affected reading comprehension as measured by story recall and a multiple-choice comprehension test. McKeown, Beck, Omanson and Pople (1985) further extended these studies in their examination of the effects of vocabulary instruction on several verbal processing skills including reading comprehension. Again, support was found for the instrumentalist hypothesis of Anderson and Freebody (1981) that vocabulary knowledge improves reading comprehension by virtue of that knowledge alone.

In a study by Stahl (1983) the effects of vocabulary pre-instruction on reading comprehension was examined. On measures of reading comprehension, significant results were found at the .001 level.

Some earlier studies, however, failed to find that the pre-teaching of vocabulary words improved reading comprehension. Pany and Jenkins (1978), Jenkins, Pany, and Schreck (1982), Schacter (1978), and Ahlfors (1979) found that students given instruction in vocabulary did not differ significantly in their comprehension of text

containing the taught words from those given no instruction. However, two of these studies (Jenkins Pany, & Schreck, 1982; Pany & Jenkins, 1978) used extremely small samples as well as questionable comprehension assessment instruments. For example, in the Jenkins et al. study (1982), it appears possible that students who received vocabulary training might not have had an advantage over controls because vocabulary was not necessary to respond correctly to the cloze tests used as comprehension measures. Two other studies (Ahlfors, 1979; Schacter, 1978) also used questionable comprehension assessment instruments. Although Ahlfors (1979) found significant differences in vocabulary acquisition and sentence comprehension among several vocabulary instruction groups, no significant differences were found on measures of reading comprehension. Another factor causing the lack of impact of vocabulary pre-instruction on reading comprehension might be that the pre-taught words accounted for less than one percent of the total number of words in the text used for assessment. This study will discussed in detail in the later section of the review on methods of vocabulary instruction.

In summary, there have been several studies (Kameenui, Carnine, & Freschi, 1982; Beck, Perfetti, &

McKeown, 1982; McKeown, Beck, Omanson, & Perfetti, 1983; McKeown, Beck, Omanson & Pople, 1985; Johnston, 1984; Wixson, 1986; Stahl, 1983) that have lent support to the second condition required for acceptance of the instrumentalist hypothesis. These studies have indicated that the pre-teaching of vocabulary has a positive effect on the comprehension of text where those words were found. Some earlier studies did not find that vocabulary training aided reading comprehension (Pany & Jenkins, 1978; Jenkins, Pany & Schreck, 1982, Ahlfors, 1979; Schacter, 1978;). These latter studies, however, have been found to have certain methodological deficiencies associated with the sample and the reading comprehension assessment instrument. Although a number of studies supported the instrumentalist hypothesis of Anderson and Freebody (1981), additional research has been called for to further establish these findings. Moreover, there has been disagreement regarding the best method for teaching vocabulary. The following section of this review will discuss methods of vocabulary instruction.

Methods of Vocabulary Instruction

A review of the reading literature revealed vocabulary training studies using the following methods:

1. Presenting a synonym or definition for an unknown word through dictionary practice or a word list.

2. Presenting a contextual sentence or passage using the unknown word.

3. Teaching vocabulary through the use of strategies for determining the meaning of an unknown word from a contextual sentence or passage.

4. Drilling students to increase the speed with which a synonym or definition for an unknown word can be recalled (speed of semantic access).

The first two methods (synonym or definition presentation, and presentation of context) have been the methods most commonly used in vocabulary training. Several studies have compared their relative effects. The use of decontextualization strategies as in the third method has been been the focus of a number of studies by Sternberg and his collaborators (e.g., Sternberg and Powell, 1983) and the fourth training method, training for speed of semantic access, has been suggested by a number of studies (e.g., Beck, Perfetti, & McKeown, 1982) as an important component of vocabulary instruction.

Common methods of vocabulary instruction

(definition presentation and presentation of context), training in decontextualization strategies and speed of semantic access will be discussed in detail concerning their effect on vocabulary acquisition and reading comprehension.

Common Methods of Vocabulary Instruction

The most common methods of vocabulary instruction used in experimental studies have been the definitional method (presenting the definition of an unknown word through dictionary practice or a word list) and the contextual method (presenting a sentence using the unknown word). A number of studies have compared these methods with mixed results.

Crist and Petrone (1980) taught seventy undergraduate college students the meanings of 15 unfamiliar words. One group was taught by a definitional method and the other group by a contextual method. On a posttest measuring the ability to use target words in context, the mean of the context group was found to be significantly larger than the definition group mean at the .01 level. Considered even more important by these researchers was the fact that the context group did almost as well as the definitional group on a posttest of vocabulary recall. Crist and Petrone (1980) concluded that the definition for an

unknown word might be learned as well through an analysis of context as by an analysis of definition, lending support to the preference for a contextual method of teaching vocabulary.

Gipe (1979) examined the effectiveness of 4 methods of teaching word meanings on 78 fifth graders and 93 third graders for a period of eight weeks. One treatment consisted of pairing an unknown word with a familiar synonym or brief definition (association method). A second method instructed subjects to locate the target words in the dictionary and write down their definitions. A third method (context) presented the target words in meaningful sentences, while a fourth method (category) required subjects to fit target words into general categories. Results indicated that, for teaching vocabulary, the definitional method and the context method were superior to the category and dictionary methods. The context method was found significantly better than the other 3 methods for both third grade $F(1,276) = 55.75$, $p < .001$, and fifth grade $F(1,231) = 83.57$, $p < 001$.

The results of the Gipe (1979) study, however, have been questioned on the count that the context was so rich that students might have been considered as having learned definitions for the target words rather than

deriving meaning from the context. Moreover, Gipe failed to replicate her findings in a second study conducted in 1981. In a later study, Levin, McCormick, Miller, Berry, and Pressley (1982) used Gipe's vocabulary and materials and found no advantage in vocabulary acquisition for the context group over the definitional group. In sum, Gipe's study did not resolve the question regarding the preferred method of vocabulary instruction.

Stahl (1983) examined the effects of vocabulary pre-instruction on reading comprehension in a study of 28 fifth graders over a three week period. Two vocabulary training treatments and a control group were used and subjects were grouped into three order groups. The effects on vocabulary acquisition and comprehension of the two vocabulary training methods and the control were compared. Results demonstrated the effectiveness of vocabulary instruction on vocabulary knowledge as both treatments showed scores on vocabulary posttests that were significantly higher than controls $F(1,50) = 99.28$, $p < .001$. One treatment taught vocabulary by a definitional method while the other treatment included both definitional and contextual information about the target words (mixed method). Results comparing these two treatments showed no

significant difference on a vocabulary posttest between the two groups. Measures of reading comprehension, included passage comprehension assessment, sentence anomaly, and sentence cloze tests. Significant results were found at the .001 level on the sentence comprehension assessments. Similar results were found for the passage comprehension measure, with two out of three order groups scoring significantly higher on both treatment conditions than the controls at the .05 level. The mixed treatment produced significantly higher scores on two sentence comprehension measures, while on a passage comprehension measure there was no significant difference. Thus, although a slight advantage for the mixed treatment over the definitional treatment was indicated, the findings regarding the most effective method of vocabulary instruction were inconclusive.

Pany and Jenkins (1978) compared the effects of three vocabulary instructional strategies on the vocabulary acquisition and reading comprehension of six learning disabled subjects. An analysis of variance revealed that for vocabulary acquisition, a definitional treatment was significantly superior to a contextual treatment at the .01 level. No significant treatment effects on reading comprehension were found. However, since the subjects in this study were learning disabled

and the sample small, generalizability was not indicated. In a subsequent study Pany, Jenkins and Schreck (1982) examined the relative effects on vocabulary acquisition and sentence comprehension of three vocabulary training conditions. Average fourth grade subjects received vocabulary training under three treatment conditions (definitional, definitional plus practice, and contextual). In general, on vocabulary and comprehension posttests, differences at the .01 level of significance were found between the controls and all treatment conditions. Tukey HSD contrasts were performed to determine which posttest means differed significantly. Results indicated significantly higher means for the definitional treatments than for the contextual and control conditions, $p < .01$. It must be noted, however, that the contextual treatment provided no direct instruction on the word meanings or on the use of context, whereas the definitional methods included direct instruction. Therefore, the results of this study were confounded by the direct instruction variable, leaving the question of the best method of vocabulary instruction unresolved.

Over a five week period, Ahlfors (1979) compared the performance on vocabulary and comprehension measures of groups of sixth grade students taught by three

vocabulary instruction methods (definitional, contextual and experience) with the performance of a control group. Those methods were then compared regarding their relative effectiveness on vocabulary acquisition, sentence comprehension, and story comprehension.

On vocabulary posttests, all treatment groups scored higher than the controls at the .001 level of significance, demonstrating the importance of vocabulary instruction to vocabulary knowledge. Differences among the means of the treatment groups were then compared using the Student-Newman-Keuls post hoc procedure. The mean of the Definitional group was significantly greater than the Contextual group mean at the .01 level and the Contextual group mean was greater than that of the Experience group at the .05 level of significance. An analysis of covariance performed on the sentence comprehension posttest results found all treatment methods superior to controls at the .05 level of significance, indicating that pre-teaching vocabulary made a difference in students' ability to interpret sentences using those words. Comparisons of treatment methods showed no significant difference (.01 level) between the Definitional and Contextual groups, although both were significantly superior to the Experience group. On story comprehension posttests, no significant

effects were found for any of the treatments(.001 level), with controls scoring equally as well as treatment groups. Stahl (1983) questioned the assessment instrument used by Ahlfors to measure story comprehension. This instrument was questioned on the grounds that it may not have been necessary for students to use targeted vocabulary words to answer the comprehension questions. The fact that pre-taught vocabulary accounted for less than one per cent of the total number of words in the text may also have contributed to the lack of effect on reading comprehension of vocabulary instruction.

A significant main effect was found for students' ability as measured by the Iowa Test of Basic Skills administered prior to the treatments. Ahlfors concluded that this finding demonstrated the importance of general verbal ability to reading comprehension. He further concluded that sixth grade students do not have skills for adequately inducing word meaning from the mere reading of prose material even when pre-taught vocabulary is used within the stories.

In sum, the Ahlfors study (1979) demonstrated that vocabulary instruction improved vocabulary knowledge with the Definitional method significantly more effective than the other methods. Also indicated was

that vocabulary instruction improved performance on sentence comprehension with the Definitional and Contextual methods proving equally effective. While results of story comprehension posttests showed no effect for any of the treatments over the controls, this finding, as indicated earlier, has been questioned. In sum, this study has produced mixed results, leaving the question of the preferred method of teaching vocabulary unresolved.

Van Daalen-Kapteyins and Elshout-Mohr (1981) trained Dutch psychology students in word meanings using a contextual method. Their study was basically aimed at differentiating between the way in which high and low verbals use context. Both high and low verbals learned vocabulary well with the vocabulary posttest scores of the low verbals less than the high verbals by an insignificant margin. The study also examined the protocols of the subjects in order to determine if there were differences between the two groups in the quality of their decontextualization skills. Here a significant difference at the .05 level was found between the high verbals and the low verbals, indicating problems on the part of low verbal subjects in making decisions as to how to use contextual information effectively. It must be noted, however, that the low verbal subjects used in

the study were in fact only relatively low as the mean I.Q. for Dutch psychology students from whom these subjects were drawn was 126. In sum, although the Van Daalen-Kapteyins et al. study demonstrated that students of both high and low verbal ability were able to learn vocabulary through the contextual method, the decontextualization strategies for the high verbal group were significantly better than for the low verbal group. These results indicate the need for more research on training decontextualization strategies. The researchers, themselves, stressed the need for research to determine whether or not low verbal subjects can be taught the strategies used by high verbal subjects.

Carnine, Kameenui and Coyle (1984) conducted a study involving 37 fourth, fifth and sixth grade children and found that students were able to learn word meanings through a contextual method. In this study the effect of providing subjects with a rule for using context was examined for the first time. The effect of systematic practice on contextual passages was also studied in isolation and in combination with the provision of a rule. The treatments were administered to children in intact classes with individual students trained in a separate part of the classroom.

In the rule condition, subjects were given the

following general rule: "When there's a hard word in a sentence, you look for other words in the story that tell more about the word" (p.198). Systematic practice involved the subject's reading passages orally, being asked to point to the hard words and then to choose a correct definition. In this treatment feedback from the experimenter was given whenever necessary. One group received the rule plus systematic practice, while the other group received only the systematic practice. A control group received no training.

An analysis of variance indicated that both treatment groups scored significantly higher than controls on posttests of ability to determine the meaning of unfamiliar words from a passage, $F(2,34) = 1100$, $p < .01$. This finding suggests that students cannot be assumed to have adequate contextual analysis skills; direct instruction and/or feedback are necessary for the contextual method of vocabulary instruction to be effective. No significant differences were found between the two treatments. It must be noted, however, that the systematic practice condition included experimenter feedback and guidance which might be interpreted as a form of instruction, perhaps equivalent to the presentation of a rule. Such an equivalence could explain the lack of significant difference between

the groups. Moreover, the rule provided to the subjects was a very general one. The question of whether more specific strategies for using context might have produced a higher performance for deciphering the meanings of unknown words from text remains unresolved.

Schatz and Baldwin (1986) conducted a study to determine the extent to which context helps students to infer the meanings of unknown words. In one experiment, students in grades 10 and 11 were randomly assigned to either a context or a no-context condition. The no-context group read difficult words in isolation. The context group read the same words embedded in passages. In a second experiment, a repeated measures study, 39 students read sets of words in isolation and also in passages taken from four different texts. Results showed no significant effects due to context and the conclusion was reached that the contextual method of training vocabulary should be reexamined.

In particular, Schatz and Baldwin criticized several prior studies (i.e., Carnine, Kameenui & Coyle, 1984; Gipe, 1979) for using text specifically designed to enhance the effect of context on the extraction of meaning for unfamiliar vocabulary. These researchers, however, can be questioned for using text having the opposite problem. More specifically, the text used in

these studies provided virtually no clues to the meanings of the unknown words. Reading the unfamiliar words in context, therefore, became little more than looking at unfamiliar words in isolation. Moreover, students were not given any training in acquiring word meaning from context, a limitation which the authors acknowledged in their study. The question of the preferred method of vocabulary instruction therefore remains unresolved.

In summary, studies of common methods of vocabulary instruction (definition presentation and presentation of context) have produced mixed results. Some studies have indicated that the contextual approach is the stronger method (Crist & Petrone, 1980; Gipe, 1979; Stahl, 1983), while the definitional method was favored by Pany, Jenkins, and Schreck (1982). Ahlfors (1979) concluded that the definitional method was stronger for vocabulary acquisition but found the two methods equally as effective for sentence comprehension. Many of these studies have been questioned on certain methodological issues (e.g., Gipe, 1979; Ahlfors, 1979; Pany Jenkins, & Schreck, 1982). In none of the above studies were students taught vocabulary through the use of decontextualizaton strategies. Other studies (Van Daalen-Kapteyins & Elshout-Mohr, 1981; Carnine, Kameenui

& Coyle, 1984) looked at the question of skills in the use of context but did not teach specific strategies for using contextual clues. Therefore, the question remains unsettled as to what method for teaching vocabulary has the most effect on vocabulary acquisition and the subsequent comprehension of passages using pre-taught vocabulary.

Decontextualization Strategies

Decontextualization strategies will be discussed in this section both from a theoretical perspective and with regard to training studies. Sternberg (1984; in press) has been the largest contributor in this area and this section will draw largely from his work.

Theoretical Background

The thrust of much recent research and theory in the area of reading research has been to explore and explain the complementary nature of the many and varied approaches which have emerged and to view reading from an interactive perspective (e.g., Spiro, Bruce & Brewster, 1980; Rumelhardt, 1977; Sternberg, 1984). Sternberg, (in press) places his theory for the acquisition of verbal comprehension skills within the context of three major interactive approaches to understanding verbal comprehension. Briefly, these three approaches to the acquisition of verbal

comprehension skills are a "knowledge-based" approach, a "bottom-up" approach, and a "top-down" approach. Sternberg (in press) described these as follows:

> The knowledge-based approach deals with the role of prior information in the acquisition of new information. The bottom-up approach deals with speed of execution of certain basic mechanistic cognitive processes. The top-down approach deals with higher-order utilization of cues in complex verbal materials. (p. 3)

Sternberg's theory of the acquisition of verbal comprehension skills with its emphasis on strategies for inferring word meaning from context draws largely from the top-down approach. While bottom-up theorists stress the importance of "mechanistic" processes in verbal ability performance and highlight such factors as the speed of word recognition, Sternberg's theory emphasizes the power to acquire vocabulary through knowledge-acquisition skills.

Based on this theory, Sternberg has developed a model for training students in the ability to acquire vocabulary from context, i.e., decontextualization strategies. This model is founded on two basic ideas. First, some verbal concepts are easier to learn because of the context, itself, that is, the facilitation or

inhibition of learning and later retrieval of the concept is affected by the context structure. Second, some individuals are better at learning verbal concepts than others and these individual differences can be caused by differences in the ability to exploit contextual clues that facilitate learning. Thus, the Sternberg theory distinguishes between the clues present in the external context (text-specific) and those aspects of vocabulary acquisition that lie at least partly within the individual (person-specific).

Regarding text-specific cues, Sternberg has devised a set of specific contextual cues to be used to facilitate the understanding of an unknown word within a text. These cues are called: (1) temporal, (2) spatial, (3) value, (4) static-descriptive, (5) functional, (6) cause/effect, (7) class membership, and (9) equivalence - both restatement of meaning and antonym presentation. Reference is made to mediating variables that foster efficient use of the cues, most of which are text-specific, e.g., number of occurances of the unknown word. One of the variables is person-specific, i.e., the usefulness of the cue to the individual based on prior experience.

Regarding this person-specific variable, Sternberg (1984; in press) has devised a set of procedures to

guide the reader in decontextualization: (1) selectively encoding, i.e., recognizing what information in the text is relevant for decontextualization, (2) selectively combining, i.e., combining selectively encoded information in such a way as to form a plausible definition of the unknown word, and (3) selectively comparing this knowledge to past knowledge.

Other theorists in the field have also commented on the importance of the ability to infer the meanings of unknown words from context and have raised the issue of training subjects in this ability.

Duffelmeyer (1984) noted that effective use of context can facilitate vocabulary acquisition and comprehension for both good and poor readers. McKeown (1985) suggested that the use of decontextualization skills provides "the discovery of a stable meaning for an unfamiliar word that makes sense in, and illuminates the meaning of, the text in which the word appears" (p.484). Thompson and Frager (1984) stressed the importance of decontextualization skills to reading comprehension, holding that deriving a word's meaning from the surrounding text is one of the most influential factors in vocabulary acquisition. Nagy and Anderson (1984) maintained that because of the sheer volume of vocabulary that students encounter in reading, "any

approach to vocabulary instruction must include some methods or activities that will increase children's ability to learn words on their own" (p.325).

To test the above model presented by Sternberg (1984; in press), several studies were conducted. These studies will be discussed in the following section.

Decontextualization Studies

Sternberg and Powell (1983) tested the effect of external contextual information on 123 high school students who were asked to read 32 passages containing from 1-4 unfamiliar words. The student's task was to define each of these words without looking back at the passages. External or text-specific cues employed included (1) cause and effect, (2) static-descriptive, (3) functional-descriptive, and (4) equivalence.

Two kinds of data analysis sought from this investigation both internal and external validation of the theory about learning from context. Internal validation used the students' definitions as the dependent variable. These definitions were rated as to their quality by three independent raters. Mean interrater reliability was .92 so an average of the three ratings was used as a definition goodness score for each word for each student. These averages were

then averaged over subjects to obtain a mean goodness of definition rating for each word. A step-wise multiple regression procedure produced statistically significant correlations (.77 to .92) between predicted and observed goodness ratings ranging over various sets of passages.

External validation for the learning from context theory was also sought. Ratings of definition goodness served as the independent variables to predict students' scores on standardized tests of intelligence, vocabulary and reading comprehension. These scores were available from school files. The rationale for this procedure was that intelligence and comprehension scores derive from the ability of students to ascertain the meanings of words from context. This procedure could not produce a causal link, but the significant correlations that were found did lend support to the theory. Those correlations for definition goodness ratings were .62 with IQ, .56 with vocabulary, and .65 with reading comprehension.

The following limitations of the study were recognized: (1) independent variables were not orthogonal (multicollinear), (2) possible interactions among variables were not examined, and (3) the sample consisted of only upper-middle class subjects.

In a further investigation by Sternberg and Powell

(1983), 190 high school students received 13 short passages, each containing one extremely unfamiliar noun. In the experimental condition, context cues were provided in both long and short segments. Subjects were then asked to rate the helpfulness of each segment containing context cues on a scale of 1 - 7. The mean helpfulness ratings were then averaged across segments for each cue, in order to compute a mean helpfulness rating for each type of cue. This method was used to circumvent the multicollinearity problem of the former study. Without any cues, the mean rating was 1.61, while the cue ratings ranged from 1.81 for temporal cues to 3.20 for equivalence cues (including antonyms). The main conclusion from this study was that all cues were helpful, but that some, i.e., equivalence cues, helped more than others.

Sternberg and Neuse (1983) tested 81 students from an inner-city high school. Students were divided into training groups and administered training in the ability to decipher word meaning from contextual cues. Training lasted over six class periods. Results showed a significant pre to posttest gain for the trained groups over the controls. These results suggested that training in decontextualization skills is possible. However, because many variables were tested, e.g., the

abstractness of the unknown word, it was not possible to establish the significance of the training effects.

Sternberg and Neuse (1983) designed another experiment to overcome this problem and make the investigation of training effects possible. This was done by discarding the distracting independent variables. In this experiment, 150 adults were divided into 5 treatment groups. There were three training conditions and two control groups. Subjects in all three training conditions and one control condition received the same practice words and passages, but differed in the instruction they received. Training sessions lasted approximately 45 minutes. One control group was given an irrelevant memorization exercise. The other control group received practice passages containing context cues but were given no training in decontextualization strategies (the condition most common in vocabulary instruction programs). The treatment groups received the practice passages as well as different forms of training in decontextualization strategies. One training group received instruction in the decontextualization process, another group was taught specific contextual cues, and a third group was given practice in applying knowledge about specific mediating variables, e.g., location of a cue in the

passage relative to the unknown word.

Results, as measured on a 25-item pretest and a 25-item posttest testing skill in the ability to figure out word meanings, indicated that all training groups gained significantly in decontextualization skills over both control groups. The researchers concluded that theoretically motivated instruction in learning words from context can make a significant difference in students' ability to learn word meanings from context, and established the teaching of strategies for decontextualization as preferable to the mere presentation of a contextual passage. In just 45 minutes of training, large gains in decontextualization ability were obtained. The study made clear that this ability was not examined as to its durability over time.

It must be noted that the purpose of Sternberg's research has been to establish the value of the ability to decontextualize, rather than to teach specific vocabulary. Of course, decontextualization ability and its possible transfer is the ultimate goal of this model. Neverthless, left open is the question of how much this method of vocabulary training may improve students'acquisition of specific vocabulary and the subsequent comprehension of passages using that specific vocabulary.

Using the above theory and model as a base, Sternberg, Powell, and Kaye (1983) presented an outline for a training program for the acquisition of vocabulary from context. This program made the claim that "it is possible to learn vocabulary from context by a method that is theoretically based, practically feasible, and of great value to students in improving their skills of verbal comprehension" (p.124). Sternberg has criticized vocabulary training programs that purport to teach vocabulary from context but give the student no training in the skill of decontextualization. Instruction in this skill is viewed as paramount to satisfactory vocabulary instruction.

Sternberg, Powell, and Kaye (1983) recognized that their proposal for a training program was still in the preliminary stage. They were optimistic, however, about the fact that it has been rooted in theory and has been supported by some training studies. These authors have called for further research on this model and have suggested that this training method might be combined with other methods, e.g., rote learning (Sternberg, Powell & Kaye, 1983).

In summary, Sternberg's theory of verbal comprehension with its emphasis on the acquisition of knowledge from context, has led to a model for the

instruction of specific knowledge-acquisition skills for decontextualizing unfamiliar words from context. Several studies have supported this model, and a training program derived from this model is in the early stages of development. Although the training studies have shown significant results in the subjects' ability to use decontextualization strategies, tests of specific vocabulary and tests of the comprehension of passages using that specific vocabulary were not administered. It thus leaves open the question of how much effect this method of training vocabulary might have on the teaching of specific vocabulary and on the comprehension of passages using these pre-taught vocabulary words. Also open is whether this top-down approach might be combined with other methods to produce an even stronger effect.

Speed of Access to Word Meaning

The speed with which a student can recall word meanings has been an issue raised by several researchers in the field of reading and vocabulary research. Although some studies (e.g., Beck, Perfetti, & Mc Keown, 1982) have suggested that this fluency is necessary for vocabulary to have a positive impact on reading comprehension, and a number of theorists have pointed to its importance (e.g., Perfetti, 1983), there has been

surprisingly little direct study of the effect on reading comprehension of training subjects in this skill.

The issue of the speed of access to word meanings has arisen out of investigations in the area of "bottom-up" theory with its emphasis on lower-level, mechanistic skills. Perfetti (1983) has suggested that four basic bottom-up verbal processes underlie many individual differences in reading ability. These processes are (a) word decoding (b) letter recognition (c) word identification, and (d) semantic access, i.e., access to word meaning.

There has been considerable research on the correlation between word recognition skills and reading performance. Most of this research has examined the relationship between accurate and rapid word decoding and/or word identification and efficient reading. There has been considerably less investigation of the correlation between accurate and rapid recall of word meanings (semantic access) and the comprehension of text using these words. These issues will be looked at in this section of the review.

It is apparent that the ability to understand the meaning of a word encountered in written text begins with the accurate identification of that word. There is

considerable evidence in the reading literature that mastery of rapid context-free word identification is a major factor separating good from poor readers (Lesgold & Perfetti, 1978; Liberman & Shankweiler, 1979; Perfetti, 1977; Perfetti & Hogaboam, 1975).

Adams and Huggins (1985) examined the sight vocabularies of above and below average readers in the second through fifth grades with the purpose of devising tests of sight vocabulary. Subjects were asked to read words aloud both in context and in isolation. Results indicated that only words that can be quickly accessed in isolation and in the absence of context should be considered as being at the level of automaticity, a condition characteristic of efficient readers.

The necessity for accurate and rapid word identification has been stressed by a number of bottom-up reading theorists. LaBerge and Samuels (1977) theorized that when readers can identify words rapidly, their comprehension increases as they can give almost all their attention to understanding the text. Perfetti and Roth (1981) suggested that the automation of word identification is essential for fluent text comprehension. Lesgold (1983) indicated that if the reader must use a large amount of thinking capacity for word recognition, less capacity is left for integrating

these verbal concepts into total comprehension. Shiffrin and Schneider (1977) maintained that by automating word identification the drain on mental capacity can be reduced.

Chabot, Zehr, Prinzo, and Petros (1984) proposed that since reading involves interrelated subprocesses of word identification and comprehension, slow inefficient word recognition can utilize subprocesses needed for text comprehension, resulting in reading deficiency. Their study examined the relationships beween word recognition subprocesses and reading comprehension measures in college undergraduates. Results indicated that word recognition subprocesses accounted for significant proportions of the variance in reading achievement between skilled and unskilled readers. They concluded from their findings that the development of rapid word recognition skills is the primary factor distinguishing good and poor readers.

Thus, although rapid word identification has been widely accepted as a necessary component of reading comprehension, research on rapid access to word meanings (semantic access) has not been extensive. One study (summarized in Perfetti, 1983) suggested that skilled readers are faster than less skilled readers at accessing word meanings, even when the time for word

identification was controlled. Perfetti (1983) maintained that, although interpretation of meanings may depend somewhat on context (a word may have multiple meanings), "there is a sense in which semantic processes are autonomous, somewhat like word coding" (p. 148). He concluded that autonomous access to word meanings can be aided by practice and that vocabulary instruction including this component could improve reading comprehension both by establishing word meanings and facilitating rapid access to them.

In a review of the computer reading instruction program, READINTIME, Wilkinson (1983) discussed two components of the program aimed at rapid word recognition. Stressing the importance of fluent word identification, he neverthless expressed the need for revising the program to include training in an extension of this component, namely, rapid access to word meanings. This semantic access was suggested as necessary for efficient reading comprehension.

Pany and Jenkins (1978) studied the effect of telling subjects the meanings of unknown words before they were encountered in written text. They concluded that this type of instruction was not adequate for improving reading comprehension and concluded that " word meanings may have to be taught to a level of

automatic association before reading comprehension is affected" (p.31).

Beck, Perfetti and McKeown (1982) investigated the connection betwen fluent access to word meanings and reading comprehension. These researchers hypothesized that if comprehension depends in part on facile access to word meanings, then vocabulary instruction ought to improve reading comprehension. They distinguished between instruction which enhances only the reader's ability to recognize accurate definitions of learned words and a richer instruction which fosters speed of access to word meaning. In their study twenty-seven fourth grade children were taught 104 words over a five month period. Exercises and word games were employed which included drill in speed of semantic access. These practice exercises were timed and students were encouraged to better their speed while maintaining accuracy. As hypothesized, subjects increased in vocabulary knowledge and the speed in which they could access this knowledge, a condition considered by these researchers as necessary for vocabulary knowledge to affect reading comprehension. For the experimental group, the mean latency for accurate recognition of word meaning was 1.8 seconds, while for the control group it was 2.74 seconds ($t = 4.49$, $p < .05$). Additional

posttests measured speed of semantic access, indicating that instructed subjects were able to respond more accurately and more quickly to instructed words in simple semantic tasks than the control group. These semantic tasks included speeded tasks involving single words and comprehension of simple sentences using these words. Story recall, another comprehension posttest, showed that subjects had gained enough control over the words to produce them in their story recalls. These results supported the proposition that, beyond accuracy, speed of semantic access is a necessary goal of vocabulary instruction.

This study by Beck et al. (1982) also examined the relationship between vocabulary knowledge and reading comprehension and found that vocabulary instruction caused an improvement in the comprehension of passages using pre-taught vocabulary. After vocabulary instruction, these subjects performed tasks requiring semantic processing ranging from single word semantic decisions to sentence verification to story recall. On all these tasks instructed subjects performed at a significantly higher level than control subjects. Thus, instructed subjects evidenced both the learning of instructed vocabulary words and improvement in the ability to process these instructed words more

efficiently in written text. Also revealing were the results of the pre and posttests of vocabulary knowledge and reading comprehension from the Iowa Tests of Basic Skills which were administered to both groups. Although the pretests for both groups were almost identical, posttests on both vocabulary and reading comprehension were significantly higher for the experimental group. Gain scores were tested by *t* tests for correlated scores. Both experimental subjects, $t(22) = 5.88$, $p < .001$, and control subjects $t(22) = 2.27$, $p = .03$, showed gains. Gain scores reflecting differences between pre and posttests were examined further. The mean gain in raw score was 6.4 for experimental subjects and 2.7 for controls. The experimental gains were significantly higher than the control gains, $t(44) = 2.32$, $p = .02$. This pattern of significant results held for both vocabulary and reading comprehension scores.

This study was replicated and extended by McKeown, Beck, Omanson and Perfetti (1983) who also taught fourth grade students 104 words over a five month period. Even greater significance was found in the comprehension score of the instructed subjects over the control subjects. The instructed group showed an increased amount of recall, with improvement in quality as well as

quantity of their responses. The results of this study also supported the importance of rapid semantic access in the reading comprehension process. For the experimental group, the mean reaction time was 2.22 seconds, while for the control group it was 2.96 seconds ($t = 3.32$, $p < .01$). While positive results were found in both of the above cited studies, the instruction lasted over a long period of time. These researchers called for further studies that might show gains resulting from a shorter instructional period.

McKeown, Beck, Omanson, and Pople (1985) further extended the above two studies in their examination of the effects of vocabulary training on several verbal processes including reading comprehension. This study investigated the effects of three types of vocabulary instruction on the comprehension of passages containing pre-taught vocabulary, comparing the level of performance to that achieved on passages containing uninstructed vocabulary and passages consisting of common words. One instruction group received traditional instruction requiring only associations between words and their definitions while two other groups received "rich" instruction involving more elaborate training in word meanings. Speed of semantic access was faster for the experimental instruction

groups than for the traditional instruction group, F (4, 126) = 3.00, p <.05, indicating a relationship between speed of semantic access and the ability to use vocabulary knowledge in the comprehension of written text.

The drill factor, although present in the above three studies, was not studied independently as to its effect on reading comprehension. Gains in speed of semantic access were basically attributed to the variety and overall richness of the instruction. This leaves open the question of whether drill on word meanings might increase speed of semantic processing and thus improve reading comprehension. In addition, the authors suggested that further research is necessary to investigate methods of instruction which might produce this speed in a shorter period of time.

An earlier study by Pany (1978) is the only study available which attempted to investigate the drill factor in isolation. In this study fourth, fifth, and sixth grade students reading at least one year below grade level served as subjects for the research. Five conditions were studied, including two control conditions and three instructional conditions. The students in the two control conditions were tested on passages after no instruction. The three instructional

groups received different instruction on ten unfamiliar words. The Accuracy Group was presented the ten words with a synonym for each and an example of each unfamiliar word in a sentence. The synonyms were practiced until they could be produced twice in succession. The Rate Group first learned the unfamiliar word to the Accuracy criterion and then was trained until able to provide all ten synonyms in ten seconds or less. A third group (Application) were taught the words through the use of examples and non-examples. This involved the presentation of the unfamiliar words followed by a brief story demonstrating the meaning of the word. The students were then told a contrasting story involving non-examples of the unfamiliar words. Practice in finding examples and non-examples of the words was then provided.

Results indicated that both the Accuracy and Rate treatments were significantly superior to the controls and to the Application group. There was no significant difference between the Accuracy and Rate Groups. The Accuracy Group, however, included the presentation of a contextual sentence, adding another variable to the treatment. Also, the students in the Accuracy group were trained until they were able to provide the correct synonym twice in succession. Such practice might have

allowed them to reach a point where sufficiently rapid semantic access had been achieved. Thus, although this study supports the proposition that rapid access to the meanings of words is important to reading comprehension, it is inconclusive as to the method of training. It also leaves open the question of how much the provision of drill in rapid access to word meanings might enhance the effects on reading comprehension of vocabulary learned through other methods of vocabulary instruction such as the use of decontextualization strategies.

Summary

The theoretical background for the proposed study has now been thoroughly discussed. Areas covered have been the relationship between vocabulary knowledge and reading comprehension, common methods of teaching vocabulary, teaching vocabulary through decontextualization strategy training, and training in the speed of access to word meanings.

Vocabulary knowledge as an important component of reading comprehension has been documented in several areas of reading research. Factor analytic studies (i.e., Davis, 1944; Spearitt, 1972; Thurstone, 1946), test construction research (e.g., Farr, 1969), readability research (Chall, 1958; Klare , 1974-75) and cross-cultural research (Thorndike, 1973) have all

concluded that reading performance is largely a function of vocabulary knowledge.

Although this relationship between vocabulary and reading performance has been largely accepted within the reading field, there has been little agreement as to why this correlation exists. The lack of a solid theoretical background has led to a general lack of direction within the field regarding the best methods of teaching vocabulary.

Anderson and Freebody (1981) advanced an instrumentalist hypothesis suggesting that vocabulary knowledge improves reading comprehension by virtue of that knowledge alone. This hypothesis has strong implications for vocabulary instruction as it suggests that pre-teaching vocabulary may have a positive effect on reading comprehension. One condition considered necessary for the acceptance of this hypothesis was that the substitution of easier or more difficult words in a text must make that text easier or more difficult to understand. This condition was fulfilled by the results of studies by Mark, Doctorow and Wittrock (1974), Wittrock, Marks, and Doctorow (1975); and Kameenui, Carnine and Freschi (1982).

Anderson and Freebody (1981) also required that a second condition be fulfilled, i.e., that learning

unfamiliar words in a text make that text more comprehensible. Results of these vocabulary studies have been mixed. Studies (e.g. Kameenui, Carnine & Freschi, 1982; Beck, Perfetti, & McKeown, 1982; McKeown, Beck, Omanson, & Pople, 1985; Stahl, 1983) showed gains in reading comprehension from the pre-teaching of vocabulary, thus supporting the instrumentalist hypothesis of Anderson and Freebody (1981).

Some earlier studies had failed to support the instrumentalist hypothesis (Pany & Jenkins, 1978; Jenkins, Pany, & Schreck, 1982; Schacter, 1978; and, Ahlfors, 1979. These studies were questioned on methodological issues such as the inclusion of learning disabled subjects, questionable comprehension assessment instruments, and the training of students on less than one percent of the total number of words in the text. In sum, further research has been called for to clarify this issue regarding the effect of vocabulary instruction on reading comprehension. "Can reading comprehension be effectively improved by the pre-teaching of vocabulary words?" is a question remaining unresolved.

The best method for teaching vocabulary has also not been firmly established. A discussion of the most

common methods of instruction has been presented earlier in the review. The most common methods have been (1) presenting a synonym or definition through dictionary practice or a word list, and (2) presenting a contextual sentence or passage using the unknown word. Results of studies comparing these methods have been mixed. Crist and Petrone (1980), Gipe (1979), and Stahl (1983) concluded that contextual methods were superior, while studies by Pany and Jenkins (1978), Pany, Jenkins and Schreck (1982), and Ahlfors (1979) produced results favoring the definitional method. Certain methodological issues were raised in connection with all of these studies. These issues have been discussed in detail earlier in the review.

An important criticism of the common methods of vocabulary instruction has been that subjects were not trained in the methods of using contextual information for deciphering word meaning. One study (Carnine, Kameenui & Coyle, 1984) attempted to address this issue but has been questioned on certain methodological issues. More specifically, this study found that instruction in the use of context through the presentation of a rule was no more effective than systematic practice with feedback. However, such practice with feedback might be considered equivalent to

the presentation of a rule, thus diminishing differences between the groups in terms of instruction in context use. Also open to question is the fact that the rule for context use was very general and did not include specific guidelines for context use. The issue as to the effect of training students on specific methods for decontextualizing word meaning from written text using these words, therefore, remains unresolved.

Inferring the meaning of an unknown word from its context has been the subject of much research by Sternberg and his colleagues (e.g., Sternberg, 1984; Sternberg (in press), Sternberg & Powell, 1983; and Sternberg & Neuse, 1983) This research is based on an elaborate theory of knowledge-acquisition from context, a skill considered by Sternberg as vital to verbal comprehension. Sternberg has, in fact, maintained that training in vocabulary instruction based on the contextual approach is incomplete unless it includes training in context use. In establishing his theory, Sternberg has analyzed several approaches to reading theory, i.e., the top-down approach, the knowledge based approach, and the bottom-up approach. This analysis has been discussed earlier in the review. From this theory of knowledge acquisition from context, Sternberg and colleagues have devised a model for vocabulary

instruction (Sternberg & Powell, 1983 ; Sternberg & Neuse, 1983) and the early stages of a vocabulary instruction training program (Sternberg, Powell, & Kaye, 1983).

Several training studies were conducted to test the theory (e.g., Sternberg & Powell, 1983; Sternberg & Neuse, 1983). Results were generally supportive but certain methodological issues were questioned. In spite of certain limitations, it was felt that these studies supported the model for training subjects in decontextualization strategies. Further research was called for to extend these studies.

The thrust of Sternberg's research has been to train students in the ability to decontextualize rather than to teach specific vocabulary. Therefore, posttests did not measure the effect of this method on reading comprehension of passages containing pre-taught vocabulary words. The following question therefore needs to be investigated: "Can vocabulary taught through the method of decontextualization strategies cause a significant improvement in reading comprehension of passages containing those pre-taught words?"

The speed with which a student can recall word meanings (speed of semantic access) has been another issue reviewed earlier in the paper. The discussion of

this issue stems mainly from the work of bottom-up theorists (e.g.,Perfetti, 1983; LaBerge & Samuels, 1977). There has been surprisingly little direct study of this variable and its possible effect on reading comprehension.

There has been considerable research on the correlation between word recognition skills and reading performance, with the majority of this work aimed at investigating the relationship between rapid word decoding and/or word identification and efficient reading. Considerably less work has been aimed at the correlation between rapid semantic access and reading performance.

Pany and Jenkins (1978) studied the effect of telling subjects meanings of unknown words prior to reading them in text and found this method inadequate for improving reading comprehension. They suggested that word meanings may need to be taught to the level of automaticity before they can positively affect reading comprehension. Beck, Perfetti, and McKeown (1982), McKeown, Beck, Omanson, and Perfetti (1983, and McKeown, Beck, Omanson, and Pople (1985) used speed word exercises in their extensive vocabulary instruction programs. In all of the studies, speed of semantic access improved. These researchers, however, called for

research which might produce these results in a shorter time. Furthermore none of these studies investigated the drill factor in isolation, leaving open the question of how much drill in rapid access to word meanings can affect vocabulary learning and reading comprehension.

Two questions therefore remain open for study. "Can drill in the rapid access to word meanings improve vocabulary and the comprehension of passages using this vocabulary?" Another question arising out of this review is "Can drill in the rapid access to word meanings be combined with the method of teaching decontextualization strategies in order to produce an even greater improvement in vocabulary and the comprehension of passages using that vocabulary than when each method is administered separately?"

As noted earlier, the thrust of much recent theory in the area of reading research has been to explore and explain the complementary nature of many approaches to reading and to view reading from an interactive perspective. The proposed combination of training methods would constitute further effort in that direction.

Research Questions and Hypotheses

Based on the preceding review, the following research questions are posed for investigation. For each research question, its attending hypotheses follow immediately.

Research Question 1. Does training in vocabulary result in gains in vocabulary knowledge?

Hypothesis 1a. Subjects in all vocabulary training conditions will display significantly higher vocabulary knowledge posttest scores than vocabulary knowledge pretest scores.

Hypothesis 1b. Vocabulary knowledge posttest scores for subjects in all training conditions will be significantly higher than vocabulary knowledge posttest scores for subjects in a control group.

Research Question 2. Are there significant differences in posttest scores for vocabulary knowledge among subjects trained under the following conditions: (a) Decontextualization, (b) Speed of Semantic Access, and (c) a combination of Decontextualization and Speed of Semantic Access? In 2b there is no research evidence for predicting the efficacy of either method over the other.

Hypothesis 2a. Subjects trained in a combination of Decontextualization and Speed of Semantic Access will display significantly higher posttest scores on vocabulary knowledge than subjects in other training conditions.

Hypothesis 2b. There will be no significant difference in vocabulary knowledge posttest scores between subjects trained in Decontextualization and subjects trained in Speed of Semantic Access.

Research Question 3. Does training in vocabulary result in gains in the reading comprehension of passages using that vocabulary?

Hypothesis 3a. Subjects in all vocabulary training conditions will display significantly higher posttest scores than pretest scores on the comprehension of passages containing pre-taught vocabulary words.

Hypothesis 3b. Gain scores on the reading comprehension of passages containing pre-taught vocabulary will be significantly higher for subjects in all training conditions than for subjects in a control group.

Research Question 4. Are there significant differences in gain scores for reading comprehension of passages containing pre-taught vocabulary words among subjects trained under the following conditions: (a) Decontextualization, (b) Speed of Semantic Access, and (c) a combination of Decontextualization and Speed of Semantic Access? In 4b there is no research evidence for predicting the efficacy of either method over the other.

Hypothesis 4a. Subjects trained in a combination of Decontextualization and Speed of Semantic Access will display significantly higher gain scores on reading comprehension of passages containing pre-taught vocabulary than subjects in other training conditions.

Hypothesis 4b. There will be no significant difference in gain scores on reading comprehension of passages containing pre-taught vocabulary words between subjects trained in Decontextualization and subjects trained in Speed of Semantic Access.

CHAPTER III

METHODOLOGY

The purpose of the present study was to investigate the relative effectiveness on vocabulary knowledge and reading comprehension of two methods of vocabulary instruction. These methods were examined separately and in combination. To ascertain the relative effectiveness of these two methods, vocabulary knowledge and reading comprehension of subjects receiving the different interventions were compared with each other as well as with that of participants receiving no vocabulary instruction.

Sample

There were 90 undergraduate students at an inner city community college participating in this study. Seventy (77.8%) were females and 20 (22.2%) were males. All subjects had been identified by a standardized reading test as not meeting the minimal reading competency requirement for college courses. Seventy-six subjects (84.4%) had received between 17 and 27 on Form A of the Descriptive Test of Language Skills (College Examination Board, 1948) and on the basis of these scores had been placed in developmental reading classes, the classes used in this study. This test is

administered during the admissions process. Ten students in the classes (11.1%) were identified as having scored lower than 17 on the standardized reading exam. These subjects had been placed in basic reading classses before entering the developmental classes used in this study. Four subjects in the classes (4.4%) who had tested below 17 were identified as students of English as a Second Language, originally placed in an ESL reading course before entering the developmental classes used in this investigation.

The intact reading classes were randomly assigned to treatment conditions. Due to the nature of the study setting, random assignment of subjects was not possible. These were students registered for specific course sections that could not be separated. Eight classes participated with each treatment being administered to two classes. There were no significant differences among the four groups on the vocabulary pretest scores (F (3,86) = 1.36, p =.26). However, on reading comprehension pretest scores, a significant effect was found (F (3,86) = 2.86, p<.05). Follow-up t-tests revealed that the Decontextualization Group had significantly higher scores than the SSA Group. No other significant t-tests were discovered. These pretest differences were addressed by the use of gain

scores in the data analysis. Twenty-one subjects (23.3%) were assigned to the SSA (Speed of Semantic Access) Group; 27 participants (30%) comprised the Decontextualization Group; 19 (21.1%) were in the Combination Group; and 23 subjects (25.6%) were assigned to the control group.

Instrumentation

Assessment of the effects of vocabulary instruction on vocabulary knowledge and the comprehension of passages containing that vocabulary was measured by a test of reading comprehension and vocabulary knowledge measures.

Reading Comprehension Assessment (RCA) scale

The RCA is an experimental test developed for the present study to assess the effect of vocabulary instruction on the comprehension of text using that pre-taught vocabulary. It consists of three passages of approximately 200 words each with the target words comprising approximately 3% of the total number of words in the text. Each passage is followed by multiple-choice questions which are designed to assess the subject's comprehension of the passages. Twenty-three multiple-choice items comprise the scale. Each item was examined using Johnson and Pearson's (1978) taxonomy of reading comprehension questions. This taxonomy resulted

from an examination of the kinds of questions asked readers in determining their comprehension of written text. Questions were categorized as a means of offering guidelines for the composition and use of questions in the assessment of reading comprehension. Textually explicit questions have obvious answers right on the page; textually implicit questions have answers in the written text but are less obvious and require the reader to make an inference to answer correctly; scriptally implicit questions require the reader to combine information in the text with background knowledge on the subject.

Examination of the RCA disclosed questions to be textually implicit, i.e.,requiring a deeper level of comprehension than is required by textually explicit questions, but not requiring background knowledge. In addition, the questions were constructed so that subjects are required to apply their knowledge of target vocabulary words to their understanding of the story ideas. There are no context clues present in the text in order that correct answers depend solely on vocabulary knowledge. Therefore, transfer of decontextualization skills is not being measured. The questions require subjects to complete the statement found in the stem by choosing the best of four possible

alternatives.

Construction Four passages were originally developed together with 40 multiple-choice questions assessing the comprehension of the passages. Two of these passages were adapted from a study by Jenkins, Stein and Wysocki (1984) who were looking at incidental vocabulary acquisition through context use and its effects on reading comprehension. One passage was adapted from a study by McKeown, Beck, Omanson, and Perfetti (1983) who were looking at the effects of vocabulary knowledge on text comprehension. One was constructed by the present researcher using the former passages as models. All passages were written in the narrative form. The questions were also adapted from or based on these studies.

Item Analysis Sixteen subjects were used to ascertain the discrimination power of the RCA. These subjects were not used in the present study, but attended the same college and were screened by the same reading achievement test (DTLS) as the population under investigation. The test was administered in the following manner: (1) Copies of the RCA were distributed to the subjects who were instructed to read the passages and respond to the multiple-choice questions following the passages to the best of their

ability; (2) the tests and answer sheets were then collected by the researcher; (3) subjects were given a modified treatment, i.e., a set of synonyms or short definitions for the 16 targeted vocabulary words was distributed to the subjects; (4) the test was again administered with subjects using the definitions of the targeted vocabulary words as they read the passages and responded to the multiple-choice questions following each passage. An item analysis of the responses disclosed that certain items negatively discriminated between higher-scoring and lower-scoring subjects. Four items were eliminated for this reason.

Validity The validity of the RCA was established by performing a Sensitivity to Instruction analysis on the pretest and posttest scores of the 16 subjects used in the preliminary studies. This analysis was conducted to determine that the RCA was sensitive to the type of treatment being conducted in the present study. Only items which indicated sensitivity to vocabulary instruction were used in the final version of the scale. Such items were deemed capable of measuring the effects of knowledge of vocabulary words on the reading comprehension of passages containing that vocabulary. Items sensitive to treatment showed increases in the number of correct answers following treatment. Items

not indicating such sensitivity to treatment on the posttest were eliminated. Items indicating a ceiling effect on the pretest were also deleted.

Sensitivity to instruction was determined by the following procedure. The RCA was administered to the same 16 subjects representative of the population from which the present sample was drawn. Following completion of the scale (pretest), a modified treatment was administered. This treatment consisted of presenting subjects with a sheet containing synonyms or definitions for the targeted vocabulary. Subjects were again presented with the RCA (posttest) and instructed to read the passages and answer the comprehension questions using the definition sheet as an aid. The pre/post scores were then analyzed to determine which items were sensitive to the modified treatment. The number of subjects going from an incorrect response on an item on the pretest to a correct response on that item on the posttest were represented as a proportion of all subjects responding to that item. So, for example, item 5 was responded to correctly by 11 of the 16 respondents on the pretest. Of the 5 respondents who selected the incorrect answer on the pretest, all selected correctly on the posttest. Hence, .31 of all responses were correctly answered following treatment.

Items not sensitive to instruction, i.e., having a sensitivity index of 0 or below, were discarded (Gronlund, 1981). Items with a sensitivity index of .19 and above were retained as adequately measuring sensitivity to instruction. Based on the data, the most rapid change in sensitivity occurred between the .19 and .06 levels. For this reason, and based on the fact that .06 shows very little sensitivity to change, items below the .19 level were dropped from the final testing instrument. The Sensitivity to Instruction analysis resulted in the elimination of one passage and 13 items. The remaining items were sensitive to instruction and therefore deemed valid.

A refined version of the test containing three passages and 23 multiple-choice questions remained. The adaptation of one passage from Jenkins, Stein and Wysocki (1984) had been dropped on the basis of the analysis.

Reliability Test/Retest reliability was determined as follows. The refined version of the test was administered twice to 20 subjects representative of the population from which the present sample was drawn. A two-week interval elapsed between administrations. Test/Retest reliability was found to be $r = .75$, $t = 4.8$, $p < .01$.

Vocabulary Knowledge (VK) scale

The VK scale is an experimental instrument developed for the present study to assess the effect of vocabulary instruction on vocabulary knowledge. Sixteen unfamiliar words which appear in Reading Comprehension Assessment (RCA) scale, and which had been targeted for instruction were used. The test format is multiple-choice, with the target word used as the stem and four alternatives offered in the form of synonyms or brief definitions. For each item the three distractors were chosen to conform to the semantic category of the target word.

In order to establish that the words were unfamiliar to the subjects, this test was administered to 20 students drawn from the same population as that under investigation. The mean score was 5.5 out of a possible 16, with a standard deviation of 5. The highest score was 9 and the lowest score was 2. Random guessing would have resulted in a score of 4 (1/4 x 16 = 4). A t-test for 1 sample, with 4 as the the comparison value disclosed no significant difference between the obtained mean and the random guessing value of 4 ($t(19) = .10$).

In order to determine reliability, the test was re-administered 2 weeks after the posttest to the sample

used in the present investigation. Test/retest reliability was then calculated between the posttest and the follow-up posttest of all the study groups (r = .93. p <.05).

Vocabulary Recall (VR) scale

The VR scale is an experimental instrument developed for the present study to assess the effect of vocabulary instruction on vocabulary recall. The 16 unfamiliar words appearing in the vocabulary knowledge (VK) scale and targeted for instruction are presented in a list format. Space is provided next to each word for the definition to be written. Subjects were instructed to write the definition of the unfamiliar word from memory. The conditions under which this scale was developed are discussed in the following section on procedures. Reliability and validity were not determined as this scale had not been developed when the preliminary studies were done. The data from this scale was used only in subsidiary analyses.

Procedures

Subjects in intact reading classes were randomly assigned to four study conditions, consisting of three treatment groups and a control group. The study was done in two phases. One administration was conducted in the fall semester and the other during the

following spring semester. There was an interval of approximately 3 months between phases. Within a one-week time frame, subjects in the three treatment groups were taught 16 unfamiliar vocabulary words by two different methods and by a combination of these two methods. One group was taught the 16 words through the use of decontextualization strategies (Decontextualization). Another group was given the definitions of the 16 words and was trained in the rapid access to these definitions (Speed of Semantic Access). A third group was given a combination of the first two treatments (Combination). Finally, a control group received a nonrelated language arts activity. This activity consisted of the presentation of a lesson on analogy-making. The time spent on this lesson was the same as in the Decontextualization and Combination treatment conditions.

A description of the treatments follows.

Decontextualization Group

As seen from the materials in Appendix A, subjects in this group were taught skills in deriving word meaning from external context in the following sequence of steps: (1) a verbal explanation of the meaning of context was presented; (2) general guidelines (as shown in Appendix B) for using decontextualization strategies

based on Sternberg's decontextualization procedures of encoding, combining, and comparing, were distributed to the students and read aloud by the instructor; (3) three specific context clues indicated by Sternberg and Powell (1983) as being the most helpful to vocabulary acquisition were introduced to the students by the instructor. A handout describing these clues was distributed (see Appendix B). The three context clues used were the (a) restatement clue (when an unknown word in a sentence is followed or preceded by a synonym or statement saying the same thing in a more understandable manner), (b) cause and effect clue (when an unknown word is either the cause or the effect of something easier to understand than the unknown word), and (c) contrast clue (when the opposite of an unknown word is given and that opposite is easier to understand than the unknown word). Recognizing words in the sentence that signal the presence of these clues was also explained. (4) A set of exercises (see Appendix C) was distributed to the students which presented the 16 target words for instruction purposes for the first time. These exercises provided practice in the use of decontextualization strategies by requiring subjects to employ these strategies to decipher the meaning of the 16 unknown words. This activity was completed by the

group under instructor direction. Immediate feedback from the instructor was given regarding the correctness of the students' use of the strategies and the correctness of the deciphered meaning of the unknown words. Instruction time consisted of approximately one hour and thirty minutes spread over two class sessions.

Speed of Semantic Access Group

Subjects in this group received synonyms or short definitions for the 16 vocabulary words and were trained to rapidly access these word meanings. A slide projector was used to present each word together with its synonym or short definition. The students were shown the words 10 times at increasingly faster speeds. They were shown the words 3 times at 13 seconds, 3 times at 8 seconds and 4 times at 3 seconds. As a group they repeated the word and its definition at each presentation. Total instruction time consisted of approximately 30 minutes.

Decontextualization and Speed of Semantic Access Group (Combination)

Subjects in this experimental group were taught skills in acquiring word meaning from external context and trained to rapidly access the meaning of these words. The 16 targeted word used in the two previous training conditions were also used in this combination

of instruction methods. As seen from the materials in Appendix A, subjects were first taught decontextualization strategies in the following sequence of steps: (1) a verbal explanation of the meaning of context was presented; (2) general guidelines (as shown in Appendix B) for using decontextualization strategies was distributed to the students and read aloud by the instructor; (3) three specific context clues indicated by Sternberg and Powell (1983) as being the most helpful to vocabulary acquisition were introduced to the students by the instructor. A handout (see Appendix B) describing these clues was distributed. The three context clues used were the (a) restatement clue (when an unknown word in a sentence is followed or preceded by a synonym or a statement saying the same thing in a more understandable manner), (b) cause and effect clue (when an unknown word is either the cause or effect of something easier to understand than the unknown word), and (c) contrast clue (when the opposite of an unknown word is given and that opposite is easier to understand than the unknown word). Recognizing words in the sentence that signal the presence of these clues was also explained; (4) a set of exercises (as shown in Appendix C) was distributed to the students which presented the 16 targeted words for instructional

purposes for the first time. These exercises provided practice in the use of decontextualization strategies by requiring subjects to use these strategies to decipher the meaning of the 16 targeted words. This activity was completed by the group under instructor direction. Immediate feedback from the instructor was given regarding the correctness of the students' use of the strategies and the correctness of the deciphered meanings.

Training in the rapid access of the meanings of these 16 targeted words was then administered. The words and their meanings were presented 10 times to the students using a slide projector. The presentations were made at increasingly faster speeds with the students repeating the word and its meaning after each presentation. The words and their meanings were presented 3 times at 13 seconds, 3 times at 8 seconds and 4 times at 3 seconds. Instruction time consisted of approximately 1 and 1/2 hours.

Table 1 shows the design of the study and the number of subjects participating in each group. A sequence of pretests, treatment, and posttests was used for all groups. All subjects received the RCA and VK scales. The vocabulary recall measure (VR) was administered to 32 of the 90 subjects in the study across the four study

Table 1.

Design of Study: Training Condition, Number of Students, Measure and Time of Testing.

	Time of Testing					
	Pre			Post		
Group	VK n	VR n	RCA n	VK n	VR n	RCA n
Decontextualization	27	10	27	27	10	27
Speed of Semantic Access n=21	21	6	21	21	6	21
Combination n=19	19	6	19	19	6	19
Control n=23	23	10	23	23	10	23

Total Subjects n=90

VK - Vocabulary Knowledge

VR - Vocabulary Recall

RCA - Reading Comprehension Assessment

conditions. Only the spring semester students were given the VR scale as it was developed in response to the solid ceiling effect shown on the VK scale administered during the fall semester. It was hoped that a vocabulary measure requiring recall of the word rather than only recognition, as required by the multiple-choice format of the VK scale, might reduce the ceiling effect. The tests were administered as pretests during the class session preceding the treatments and as posttests following the treatments. The VR scale was administered first, followed by the VK scale and then the RCA scale. In a tryout of these tests, it had been determined that administration of the VK and RCA scales requires approximately 45 minutes. The VR scale took another ten minutes to administer.

Careful attention was given to assure treatment integrity. A strict protocol (see Appendix A) was adhered to within the limits possible in a classroom setting. Likewise, pretests were not corrected until after posttests had been administered to all study groups.

Method of Data Analysis

Hypotheses requiring pre/posttest comparisons were analyzed by means of a mixed model analysis of variance design. The within subjects factor was time of testing

(pre, post) and the between subjects factor included the 3 treatment groups. For all other hypotheses, one-way ANOVAS on both gain scores and posttest scores were conducted for the appropriate treatment and control comparisons. Follow-up multiple *t* test comparisons were run using a conservative level of significance.

Since it was not possible to randomly assign subjects to study conditions, the possibility of pretest differences among the intact classes arose. The analysis of gain scores as well as posttest differences was decided upon to address this possibility. The use of gain scores permits the examination of the pre/post differences among the study groups, while allowing these comparisons to be expressed in the original units of measurement. In terms of the questions asked by the study, focus is on both the absolute level of attainment in vocabulary and reading comprehension and the gains exhibited by each treatment group. Therefore, the analysis of both posttest and gain scores seemed appropriate as it provides information as to how high the subjects scored as well as how much their scores increased.

In the following paragraphs, the research questions and hypotheses will be reiterated and the method of data analysis indicated for each hypothesis.

Research question 1 asks "Does training in vocabulary result in improved vocabulary knowledge?"

Hypothesis 1a stated that subjects in all vocabulary training conditions will display significantly higher vocabulary knowledge posttest scores than vocabulary knowledge pretest scores. To test this hypothesis, t-tests were conducted using the data from the pre/post vocabulary knowledge tests.

Hypothesis 1b stated that vocabulary knowledge posttest scores for subjects in all training condtions will be significantly higher than posttest scores for subjects in a control group. To test this hypothesis, a one-way ANOVA on the posttest scores for each study group was conducted. A separate ANOVA on the pre/posttest gains for each study group was also performed. Follow-up t-tests were also run at a conservative level of significance.

Research question 2 asks "Are there significant differences in posttest scores for vocabulary knowledge among subjects trained under the following conditions: (a) Decontextualization, (b) Speed of Semantic Access, and (c) a combination of Decontextualization and Speed of Semantic Access?"

Hypothesis 2a stated that subjects trained in a combination of Decontextualization and Speed of Semantic

Access will display higher posttest scores in vocabulary knowledge than subjects in other training conditions. To test this hypothesis, a one-way ANOVA on the posttest scores for each treatment group was conducted. Follow-up t-tests were also run at a conservative level of significance. A separate ANOVA on the pre/posttest gains for each treatment group was also performed.

Hypothesis 2B stated that there will be no significant difference in vocabulary knowledge posttest scores between subjects trained in Decontextualization and subjects trained in Speed of Semantic Access. To test this hypothesis, a one-way ANOVA on posttest scores for these two treatment groups was conducted. A separate ANOVA on the pre/posttest gains was also performed.

Research Question 3 asks "Does training in vocabulary result in gains in reading comprehension of passages using that vocabulary?"

Hypothesis 3a stated that subjects in all vocabulary training conditions will display significantly higher posttest scores than pretest scores on the comprehension of passages containing the pre-taught words. To test this hypothesis, t-tests were conducted using the data from the pre/post reading comprehension tests.

Hypothesis 3b stated that gain scores on the reading comprehension of passages containing pre-taught vocabulary will be significantly higher for subjects in all training conditions than for subjects in a control group. To test this hypothesis, a one way ANOVA was performed on the pre/posttest gains for each study group. A separate ANOVA on posttest scores for each study group was also conducted. Follow-up t-tests were then run at a conservative level of significance.

Research Question 4 asks "Are there significant differences in gain scores for reading comprehension of passages containing pre-taught vocabulary among subjects trained under the following conditions. (a) Decontextualization, (b) Speed of Semantic Access, and (c) a combination of Decontextualization and Speed of Semantic Access?"

Hypotheses 4a stated that subjects trained in a combination of Decontextualization and Speed of Semantic Access will display significantly higher gain scores on reading comprehension of passages containing pre-taught vocabulary than subjects in other training conditions. To test this hypothesis, a one-way ANOVA on the pre/posttest gains for each treatment group was conducted. A separate ANOVA on posttest scores for each treatment group was also performed.

Hypotheses 4b stated that there will be no significant difference in gain scores on the reading comprehension of passages containing pre-taught vocabulary between subjects trained in Decontextualization and subjects trained in Speed Speed of Semantic Access. To test this hypothesis, a one-way ANOVA on the pre/posttest gains for these two treatment groups was conducted. A separate ANOVA on posttest scores was also performed.

CHAPTER IV

RESULTS

The present study examined the relative effects of two methods of vocabulary instruction on vocabulary knowledge and reading comprehension. These methods were examined separately and in combination. Vocabulary knowledge and reading comprehension of subjects who received the different interventions were compared with each other as well as with that of participants who received no vocabulary instruction. Vocabulary recall comparisons among groups were not made because of the small number of subjects receiving the vocabulary recall assessment scale.

In this section each hypothesis is examined individually, followed by scale reliability, other correlational analyses and supplementary vocabulary recall comparisons.

Hypothesis Testing

Hypothesis 1a predicted that subjects in all vocabulary training conditions would display significantly higher vocabulary knowledge posttest scores than vocabulary knowledge pretest scores. Vocabulary knowledge pretest scores for the 3 treatment groups ranged from 2 - 14, while posttest scores ranged

from 14 to 16. Table 2 displays means and standard deviations for each group on vocabulary knowledge pretest, posttest and gain scores. Pretest mean scores ranged from 5.10 for the Speed of Semantic Access Group to 6.25 for the Decontextualization Group. All groups except for the controls showed dramatic posttest increases and gains. Posttest scores were negatively skewed and exhibited a ceiling effect. This was evidenced by scores clustered slightly below 16, the highest possible score, and by small standard deviations. Across all groups 58 out of the 67 subjects (87%) receiving vocabulary training achieved a perfect score. The remaining 9 subjects scored either 14 or 15. No common word was missed by these subjects.

To test hypothesis 1a, t-tests were conducted using the data from the pre/post tests of the three training groups. As further shown in Table 2, there were significant differences between the pre/post scores of the Combination Group (t = 20.04, p <.001) as well as for the Decontextualization Group (t = 16.50, p <.001), and the Speed of Semantic Access Group (t = 29.07, p <.001.). For all groups taken together, vocabulary knowledge posttest scores were significantly higher than pretest scores (t = 33.40, p <.001).

Hypothesis 1b predicted that vocabulary knowledge

Table 2

Means, Standard Deviations and t-values for Vocabulary Knowledge Pre/Posttest and Gain Scores of all Study Groups.

		Pretest		Posttest		Gain		
Group	n	Mean	SD	Mean	SD	Mean	SD	t-value (pre/post)
Combination	19	6.11	2.18	15.95	0.23	9.84	2.14	20.04***
Decontextualization	27	6.26	2.74	15.63	0.69	9.37	2.95	16.50***
Speed of Semantic Access	21	5.10	1.68	15.95	0.22	10.86	1.71	29.07***
Control	23	6.17	1.83	7.65	2.27	1.48	2.09	3.40**
All Treatment Groups	67	5.85	2.32	15.82	0.49	9.97	2.45	33.40***

*** $p < .001$

** $p < .01$

posttest scores for subjects in all vocabulary training conditions would be significantly higher than vocabulary knowledge posttest scores for subjects in a control group. To test this hypothesis, a one-way ANOVA was conducted on the posttest scores of all study groups. Means and standard deviations for all groups are displayed in Table 2. The means of the posttest scores for all treatment groups are high, demonstrating a ceiling effect. The fact that these posttest scores were clustered around the ceiling is reflected in the small standard deviations. The ANOVA results are summarized in Table 3 and indicate a strong effect for group membership $F(3,86) = 257.43$, $p<.001$. Follow-up t-tests showed significant differences between each treatment group and the control group ($p < .001$), supporting Hypothesis 1b. Significant differences were found between the Combination Group and the control group ($t = 21.98$, $p < .001$,), Decontextualization and control ($t = 23.10$, $p < .001$), and SSA and control ($t = 22.59$, $p < .001$). No significant differences were found between any of the treatment groups.

To examine this hypothesis further, and to reduce the impact of the posttest ceiling effect, gain scores were calculated from the pre/posttest scores. A one-way ANOVA was performed on these gain scores. Table 2

Table 3

Summary Table of the ANOVA for the Posttest Vocabulary Knowledge Scores for all Study Groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	3	1144.19	381.40	257.43	0.001***
Error	86	127.41	1.48		
Total	89	1271.60			

*** $p < .001$

displays these means and standard deviations. While the mean gain score for each treatment group was found to be at least 9 points, the mean gain score for the control group was only 1.48. Once again, Table 4, the ANOVA summary table, indicates a strong effect for group membership $F(3,86) = 78.07, p < .001$. Follow-up t-tests showed significant differences between each treatment group and the control ($p < .001$) supporting Hypothesis 1b. Significant differences were found between the Combination Group and the control group ($t = 11.63$, $p < .001$), Decontextualization and controls ($t = 11.99$, $p < .001$), and SSA and controls ($t = 13.39$, $p < .001$). Significant differences were not found between any of the treatment groups except between the Decontextualization and the Speed of Semantic Access Group ($t = 2.20$, $p < .05$). However, when corrected for the number of t-test comparisons conducted, this effect no longer reached significance at the .05 level. Therefore, it would appear that this finding is at best marginal.

Hypothesis 2a predicted that subjects trained in a combination of decontextualization skills and speed of semantic access would display significantly higher vocabulary knowledge posttest scores than subjects in other training conditions. The other training

Table 4

Summary Table of the ANOVA for the Vocabulary Knowledge Gain Scores for all Study Groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	3	1261.27	420.42	78.07	0.001***
Error	86	463.13	5.39		
Total	89	1724.40			

*** $p < .001$

conditions consisted of decontextualization training alone and speed of semantic access training alone. Hypothesis 2b predicted no significant differences in the vocabulary knowledge posttest scores between subjects receiving training in decontextualization skills alone and subjects receiving training only in speed of semantic access. To test these hypotheses, a one-way ANOVA was conducted on vocabulary knowledge posttest scores for the three treatment groups. The means and standard deviations for the treatment conditions, as displayed in Table 2, show a marked ceiling effect, with all scores clustered near the highest possible score of 16. The ANOVA results, as summarized in Table 5, indicate a significant effect for group membership $F(2,64) = 3.73$, $p < .05$.

Follow-up t-tests were then run to determine which groups were significantly different from each other. These t-tests showed some marginal differences. The mean for the Decontextualization Group was significantly below the Combination Group ($t = 2.25$, $p < .05$), and the Speed of Semantic Access Group ($t = 2.36$, $p < .05$). However, these results may be a function of the ceiling effect on vocabulary knowledge posttest scores and the associated extremely small standard deviations. Further, with corrections for multiple t-tests, these

Table 5

Summary Table of the ANOVA for the Posttest Vocabulary Knowledge Scores for Treatment Groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	2	1.65	0.83	3.73	.05*
Error	64	14.20	0.22		
Total	66	15.85			

* $p < .05$

findings would not be considered significant. In general, Hypothesis 2a was not supported by the data, as the Combination Group did not score significantly higher than the other two training groups. The analysis of Hypothesis 2b revealed a small but significant effect between the Decontextualization Group and the Speed of Semantic Access Group (t = 2.36, p <.05). Further examination, however, using a one-way ANOVA on vocabulary knowledge gain scores for all treatment groups, indicated that no significant differences were found in gain scores of the three treatment groups $F(2,64)$= 2.31, p>.05. These ANOVA results are summarized in Table 6. It appears, then, that Decontextualization and SSA vocabulary knowledge posttest differences may be spurious and that these treatments do not differ significantly. Hypothesis 2b, therefore, was supported by the data.

Hypothesis 3a predicted that subjects in all vocabulary training conditions would display higher posttest scores than pretest scores on the comprehension of passages containing the pre-taught words. Means and standard deviations for each group on Reading Comprehension pretest, posttest and gain scores are displayed in Table 7. Pretest mean scores ranged from 9.71 for the SSA Group to 12.07 for the

Table 6

Summary Table of the ANOVA for the Vocabulary Knowledge Gain Scores for Treatment Groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	2	26.55	13.27	2.31	0.10
Error	64	367.39	5.74		
Total	66	393.94			

Table 7

Means, Standard Deviations and t-values for Reading Comprehension Pre/Posttest and Gain Scores of all Study Groups.

		Pretest		Posttest		Gain		
Group	n	Mean	SD	Mean	SD	Mean	SD	t-value (pre/post
Combination	19	11.42	2.29	19.53	2.61	8.11	3.46	10.20***
Decontextualization	27	12.07	2.99	17.78	3.70	5.70	4.16	7.13***
Speed of Semantic Access	21	9.71	3.13	17.10	3.33	7.38	2.48	13.64***
Control	23	10.61	3.07	10.70	2.91	0.09	2.83	0.15
All Treatment Groups	67	11.15	2.99	18.06	3.40	6.91	3.61	15.67***

*** $p < .001$

Decontextualization Group. All groups, except for the controls, showed significant posttest increases and gains. As can be seen in Table 7, no ceiling effect was found for the posttest comprehension scores. To test Hypothesis 3a, t-tests were conducted using the data from the pre/posttests of the three treatment groups. As further shown in Table 7, there were significant differences between the pre/posttest scores of the Combination Group (t= 10.20, p <.001) as well as for the Decontextualization Group (t = 7.13, p <.001) and for the Speed of Semantic Access Group (t = 13.64, p<.001). For all groups taken together, reading comprehension posttest scores were significantly higher than pretest scores (t = 15.67, p <.001). Hypothesis 3a was thus supported by the data.

Hypothesis 3b predicted that gain scores on the reading comprehension of passages containing pre-taught vocabulary would be significantly higher for subjects in all training conditions than for subjects in the control group. To test this hypothesis, a one-way ANOVA was performed on the pre/post gain scores of each study group. Means and standard deviations for all groups are displayed in Table 7. The results of the ANOVA are summarized in Table 8 and indicate a strong effect for group membership $F(3,86)$ = 25.82, p <.001. Follow-up

Table 8

Summary Table of the ANOVA for the Reading Comprehension Gain Scores for all study groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	3	868.30	289.43	25.82	.001***
Error	86	964.20	11.21		
Total	89	1832.50			

*** $p < .001$

t-tests showed significant differences between each treatment group and the control(p <.001), supporting Hypothesis 3b. Significant differences were found between the gain scores of the Combination Group and the control group (t = 7.72, p <.001), Decontextualization and controls (t = 5.91, p <.001), and SSA and controls (t = 7.22, p <.001). No significant differences were found between any of the treatment groups.

To examine this hypothesis further, a one-way ANOVA was conducted on the reading comprehension posttest scores of all study groups. Means and standard deviations are displayed in Table 7. The results of the ANOVA are summarized in Table 9, and again, a strong effect was shown for group membership $F(3, 86) = 31.99, p < .001$. Follow-up t-tests showed significant differences between each treatment and the control (p <.001), further supporting Hypothesis 3b. Significant differences were found between the reading comprehension posttest scores of the Combination Group and the control group (t = 8.86, p <.001), Decontextualization and controls (t = 7.71, p <.001) and SSA and controls (t = 6.60, p <.001). Thus, Hypothesis 3b was supported by the analysis of data from both the posttest scores and the gain scores.

Hypothesis 4a predicted that subjects trained in a

Table 9

Summary Table of the ANOVA for the Reading Comprehension Posttest Scores for all study groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	3	991.07	330.36	31.99	.001***
Error	86	888.08	10.33		
Total	89	1879.16			

***p < .001

combination of decontextualization skills and speed of semantic access would display significantly higher gain scores on the reading comprehension of passages containing pre-taught vocabulary than subjects in the other training conditions. The other training conditions consisted of decontextualization training alone or only speed of semantic access. Hypothesis 4b predicted no significant differences in the reading comprehension scores between subjects receiving training in decontextualization skills alone and those receiving only speed of semantic access training.

To test these hypotheses, a one-way ANOVA was conducted on reading comprehension gain scores for the three treatment groups. The means and standard deviations for these groups are displayed in Table 7. The ANOVA results, as summarized in Table 10, reveal no significant differences among groups, demonstrating a lack of support for the prediction that the Combination Group would show significantly higher gain scores than the other treatment groups $F(2,64 = 2.89, p = .06$. On the other hand, these results support the hypothesis that there would be no significant difference between the gain scores of the Decontextualization Group and the Speed of Semantic Access Group ($t = 1.64$, $p=.10$). Follow-up t-tests indicated a significantly higher gain

Table 10

Summary Table of the ANOVA for the Reading Comprehension Gain Scores for Treatment Groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	2	71.09	35.55	2.89	.06
Error	64	788.37	12.32		
Total	66	859.46			

score for the Combination Group than for the Decontextualization Group (t = 2.29, p <.05). With corrections for multiple t-tests, however, this difference appears to be only marginal rather than significant.

To further examine the differences among the treatment groups, a one-way ANOVA was performed on the posttest reading comprehension scores. The means and standard deviations are displayed in Table 7. The ANOVA results, as summarized in Table 11, indicate no significant differences among treatment groups, $F(2,64)$ = 2.85, p =.06), showing support for Hypothesis 4b and lack of support for Hypothesis 4a. Follow - up t-tests indicated a significantly higher posttest score for the Combination Group than for the SSA Group (t = 2.32, p <.05. Again, with corrections for multiple t-tests, this difference appears to be marginal rather than significant. Further, no significant difference was revealed between Decontextualization and SSA in reading comprehension posttest scores (t = .71, p =.51), or in reading comprehension gain scores (t = 1.64, p = .10).

In summary, Hypotheses 1a, 1b, 2b, 3a, 3b, and 4b were supported by the data, while Hypotheses 2a and 4a were not supported.

Table 11

Summary Table of the ANOVA for the Reading Comprehension Posttest Scores for Treatment Groups.

Source of Variation	DF	Sum of Squares	Mean Squares	F	Significance Level
Groups	2	62.55	31.27	2.85	.06
Error	64	701.21	10.96		
Total	66	763.76			

Additional Analyses

The following section will report the results of additional analyses. These will include the findings from an analysis of the reliability of the vocabulary knowledge (VK) scale, scale correlations, and the vocabulary recall measure.

Reliability of VK scale

In order to ascertain the reliability of the Vocabulary Knowledge scale (VK), the administration of the scale at posttest was correlated with a follow-up administration two weeks later. For the 67 individuals in the three treatment groups, the correlation between the posttest and follow-up test was found to be significant (r = .49, p <.05). Because of the restriction of range caused by the solid ceiling effect, this finding may be smaller than it should be. This same relationship was found to be extremely strong when the control group was included in the analysis (r = .93, p <.05). The control group demonstrated consistent, albeit poor, vocabulary knowledge scores possibly because by the third administration of the same scale, recall of the erroneous answer may have taken place. It seems advisable to include the control group in the correlation, even with the possibility of some inflation

of the relationship, as the number of subjects is greater and the range of scores broader.

Scale Correlations

It was expected that measures of vocabulary knowledge and measures of reading comprehension would be substantially related. A correlation analysis of the dependent variables using all study groups revealed that posttest vocabulary knowledge was significantly related to posttest reading comprehension (r = .71, p < .001). Vocabulary knowledge gain scores were also significantly related to reading comprehension gain scores (r = .56, p <.001). When just treatment groups were examined, the picture was somewhat different. A correlation analysis using only treatment groups revealed a small but significant relationship between posttest vocabulary knowledge and posttest reading comprehension (r = .27, p < .05). Vocabulary knowledge gain scores, however, were not found to be significantly related to reading comprehension gain scores (r = .01, p >.05). This lack of relationship between the gains in vocabulary knowledge and reading comprehension may have been caused by the marked ceiling effect on the posttest vocabulary knowledge scores and the restricted range of the vocabulary knowledge gain scores.

Recall Measures

The vocabulary recall test (VR) was administered to 32 subjects across all 4 study groups. It was administered first as a pretest and then as a posttest. The pretest scores ranged from 0 to 4 with a mean of 0.875, and a standard deviation of 0.820. The scores were positively skewed, the highest score being 4 out of a possible 16. The posttest scores ranged from 1 to 16, with a mean of 10.25 and a standard deviation of 5.87. The mean gain score was 9.38 with a standard deviation of 5.98.

It was expected that vocabulary knowledge and vocabulary recall posttest scores, as well as gain scores would be substantially related. When the correlation analysis was performed on all of the study groups, posttest vocabulary knowledge and posttest vocabulary recall showed a very powerful relationship (r = .91, p <.001), as did vocabulary knowledge and vocabulary recall gain scores (r = .83, p <.001). A substantial correlation was also found between vocabulary recall posttest scores and reading comprehension posttest scores (r = .73, p <.001) and between vocabulary recall gain scores and reading comprehension gain scores (r = .74, p <001).

When only treatment groups were used in the

correlation analysis, a different picture emerged. No significance was found between vocabulary knowledge and vocabulary recall posttest scores (r = .25, p >.05), nor between gain vocabulary knowledge and gain vocabulary recall scores (r = .06, p>.05). Although posttest vocabulary recall scores were not correlated with posttest reading comprehension scores (r = .11, p >.05), gain vocabulary recall scores were significantly related to gain reading comprehension scores (r = .53, p <.05). It must be noted that the size of the sample used for vocabulary recall testing was small (n = 32). Overall results may have been affected by this small sample size as well as by the strong ceiling effect on posttest vocabulary knowledge scores. Also, gain scores may have shown more correlation than posttest scores because the ceiling effect was less influential and there was a wider range than with the posttest scores where they were all clustered just below the highest possible score of 16.

CHAPTER V

DISCUSSION

The present study was conducted to examine the relationship between vocabulary and reading comprehension. More specifically, the effect of the pre-teaching of vocabulary on the reading comprehension of passages containing that vocabulary was investigated. The relative effectiveness of two methods of vocabulary instruction on vocabulary knowledge and reading comprehension was studied. Vocabulary training through the use of strategies for acquiring meaning from context (decontextualization) and training in the rapid recall of word meanings (speed of semantic access) were examined separately and in combination with each other.

Before the major issues are discussed, generalizability and reading comprehension pretest differences between two of the treatment groups will be addressed. Focus will then turn to the effect of vocabulary instruction on vocabulary knowledge and reading comprehension respectively. These are the issues addressed in Hypotheses 1a, 1b, 3a, and 3b.

The discussion will then center on the relative effectiveness of the two methods of vocabulary training, individually, and in combination, on vocabulary

knowledge and reading comprehension. These are the issues addressed in Hypotheses 2a, 2b, 4a, and 4b. Educational implications and suggestions for further research will then be addressed.

All 90 participants in this study came from an inner city community college and had been identified by a standardized reading test administered at the time of admission to the university as not meeting the minimal reading competency requirement for college courses. One would expect the findings of the present study to generalize to students in similar settings.

The issue of reading comprehension pretest differences between two of the treatment groups needs to be considered before the major results are discussed. Although there were no significant differences among the three treatment groups and the control group on the vocabulary knowledge pretest, the ANOVA run on the reading comprehension pretest scores revealed a significant effect for group membership. Follow-up t-tests indicated that the Decontextualization Group had significantly higher scores than the Speed of Semantic Access Group.

It would appear that this pretest difference does not affect the findings with regard to the hypotheses posed in the present investigation. As indicated in

Table 7, all treatment groups scored significantly higher on reading comprehension posttests than on pretests. All groups increased, showing that the prediction of Hypothesis 3a that all treatment groups would score significantly higher on posttests than on pretests was not affected by this pretest difference.

With regard to Hypotheses 3b which predicted that all treatment groups would score significantly higher than the no-training control group, it must be noted that every group was higher than the control.

Furthermore, there were no significant differences among any of the treatment groups on either reading comprehension posttest or gain scores. Therefore, it appears that no substantial effect can be attributed to this finding of pretest difference on reading comprehension pretests between two of the treatment groups with regard to Hypotheses 4a and 4b.

Effects of Vocabulary Instruction

The effects of vocabulary instruction on two variables were investigated. An examination was made of the impact of vocabulary training on both vocabulary knowledge and reading comprehension. Hypotheses 1a and 1b predicted that vocabulary training would result in gains in vocabulary knowledge. This prediction was convincingly supported by the present study. The

subjects in all vocabulary training conditions displayed significantly higher vocabulary posttest scores than vocabulary pretest scores. Vocabulary posttest and gain scores for the subjects in all training conditions were significantly higher than vocabulary posttest and gain scores for the control group.

Pretest scores for the three treatment groups ranged from 2 to 14, with a mean of 5.8. On the posttest, 58 out of the 67 subjects in training conditions attained a perfect score. All of the remaining 9 subjects scored 14 or 15 out of a possible raw score of 16. This ceiling effect on the posttest indicates the high level of vocabulary learning achieved by all training groups. Gain scores showed somewhat more variability than posttest scores as students reached a perfect or almost perfect score regardless of their score on the pretest.

Although students in the training groups showed strong increases in vocabulary knowledge after treatment, the control group showed little gain on the posttest. Vocabulary posttest and gain scores for all training groups were significantly higher than posttest and gain scores for the controls.

These results lend strong support to the findings of other studies (e.g. Ahlfors, 1979; Crist & Petrone, 1980; Stahl, 1983) that vocabulary knowledge can be

effectively trained. All of these studies compared subjects receiving vocabulary instruction to no-training controls on vocabulary assessment tasks. Each study found that trained subjects scored significantly better than controls on these measures.

The effect of vocabulary instruction on the second variable, reading comprehension, was addressed by Hypotheses 3a and 3b.

Although the strong relationship between vocabulary knowledge and reading comprehension has long been recognized in the field, the nature of that relationship has been poorly understood. Anderson and Freebody (1981) advanced an instrumentalist hypothesis suggesting that vocabulary knowledge improves reading comprehension by virtue of that knowledge alone. Two conditions were considered necessary for the acceptance of this hypothesis. One condition, that the substitution of easier or more difficult words in a text must make that text easier or more difficult to understand, has been fulfilled by several studies (e.g. Kameenui, Carnine & Freschi, 1982). The results of the present study strongly supports the fulfillment of the second condition, that learning unfamiliar words in a text must make that text more comprehensible. Subjects in all vocabulary training conditions displayed significantly

higher posttest scores than pretest scores on the comprehension of passages containing pre-taught vocabulary. Likewise, reading comprehension gain scores and posttest scores for each of the treatment groups were significantly higher than gain and posttest scores of the controls. The results of prior studies, however, have been mixed in their findings.

The present research lends credence to the findings of several studies (e.g. Kameenui,Carnine & Freschi, 1982; Beck, Perfetti, & McKeown, 1982; Stahl, 1983) that showed improvement in the reading comprehension of passages containing pre-taught vocabulary. Kameenui, Carnine and Freschi (1982) supported Anderson and Freebody's contention that learning the meanings of unfamiliar words in a text facilitates comprehension. They compared the performance of subjects with vocabulary training to those without training on the comprehension of passages containing low frequency vocabulary. Trained subjects significantly outperformed the untrained controls. Similar results were found by Stahl (1983).

Likewise, Beck, Perfetti and McKeown (1982) found improved performance on comprehension tasks for subjects given vocabulary training. They attributed the effect of pre-teaching vocabulary on comprehension to the more

facile construction of passage meaning when individual vocabulary is understood. The Beck et al study (1982), unlike the present study was a long-term experiment, with training covering a 5-month period. The length of treatment was in accord with their premise that acquiring word meanings to a high level is extremely difficult, even with extensive training. The present study, however, demonstrated that a high level of vocabulary knowledge can be achieved within a relatively short instructional period. The instruction also impacted strongly on the ability of the subjects to comprehend passages using that vocabulary. Of course, instructional goals must be kept in mind when a training method is chosen. Long-term goals need to be considered when deciding on a vocabulary training method.

The present findings differed from those of studies that did not show improved reading comprehension after vocabulary training (e.g. Pany & Jenkins, 1978; Jenkins, Pany & Schreck, 1982; Schacter, 1978; and, Ahlfors, 1979). It must be noted that this study used a larger and more tightly controlled subject population than did Jenkins et al. (1982) and Pany and Jenkins (1978), and presented passages with a higher percentage of words on which instruction had been provided than did Ahlfors (1979) and Schacter (1978). A major difficulty with

these studies has been questionable comprehension assessment instruments. In the Jenkins et al. study (1982), it seems possible that subjects who received vocabulary training might not have had an advantage over controls because the vocabulary was not necessary to respond correctly to the cloze tests used as comprehension measures. The nature of the comprehension assessment instrument used by Ahlfors (1979) was considered limited in its sensitivity to the effects of pre-taught vocabulary. It is entirely possible that it was not necessary for students to know targeted vocabulary words in order to provide correct answers to the open-ended reading comprehension questions. The development of a more satisfactory reading comprehension assessment instrument was suggested by the Ahlfors study as an important area for further research.

The reading comprehension test used in the present study was carefully designed to avoid these pitfalls. All targeted vocabulary words were presented in the passages used in the comprehension measure and no context clues were present. The questions following the passages were in the multiple-choice format and constructed to require the understanding of the targeted vocabulary words in order to answer the questions correctly. In preliminary studies the reliability of

this instrument had been established (r = .75, t = 4.80, p < .01). Sensitivity to instruction had also been determined by preliminary studies. The results of the present research demonstrate the scale's sensitivity to instruction as all training conditions showed significant gains over pretest scores and over control subjects. These results demonstrate the importance of using a reading comprehension assessment instrument that is sensitive to the vocabulary treatment. The more global measures of reading comprehension used in several previous studies were not satisfactory for measuring the results of pre-teaching vocabulary. Thus, in contradiction to various previous studies, this investigation shows that vocabulary training leads to gains in the reading comprehension of text using that vocabulary.

Methods of Vocabulary Instruction

The following section will consider the effectiveness of the different treatments and then discuss the issue of their relative effectiveness. Previous studies have concentrated on the most common methods of vocabulary instruction (definition presentation and presentation of context). Such studies have produced mixed results as to the preferred method. Furthermore, critics of the context method have stressed

the necessity for training students in strategies for using context to extract the meaning of an unfamiliar word. Sternberg (1984) urged the incorporation of these strategies into vocabulary instructional programs. Sternberg's research brought about the development of a training program in decontextualization skills. This program has been shown to be successful in training subjects to decontextualize meaning from text but has not been studied as to its effectiveness in the teaching of specific vocabulary nor the effects of this training on the reading comprehension of text using the pre-taught vocabulary words.

The present study demonstrates the effectiveness of this method of vocabulary instruction. One of the treatment conditions examined in the present study was the teaching of strategies for extracting meaning from context (Decontextualization Group). Very positive results were found for this method. Vocabulary and Reading Comprehension posttest scores for these subjects were significantly higher than pretest scores. Likewise, vocabulary and reading comprehension posttest and gain scores were significantly higher for this group than for the control group. Therefore it has been strongly indicated by the present study that the teaching of vocabulary through the use of

decontextualization strategies produces improved vocabulary knowledge and improved reading comprehension of passages containing that vocabulary. Transfer of the decontextualization skill was not tested in this study. No context clues were present in the reading comprehension assessment instrument in order that correct answers would depend solely on vocabulary knowledge. Therefore, decontextualization skills could not be measured by this instrument.

The present study also trained subjects to rapidly recall the meanings of words (speed of semantic access). One of the treatment conditions consisted of this training.

The issue of the speed of access to word meanings has arisen out of investigations in the area of "bottom-up" theory with its emphasis on lower-level mechanistic skills. Although considerable research on the relationship between word recognition and reading performance has been done, much less investigation of the impact of the rapid recall of word meanings (semantic access) on the comprehension of text using these words has taken place. Perfetti (1983) maintained that fast access to word meaning is essential to good reading and suggested that autonomous access to word meaning can be aided by practice and that vocabulary

instruction including this component could improve reading comprehension both by establishing word meanings and facilitating rapid access to them. Other researchers have stressed the importance of rapid semantic access (e.g. Wilkinson, 1983; Pany & Jenkins, 1978; Beck, Perfetti & McKeown, 1982).

The present study demonstrates the effectiveness of this method of vocabulary training. Subjects receiving this training scored significantly higher on posttest vocabulary and reading comprehension measures than on pretest measures. Likewise, subjects in this treatment group received significantly higher vocabulary and reading comprehension gain and posttest scores than control subjects.

Can drill in the rapid access to word meaning improve vocabulary and the comprehension of passages using that vocabulary? This question has been unresolved in the literature. This study brings strong support for the use of drill as a method of improving rapid access to word meaning. It is interesting to note that a short period of instruction was used for this treatment. Words were presented 10 times at increasingly faster speeds. They were shown 3 times at 13 seconds, 3 times at 8 seconds, and 4 times at 3 seconds. The students seemed the most comfortable at

the faster speeds. In spite of the short period of instruction, gain and posttest vocabulary and reading comprehension scores were not significantly different from the other treatment groups.

What is the preferred method of treatment? Discussion will now focus on this issue. Hypotheses 2a and 4a predicted that the combination of decontextualization strategies and speed of semantic access (Combination Group) would produce the greatest gains in vocabulary knowledge and reading comprehension. These hypotheses were not supported by the data. The Combination Group did not score significantly higher than the other two training groups on either vocabulary knowledge or reading comprehension.

This lack of differentiation among the three treatment groups may be largely attributed to the solid ceiling effect on the Vocabulary Knowledge test (VK). This caused a lack of variability among the scores. The ceiling effect is partly a function of the nature of the VK scale. This test is in the multiple-choice format and requires only the recognition of the correct definition. A vocabulary recall measure (VR) was developed in response to the ceiling effect shown on the VK scale. It was only possible, however, to administer this test to 32 of the 90 participants in the study.

There was less of a ceiling effect on the VR scale, probably because it required recall rather than recognition of the definitions. The development of other vocabulary measures might be a useful avenue for future research.

The ceiling effect is also attributable to the fact that each vocabulary treatment group learned the vocabulary to a very high level. Regardless of their pretest scores, subjects in all treatment groups reached a score of at least 14 out of a possible 16 and 87% of the treatment subjects attained a perfect score of 16 on the VK scale. The VR posttest also showed strong gains in vocabulary knowledge. Although the reading comprehension posttest (RCA) did not demonstrate a ceiling effect, the fact that this measure was designed to be sensitive to knowledge of the targeted vocabulary made it sensitive to the high level of vocabulary learning demonstrated by all the treatment groups.

It therefore seems possible that the high standard of vocabulary learning reached by all treatment groups made it impossible to distinguish among treatments. Future research might examine the effects of shorter or less intensive training sessions. It is also possible that a larger number of targeted words might cause differences to appear among treatments.

Educational Implications and Additional Research

The results of this study reinforce the importance of vocabulary training within the reading curriculum. The data indicates that students can be taught word meanings within a relatively short amount of instructional time and that this instruction is effective for learning vocabulary and understanding passages using that vocabulary. In other words, both vocabulary knowledge and reading comprehension can be facilitated by vocabulary training.

This study indicates that there are several ways to teach word meanings efficiently. Decontextualization and Speed of Semantic Access proved effective as instructional methods in combination with each other as well as separately. The choice of method may depend upon the particular teaching situation and the instructional goals.

Speed of Semantic Access training is extremely effective considering the short instructional time it requires. The findings of this study agree with those of Ahlfors (1979) in suggesting that definition drill can be a useful vocabulary teaching device. Although held in poor esteem by several researchers (e.g. Gipe, 1979), drill may prove effective when only a short instructional period is available for vocabulary

training. At the beginning of a content lesson, for example, when unfamiliar vocabulary is commonly presented, a short period of drill might provide students with the rapid access to definitions requisite for satisfactory comprehension of the text. Of course, increase in comprehension would only take place if the unfamiliar words were essential to the comprehension of the text. Selection of vocabulary to be trained is an important consideration in establishing instructional goals and the appropriate methods for meeting them.

Speed of Semantic Access training might also be used as a component of a larger vocabulary instructional program. It might be combined with the teaching of Decontextualization Strategies as in the Combination Group used in the present study.

The Decontextualization Group also learned the vocabulary to an extremely high level. This method required longer instructional time than Speed of Semantic Access training, although it appears that the specific vocabulary words might have been learned in an even shorter training period. To become automatic, the skill of decontextualization undoubtedly requires more than the teaching of one set of vocabulary words. Transfer has not been examined in this study but has been the subject of studies by Sternberg et al. (1984)

and is an important area for continued research.

Teaching vocabulary by the method used in the Decontextualization Group has the advantage of both teaching specific vocabulary effectively and providing the student with a valuable tool for use in independent reading. Nagy and Anderson (1984) have stressed the need for such tools due to the sheer volume of vocabulary that students encounter in reading. Sternberg, Powell and Kaye (1983) have pointed out that no vocabulary instruction is complete without providing students with training in how to use context to obtain the meaning of unfamiliar words. It is also interesting to note that although studies have shown that higher level students tend to use context more effectively than lower ability readers, the subjects of this study were college readers who had not met the college minimum reading competency requirement. Although this study does not examine transfer of the decontextualization skill, it points in the direction of the usefulness and effectiveness of this training to weaker readers. Further research might also investigate the possibility of this vocabulary training for students where English is a second language. These students have so many unfamiliar words to master that an effective method requiring only a short instructional period could

be valuable in ESL education.

Although the data did not support the prediction that the Combination Group would perform better on vocabulary knowledge and reading comprehension tasks, it did demonstrate that the combination of decontextualization strategy training and speed of semantic access drill teaches vocabulary effectively. The fact that it also provides the student with an important strategy for attacking new vocabulary makes it a strong vocabulary training technique. The combination of decontextualization and drill into a vocabulary program for independent use might be the appropriate method for older students. Students could be extensively trained in the ability to decontextualize and then given instructions in how to drill newly acquired words with the purpose of making them rapidly accessible. Further research on this combination of vocabulary training techniques might provide valuable information for the development of vocabulary instructional programs.

The need for vocabulary training programs seems clear. Jenkins, Stein, and Wysocki (1984) studied the occurance of incidental vocabulary learning from context during independent reading. They found that the number of words learned in this manner was smaller than had

been anticipated. The Jenkins et al. study (1984) suggested that although learning word meanings may occur incidentally during reading, this learning apparently does not come easily or in sizeable amounts. It was pointed out, therefore, that prescribing large amounts of reading may not be the most efficient means of increasing vocabulary knowledge. Their study also suggested that prior exposure to the meaning of unfamiliar words strongly affects the ability to understand them in written text. The present study supports this finding by demonstrating that all of the examined methods of vocabulary training brought substantial gains in vocabulary knowledge and the comprehension of passages using that vocabulary. It seems indicated that some direct vocabulary teaching may have a substantial effect on the ability of a student to understand unfamiliar words and the text in which they are found during independent reading. Further research in this area is recommended.

APPENDIX A

PROTOCOL: TEACHING DECONTEXTUALIZATION STRATEGIES

Say: There are various ways of improving your vocabulary. For example, using the dictionary. But sometimes a dictionary is not available and/or sometimes you don't want to continuously break your concentration by looking up words.
Elicit group example:
Say: Another method of improving vocabulary which I am going to teach you today is getting the meaning of an unknown word from its context. This skill can be helpful when you are taking reading tests and can't use a dictionary as well in your regular college classwork.

Ask: What is context? (Use teacher/classroom example)

Put on board: Surroundings

Ask: What are the surroundings of a word when you come across it in a text (paragraph)?

Put on board: Other words in the paragraph or sentence.

Say: Here are some guidelines for getting the meaning of an unknown word from its context or surroundings: (Here the meaning of surroundings might be reviewed)

Distribute handout
Read with class the following:

1. Examine the text before and after the unknown word to see if it gives any clue as to the meaning.
2. In addition, look for specific context clues that might be present in the text (sentence or paragraph).

Say: We are going to learn three specific context clues today.

3. Try to figure the meaning from these clues.

Say: I'm going to show you how to do this today.

4. Try to fit your definition into the sentence in place of the unknown word and see if it makes sense.

Say: These are the three context clues we are going to learn today:

Before we do you must know the definition of two concepts.

Put on board: synonym - definition
antonym - definition

Have on board: 1. Restatement clue

Say: This is when an unknown word in a sentence is followed or preceded by a statement which says the same thing in an easier way. (Make sure students know what is meant by (followed or preceded by) Let's look at an example.

Have on board: Restatement example: John always tried to emulate his brother; whatever his brother did, John tried to do as well or better.

Say: The unknown word is - - - - emulate

Ask: In the first part of the sentence, what does it say John tried to do?

Point to: Emulate

Ask: In the last part of the sentence, what does it say John tried to do?

Point to: Do things as well or better.

Ask: So, using what we have learned about the restatement clue, what does emulate mean?

Put on board: emulate - (general meaning)

Ask: Can you think of a synonym for doing something as well or better?

Put on board: imitate

Go to handout

Say: So, we see that without using a dictionary, we came up with the meaning of emulate. Even if you couldn't think of the exact synonym, you would still have gotten the general meaning for emulate, that is, doing something as well or better, and would have been able to understand the sentence. (This concept should be repeated as the

discussion continues).

Say: Let's try imitate in the sentence and see if it works. Do so.

Say: Let's look at another clue:

Have on board: Cause and Effect clue

Say: This is when an unknown word is either the cause or the effect of something in the sentence which is easier to understand. There are often signal words in the context which signal that a cause and effect clue is present. Two of these signal words are:

Put on board: because, since

Say: When you see these words be on the lookout for a cause and effect clue. Let's look at an example.

Have on board: Cause and effect example: Because John studies hard, he will get good grades.

Say: The signal word is -------- because

Put on board:

Cause	Effect
studies hard	gets good grade

Say: Let's see how this works with a little harder example.

Go to Handout: Because sea otters have been hunted so avidly, there are hardly any of these animals left.

Ask: What is the signal word?

because

Ask: What clue does this word signal?

Cause and effect

Put on board:

Cause	Effect
hunted avidly(unknown word)	hardly any left

Ask: If there are hardly any otters left, how were they hunted?

Elicit an answer that conveys the meaning of "a lot, stongly, greedily"

Ask: What do you think would be a good synonym for avidly?

Elicit answers

Say: Let's look at the third context clue we are going to learn today.

Have on board: Contrast clue

Say: This is when the opposite of an unknown word is given and it is easier to understand this opposite word (antonym). There are often signal words in the sentence which signal that this clue is present in the sentence. Three of these signal words are:

Put on board: although, instead, unlike

Say: When you see these words, be on the lookout for a contrast clue. Let's look at an example.

Have on board: Contrast clue example: Although John gave up easily, Mary was <u>adamant</u> in her opinions.

Say: The signal word is ---------- although

Point to: although

Say: What clue does this word signal?

Point to: Contrast

Ask: Who or what is being contrasted?

Point to: John and Mary

Ask: What is John like?

Put on board: John - gives up easily

Ask: What is Mary like?

Put on board: Mary - adamant

Say: Adamant (unknown word) is opposite of gives up easily.

Elicit: opposite of gives up easily is does not give up easily. So the meaning of adamant is "does not give up easily." Remember what I said earlier. For understanding what you read, the general meaning for an unknown word is enough to allow you to grasp what is being expressed in the passage. At this point you understand what Mary is like.

Ask: But, can you think of a good synonym for "does not give up easily?" Elicit words such as "persistent" or stubborn."

Say: So the meaning of adamant is persistent. Let's try it in the sentence and see if it works.

Distribute decontextualization exercises.

APPENDIX B

MEANING FROM CONTEXT

General Guidelines

1. Examine the text before and after the unknown word to see if it gives any clue to the word's meaning.
2. In addition, look for context clues that might be present in the text (the sentence or paragraph).
3. Try to figure out the meaning by using this context.
4. Try to fit your definition into the sentence in place of the unknown word to see if it makes sense.

SPECIFIC CONTEXT CLUES

1. Restatement clue

This is when an unknown word in a sentence is followed or preceded by a statement which says the same thing in an easier way.

Example

John always tried to emulate his brother; whatever his brother did, John tried to do as well or better.

Restatement -

Meaning -

Synonym -

2. Cause and Effect clue

This is when an unknown word is either the cause or the effect of something in the sentence which is easier to understand. There are often signal words in the context which signal that a cause and effect clue is present.

Two of these signal words are: because since

When you see these words, be on the lookout for a cause and effect clue.

Example

Because sea otters have been hunted so avidly, there are hardly any of these animals left.

Signal word

Kind of clue

Meaning

Synonym

3. Contrast clue

This is when the opposite of an unknown word is given and it is easier to understand this opposite word (antonym). There are often signal words in the sentence that indicate that this clue is present. Three of these signal words are:

although, instead, unlike

When you see these words, be on the lookout for a contrast clue.

Example

Although John gave up easily, Mary was adamant in her opinions.

Signal word

Kind of clue

Meaning

Synonym

APPENDIX C

DECONTEXTUALIZATION EXERCISES

Directions: First, examine the text preceding and following the unknown word to see if it gives you any clues as to the meaning of the unknown word. Then answer the questions following the sentences.

1. Everyone realized that Ellis was a sycophant as he constantly told his supervisor that she was a perfect boss.

   Is there a signal word?

   Is there a statement before or after the unknown word which says the same idea in an easier way?

   What is that statement?

   Can you think of a synonym for this kind of behavior?

   Sycophant means

   Try the synonym in the sentence to see if it makes sense.

2. Because Tony was lachrymose that day, he cried very easily.

   Is there a signal word?

   What kind of clue does this word signal?

   What is the cause?

   What is the effect?

   Can you think of a synonym for this?

   Lachrymose means

   Try it in the sentence and see if it makes sense.

3. Unlike Reverend Jackson who spoke in an exciting manner, Senator Smith droned on and on.

   Is there a signal word?

   What clue does this word signal?

   What two things contrast (don't seem to agree with each other)?

   How did Reverend Jackson speak?

   How did Senator Smith speak?

   Droned means

   Try this in the sentence and see if it makes sense.

4. Since Jean had an aversion to persons of the opposite sex, she chose an all girls' school.

   Is there a signal word in the sentence?

   What kind of clue does this word signal?

   What is the cause?

   What is the effect?

   Aversion means

   Try this in the sentence and see if it works.

5. Although Albert was a very silent man, his wife was extremely loquacious.

Is there a signal word?

What clue does this word signal?

Who or what is being contrasted?

What kind of a man was Albert?

What kind of a woman was his wife?

Can you think of a synonym for this?

Loquacious means

Try this in the sentence and see if it works.

6. Calvin was a zealous young man who worked hard to become skilled at whatever he attempted to do.

Is there a signal word in the sentence?

If not, is there a statement which describes Calvin in a simple way?

What is that statement about Calvin?

Can you think of a synonym for that?

Zealous means

Try it in the sentence and see if it works.

7. Instead of being peripatetic like his brother, Tom preferred to stay close to home.

Is there a signal word in the sentence?

What clue does this word signal?

Who or what is being contrasted?

What did Tom like to do?

What was his brother like?

Peripatetic means

Is there a synonym for this?

Try this meaning in the sentence and see if it works.

8. Helen is a tyro at writing essays; in fact, she is writing her first one this semester.

Is there a signal word in the sentence?

If not, is there a statement which describes Helen in a simple way?

What is that statement about Helen?

Can you think of a synonym for this?

Tyro means

Try it in the sentence and see if it works

9. Because the teacher constantly <u>berated</u> her for misbehaving, Celeste always looked ashamed of herself.

Is there a signal word in the sentence?

What clue does this word signal?

What is the cause?

What is the effect?

Berated means

Can you think of a synonym for this?

Try it in the sentence and see if it works.

10. The young man was a <u>virtuoso</u>; his knowledge and skill with the violin were perfect.

Is there a signal word in the sentence?

If not, is there a statement before or after the unknown word that says the same thing in an easier way?

Virtuoso means

Can you think of a synonym for this?

Try it in the sentence and see if it works.

11. Because the water was so enticing, everyone rushed to go swimming.

Is there a signal word in the sentence?

What clue does this word signal?

What is the cause?

What is the effect?

Enticing means

Can you think of a synonym for this?

Try it in the sentence and see if it makes sense.

12. Unlike the adults who were serious about the speaker's message, the children were bantering about the way he spoke.

Is there a signal word in the sentence?

What clue does this signal?

What is being contrasted?

What were the adults like?

What were the children like?

Bantering means

Is there a synonym for this?

Try it in the sentence and see if it makes sense.

13. Since Pam and her sister were having an altercation over what to serve at the dinner party, no agreement was reached on the menu.

Is there a signal word in the sentence?

What clue does this signal?

What is the cause?

What is the effect?

Altercation means

Is there a synonym for this?

Try it in the sentence and see if it makes sense.

14. Although the captain of the girls' team treated the players as her equal, the captain of the boys' team was condescending to his players.

Is there a signal word in the sentence?

What kind of clue does this word indicate?

What two things are being contrasted?

What was the captain of the girls' team like?

What was the captain of the boys' team like?

Condescending means

Is there a synonym for this

Try it in the sentence and see if it makes sense.

15. The cruel sergeant wanted to <u>extirpate</u> the prisoners of war; he didn't want to leave any of them alive.

Is there a signal word in the sentence?

If not, if there a statement discussing the sergeant in a simple way?

What is that statement?

Can you think of a synonym for this kind of behavior?

Extirpate means

Try it in the sentence and see if it makes sense.

16. Unlike the <u>disparate</u> dress of the women's team, the men were all wearing the same uniform.

Is there a signal word in the sentence?

What clue does this word signal?

Who or what is being contrasted?

How are the men dressed?

How are the women dressed?

Can you think of a synonym for this?

Disparate means

Try it in the sentence and see if it works.

APPENDIX D

RCA

Reading Comprehension Test

Reading Comprehension Test

Directions: Read the following passages and answer the questions that follow by marking the letter of the correct answer on the answer sheet.

One morning Marty woke up thinking about his life. He decided that he was tired of being so peripatetic. When his friend Roy talked to him about California, he found the idea of living there to be enticing. Next thing he knew, Marty was on a bus headed for Los Angeles. Marty looked around and was surprised to notice how disparate the passengers looked. He started thinking about their lives and the kinds of jobs they might have.

In the two seats next to Marty were a man and woman. They looked like they might be married. They were having an altercation, but Marty couldn't hear what they were saying. Marty thought he heard them talking about extirpating something, but he wasn't sure. Later, he heard them talk about going to Mexico on the bus. Marty looked around and saw that everyone else was asleep, so he went back to reading his book.

The book was the most provocative one he had ever read. But his attention kept returning to the couple. Meanwhile the couple's altercation about their plans had grown louder and more intense. This time Marty heard them mention extirpating the other passengers and the driver. Marty decided to mention this to the driver at the next stop.

1. Marty's friend, Roy, probably

   a. lived in San Francisco
   b. disliked California a great deal
   c. thought California was an average place to live
   d. liked California a great deal

2. The other passengers on the bus were probably

   a. dressed in similar kinds of clothes
   b. dressed in a wide variety of ways
   c. happy about the smooth ride
   d. not happy about the bumpy ride

3. The couple on the bus probably were

   a. artists
   b. tourists
   c. criminals
   d. lazy

4. After Marty talked with him, the bus driver probably

   a. told Marty to go to sleep like the other passengers.
   b. told the couple to lower their voices
   c. sold the passengers tickets to Mexico
   d. called the police

5. The passage indicates that in his early life Marty did a great deal of

   a. reading
   b. travelling
   c. conversing
   d. writing

6. The passage implies that the passengers may have been

   a. from the same section of the country
   b. from different parts of the country
   c. on a group tour
   d. members of a rock group

7. Most likely, the man and woman believed that

   a. disagreements help solve problems
   b. travel plans should be discussed carefully
   c. travelling is too expensive
   d. sleeping on a bus is unpleasant

Sam was a tyro at playing the violin. He knew that usually only a virtuoso gave concerts, but Sam was a zealous young man. So one day he rented a music hall and invited some people to hear him play.

The next night he gave a concert. Just as he started to play a few notes, a woman in the first row said "I wish that I could vault right this minute." This remark was heard by Sam and distracted him from the music. Sam was glad when intermission came and he had a chance to find this woman and berate her for her remark.

At that moment Sam noticed several people from the audience bantering about how the music sounded. This caused Sam to be lachrymose and he was glad that he saw a friend among the people. He wanted to share his feelings with someone. After talking to his friend during the entire intermission he found that his earlier attitudes were returning. Being the zealous young man that he was, Sam confidently returned to the stage eagerly hoping that this concert would help turn him into a virtuoso.

8. Sam probably

   a. was a very good violin player
   b. could not play the violin at all
   c. was a famous violin player
   d. was a beginning violin player

9. Sam most probably gave the concert because

   a. he wanted to become famous quickly
   b. he wanted to entertain his friend
   c. a friend asked him to do it
   d. he liked to play for an audience

10. At intermission Sam wanted to find the woman in the first row in order to

   a. thank her for her attention
   b. offer to give her lessons
   c. criticize her for her rudeness
   d. find out what she looked like

11. During intermission, Sam saw several people in the audience

    a. leaving to go home
    b. praising the quality of the music
    c. discussing the music quietly
    d. joking about Sam's playing

12. Sam was convinced that the concert would probably

    a. cause him to be a rich man
    b. gain him many friends
    c. cause him to be a skilled musician
    d. cause him to be happy

13. When he noticed Sam's mood at intermission, Sam's friend was probably

    a. very pleased
    b. very worried
    c. unconcerned
    d. relaxed

14. The passage implies that Sam could have given a better concert if he had

    a. asked more friends to come
    b. played for a shorter time
    c. waited until he was a better player
    d. bought a more expensive violin

15. When he met his friend during intermission, Sam probably

    a. had a smile on his face
    b. had tears in his eyes
    c. was clenching his fist
    d. was stumbling

On her way to class, Joan was lost in thought. She was thinking about her instructor and some of her classmates. Peter, the young man who sits next to her, is extremely loquacious. Joan herself is sometimes embarrassed at his ideas. It is not clear whether or not he has earned a good reputation with the instructor because Professor Smith's attitude towards all of her students is condescending.

Joan has a particular aversion to Mary, the young woman who sits in the first row near the window. Mary is very anxious to get good grades and Joan believes that she is a real sycophant. All the students are aware of what she is doing but Professor Smith takes no notice of her remarks as she continues to drone on in front of the class.

Before she knew it, Joan arrived at her classroom door. The walk had passed very quickly. She thoroughly enjoyed daydreaming in this manner.

16. In earlier schoolyears, the young man named Peter was probably criticized for

    a. teasing the girls
    b. talking to his neighbors
    c. criticizing the teacher
    d. cheating

17. Professor Smith has probably been accused of

    a. being an easy grader
    b. giving bad grades
    c. arguing with students
    d. feeling superior to others

18. Joan most probably dislikes

    a. students who flatter the teacher
    b. students who earn good grades
    c. teachers who argue with students
    d. students who attract attention

19. At the end of Professor Smith's lecture most of the students were probably

    a. excited
    b. angry
    c. asleep
    d. nervous

20. As a child the young woman named Mary most probably

    a. copied from the person next to her
    b. told the teacher that she was pretty
    c. was a very good student
    d. stared out of the classroom window

21. The passage implies that Professor Smith believes her students are

    a. excellent workers
    b. overly sensitive
    c. very critical
    d. not as good as her

22. The passage implies that the students in the class found it difficult

    a. to pass the course
    b. to listen to the instructor
    c. to do their homework
    d. to find the classroom

23. In later life, the young woman named Mary will probably

    a. say the right things to her boss
    b. get along well with her co-workers
    c. work in an outdoor job
    d. be a college teacher

APPENDIX E

VK

Vocabulary Test

Vocabulary Test

Directions: Below appear a number of words in capital letters followed by several choices regarding their meaning. Mark the letter of the best meaning of the word on the answer sheet.

1. ZEALOUS

a. spontaneous
b. dangerous
c. ambitious
d. peaceful

2. VIRTUOSO

a. expert
b. innocent
c. saint
d. coward

3. DRONE

a. speak carefully
b. speak boringly
c. build up
d. tear down

4. AVERSION

a. delusion
b. measure
c. dislike
d. enthusiasm

5. EXTIRPATE

a. invite
b. examine
c. state
d. destroy

6. LACHRYMOSE

a. brave
b. sad
c. angry
d. calm

7. PERIPATETIC

a. rich
b. wandering
c. unwilling
d. annoying

8. BERATE

a. become
b. reward
c. thank
d. scold

9. DISPARATE

a. careless
b. moderate
c. different
d. carefree

10. ALTERCATION

a. argument
b. discussion
c. guess
d. protection

11. TYRO

a. beginner
b. king
c. tyrant
d. foreigner

12. BANTER

a. read
b. waste
c. joke
d. trade

13. LOQUACIOUS

a. stingy
b. humorous
c. talkative
d. secret

14. ENTICING

a. unfavorable
b. entailing
c. attractive
d. shocking

15. CONDESCENDING

a. clever
b. snobbish
c. abrupt
d. agreeable

16. SYCOPHANT

a. one who flatters
b. one who sings
c. glutton
d. debutante

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