



1988

The Effects of Oral and Written Context as a Function of Number and Distribution of Presentations of Vocabulary Acquisition

Ernie J. Hill

Loyola University Chicago

Follow this and additional works at: https://ecommons.luc.edu/luc_theses



Part of the [Psychology Commons](#)

Recommended Citation

Hill, Ernie J., "The Effects of Oral and Written Context as a Function of Number and Distribution of Presentations of Vocabulary Acquisition" (1988). *Master's Theses*. 3589.

https://ecommons.luc.edu/luc_theses/3589

This Thesis is brought to you for free and open access by the Theses and Dissertations at Loyola eCommons. It has been accepted for inclusion in Master's Theses by an authorized administrator of Loyola eCommons. For more information, please contact ecommons@luc.edu.



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License](#).
Copyright © 1988 Ernie J. Hill

THE EFFECTS OF ORAL AND WRITTEN CONTEXT AS A FUNCTION
OF NUMBER AND DISTRIBUTION OF PRESENTATIONS ON
VOCABULARY ACQUISITION

by

Ernie J. Hill

A Thesis Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of

Master of Arts

November

1988

ACKNOWLEDGMENTS

The author gratefully acknowledges the assistance and encouragement provided by the director of his thesis committee, Dr. Eugene B. Zechmeister. He would also like to thank the member of his committee, Dr. James W. Hall for his help and guidance.

VITA

Ernie James Hill is the son of Cordie Lee Hill-Lawler and Ernest A. McWhorter. He was born on April 16, 1961, in Denver, Colorado.

He received his elementary and secondary education in the public schools of Denver; and in 1979, graduated from George Washington high school.

In September of 1979, Ernie entered the University of Northern Colorado, where he completed two years of coursework. He then transferred to Colorado State University and, in December of 1983 received the degree of Bachelor of Science with a major in psychology and a minor in sociology.

Ernie entered the graduate program in Clinical Psychology at Loyola University of Chicago in August of 1985. During his first year, he was awarded a Graduate Fellowship for minority students. He was granted assistantships for each of his next two years at Loyola. Both of these years were spent working with Dr. Eugene B. Zechmeister. In 1986, Ernie received a summer, clinical placement at West Side Veterans Administration Hospital.

Ernie has co-authored (with Drs. Bell and Richards,

and S. Hess, S. L. Kukas, and D. Sargent) the article "Noise and context-dependent memory" which was presented at the meeting of the Rocky Mountain Psychological Association in April 1983 and published in the Bulletin of the Psychonomic Society in March 1984. He and Dr. Zechmeister have also collaborated on a paper: "Do you know when you know the meaning of a word learned in context?" which was presented at the meeting of The Psychonomic Society in November 1987.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS.....	ii
VITA.....	iii
LIST OF TABLES.....	vii
INTRODUCTION.....	1
Number of Words in the English Language.....	1
Vocabulary Growth.....	1
Acquisition of Vocabulary.....	3
REVIEW OF RELATED LITERATURE.....	9
Deriving Word Meanings from Context.....	9
Research on Learning from Context.....	19
Learning Vocabulary from Context.....	19
Vocabulary Instruction and Context.....	23
Verbal Ability and Use of Context.....	27
Instruction in How to Use Context.....	36
NONSUPPORTING EVIDENCE.....	46
METHODOLOGICAL ISSUES.....	61
ASPECTS OF CONTEXT WHICH HAVE RECEIVED MINIMAL FOCUS.....	68
Vocabulary Learning and Oral Context.....	68
Vocabulary Learning from Context and Number of Presentations.....	69
Metamemory and Vocabulary Learning from Context.....	73
EXPERIMENT 1.....	77

	Page
METHOD.....	79
Design.....	79
Materials.....	80
Subjects.....	84
Procedure.....	84
Scoring.....	87
RESULTS.....	88
Recall Test.....	88
Multiple-Choice Test.....	90
Confidence Ratings.....	93
EXPERIMENT 2.....	100
METHOD.....	102
Design.....	102
Materials.....	102
Subjects.....	104
Procedure.....	104
Scoring.....	107
RESULTS.....	108
Recall Test.....	108
Multiple-Choice Test.....	111
Confidence Ratings.....	114
Comprehension Ratings.....	122
DISCUSSION.....	126
REFERENCES.....	138

LIST OF TABLES

Table	Page
1. Mean Number of Definitions Correct on Recall Test (Written and Oral Context Conditions).....	89
2. Mean Proportion Correct on Multiple-Choice Test (Written and Oral Context Conditions).....	91
3. Proportion Correct as a Function of Confidence Level on Recall Test (Written and Oral Context Conditions).....	94
4. Proportion Correct as a Function of Confidence Level on Multiple-Choice Test (Written and Oral Context Conditions)...	97
5. Mean Proportion of Definitions Correct on Recall Test Informed and Uninformed Conditions.....	109
6. Mean Proportion Correct on Multiple-Choice Test Informed and Uninformed Conditions.....	112
7. Proportion Correct as a Function of Confidence Level on Recall Test (Informed and Uninformed Conditions).....	115
8. Proportion Correct as a Function of Confidence Level for Control Items on Recall Test (Informed and Uninformed Conditions).....	117
9. Proportion Correct as a Function of Confidence Level on Multiple-Choice Test (Informed and Uninformed Conditions).....	119
10. Proportion Correct as a Function of Confidence Level for Control Items on Multiple-Choice Test (Informed and Uninformed Conditions).....	121

INTRODUCTION

NUMBER OF WORDS IN THE ENGLISH LANGUAGE

Estimates of the total amount of words in the English language vary considerably. Liberal counts, which include derivatives and compounds as words, put the number of known words at approximately 166,247 (Smith, 1941). More restrictive counts, which exclude derivatives and compounds, as well as slang, foreign derivatives, and archaic and technical terms, suggest that the number of known words in the English language is as low as 12,300 (Jenkins & Dixon, 1983). It is apparent that depending upon how one defines what is a word, the figures for the number of words in the language can differ widely. Other reasons for variation in the number of words in the language include the source, for example, the dictionary, one uses to define words in the language. Nevertheless, unless one relies on highly restrictive counts, the number of words in the English language can be quite large.

VOCABULARY GROWTH

Despite the large number of words which comprise the English language, individuals seem to learn many of

them, judging from the estimates of growth of absolute vocabulary size. Many researchers (e.g., Jenkins & Dixon, 1983; Terman, 1916) suggest that vocabulary size roughly doubles between the third and seventh grades. Smith (1941), employing more liberal methods, appraised third grade vocabulary at 25,000 compared to 51,000 at the seventh grade level. Applying a somewhat restrictive procedure, Dupuy (1974, cited in Jenkins & Dixon, 1983) estimated the average third grade vocabulary of basic words at 2000, which increases to approximately 4760 for the average seventh grade student. McKeown and Curtis (1987) suggest vocabulary size increases about 3,000 words per year during the school years. Given such estimates in growth rates, the average high school senior's vocabulary would be in the neighborhood of 40,000 words. By the time one is an adult, an individual's vocabulary probably exceeds 50,000 words; for a college educated adult, the number of words known may be in excess of 80,000 (Sternberg, 1986).

Regardless of how one measures vocabulary size, it can be concluded that most individuals encounter new words by the tens of thousands. Secondly, individuals learn thousands of these words at a substantial rate.

Thirdly, and probably most obvious, there is a considerable amount of vocabulary to acquire.

ACQUISITION OF VOCABULARY

How does one account for such growth in word knowledge? One source of vocabulary knowledge is through direct teaching of vocabulary in school. Research (e.g., Jenkins & Dixon, 1983; McDaniel & Pressley, 1984) on vocabulary instruction has demonstrated that certain procedures are more efficacious than others.

One technique is the keyword method (Pressley, Levin, & Miller, 1982). The keyword method is a mnemonic technique for learning vocabulary definitions. There are two common versions of the method, one based on the construction of visual images and the other based on the construction of sentences. To use the imagery version, the learner forms an interactive image between the definition referent of the to-be-learned vocabulary word and a keyword, which is a word that sounds like a part of the word. The sentence version entails placing the keyword and the definition of the vocabulary word in a meaningful sentence. As an illustration, consider the word, carlin, which means "old woman." Using the keyword "car," a learner might generate either an image

of an old woman driving a car or a sentence such as, "The old woman drives a car." Empirical investigations (e.g., Pressley, Levin, & Miller, 1982; McDaniel & Pressley, 1984) have demonstrated that instruction in the keyword method aids the learning of new English words as well as the learning of vocabulary in a foreign language, relative to uninstructed control groups.

One of the most intensive and ambitious vocabulary instruction programs (Beck, McCaslin, & McKeown, 1980) included defining of words, sentence generation tasks, and pronunciation tasks. Target words, which were grouped by semantic category, were taught to elementary school children over a 5-day cycle, 30 minutes daily, with all the words being introduced on the first day of the cycle. A subset of words for spaced reviews beyond the regular 5-day cycle was also selected. These words reappeared in 2 or 3 days in review exercises. This resulted in another 16-22 exposures for each word in this subset. The premise for including this additional review was that students would learn the reviewed words to a higher degree. Thus, when students encountered these words at a later time, for example during reading or listening activities, it was assumed that they would be able to access meanings in an automatic fashion,

without deliberate or conscious effort.

Using intact classrooms of elementary school students, classrooms were either designated as the experimental vocabulary learning program or the regular language instruction group. The results indicated that students in the vocabulary instruction programs performed significantly better on vocabulary measures, for example, determining whether a target word was used appropriately, than students not in the program. Moreover, the reviewed word set was learned better than words not reviewed. Unexpectedly, on a standardized vocabulary test that did not contain words taught in the program, students in the program did better than the control students. The reason for this generalized effect may have been due to the increased awareness of words on the part of the experimental group who had been reinforced for finding and using the targeted words beyond the classroom.

While studies using the keyword method, as well as those employing specific vocabulary instruction programs, demonstrate that direct teaching of vocabulary can be effective, these programs of vocabulary instruction do not result in a substantial increase in vocabulary size. The aforementioned vocabulary program,

which is more thorough than most, resulted in a gain of only 104 words over a five month period (Jenkins & Dixon, 1983). It seems that only a small part of our vocabulary is directly taught. That is, explicit instruction is not a primary source of the copious amount of words in our vocabulary.

Another potential source of vocabulary acquisition is through reading instruction. Yet, in a survey of reading programs by Jenkins and Dixon (1983) it was found that intentional efforts to improve vocabulary were not widespread. Most programs devoted none to minimum attention to vocabulary learning. Programs that did include vocabulary instruction lacked intensity and scope. For example, in the examination of one popular fourth grade level basal reading series, there were no lists of vocabulary identified for emphasis. Also lacking were specific lessons for teacher-led instruction and exercises expressly for the teaching of word meanings. From such a program, it is unlikely that an individual would learn the meanings of many words. One of the better designed reading programs entailed introducing a new word in a sentence that clarified its meaning and selecting a text that included the target word. At this point, if the student did not recall the

meaning of the word he or she looked it up in the glossary. Finally, the word appeared in a reading exercise. Although a program of this scope would most likely result in long-term gains in vocabulary knowledge, programs such as this are few. From the research on reading instruction, it is apparent that most reading programs are deficient and ineffective, and few can result in any substantial growth in vocabulary. Even if a reading program does facilitate vocabulary knowledge, it is not of the magnitude to account for a large percentage of the total amount of words in one's vocabulary.

Another means of vocabulary learning is to refer to a glossary or dictionary when the meaning of a word is not known. However, some individuals, especially children, either do not know how to use a dictionary or glossary, or do not always have access to these items or both. Other individuals, upon encountering an unknown word likely skip over it. This may be because he or she is not aware that it is an unknown word or he or she does not want to take the time to consult a dictionary. Moreover, when individuals do make use of a glossary or dictionary their attempts to comprehend the meaning of a writer's ideas may be disrupted (Carnine, Kameenui, &

Coyle, 1984). Consequently, one may opt not to look up a word's meaning. According to Bergman (1977), at best most individuals use a dictionary on a random and infrequent basis. It is doubtful that use of a dictionary whenever an unfamiliar word is encountered is the source of much vocabulary acquisition.

While the aforementioned methods can account for a portion of vocabulary learning, it is evident that the major part of vocabulary acquisition cannot be accounted for by these techniques. In other words, individuals must acquire the vast bulk of their vocabulary by other means. The conclusion has been reached, based on a default argument, that increases in vocabulary knowledge are for the most part the result of learning meanings from context (Jenkins & Dixon, 1983; McKeown & Curtis, 1987). That is, learning from context is assumed to be the major source of vocabulary acquisition because no other explanation can account for such large gains in one's vocabulary. Many researchers (e.g., Crist & Petrone, 1977; Gipe, 1979; McKeown, 1985; Nagy, Herman, & Anderson, 1985, Power & Kaye, 1982; Sternberg, 1982) support this view.

REVIEW OF RELATED LITERATURE

DERIVING WORD MEANINGS FROM CONTEXT

Given that most researchers believe that vocabulary learning occurs predominantly through context, the issue is to understand how this might occur. One approach is given by Sternberg and Power (1983) who posit a theory of learning from context. This theory is based upon the processes of knowledge acquisition, contextual cues, and mediating variables.

According to their theory of learning the meanings of unknown words from context, Sternberg and Powell believe that the processing of available information requires three distinct operations. One is selective encoding which involves separating relevant from irrelevant information. When an individual encounters an unfamiliar word in context, information relevant to figuring out its meaning is present with varying amounts of helpful and misleading information. The reader must separate these pieces of information. A second operation is selective combination, which involves combining the selectively encoded information into a plausible, workable definition. In other words, the reader must combine the information he or she has into a

meaning of the word. The third operation is selective comparison, which is a process involving relating newly acquired information to old information already stored in memory. As a reader decides what information to encode and how to combine this information, what the reader already knows about a topic will be beneficial in guiding the reader towards a suitable definition of the word. Taken together these three processes control the activities required to figure out the meanings of unknown words. However, these processes do not occur in a vacuum or at random. Rather, they are applied to a set of cues provided by the context in which a word occurs (Sternberg, 1987).

Context cues are hints contained in a passage that facilitate, and sometimes hinder, the process of figuring out the meaning of an unknown word (Sternberg, et al. 1982). Contextual cues presented in the verbal text convey various types of information about a word. The context cues determine the quality of a definition that theoretically can be ascertained from a word in context (Sternberg & Powell, 1983). Sternberg and Powell propose that context cues can be classified into eight categories depending upon the type of information provided by the cue. The context cues are: 1) temporal

cues: cues referring to the duration or frequency of X (the unknown word) or referring to when X can occur; 2) spatial cues: cues referring to the general or specific location of X or possible locations in which X can sometimes be found; 3) value cues: cues referring to the worth or desirability of X or referring to the kinds of affect X arouses; 4) stative descriptive cues: cues referring to physical properties of X (e.g., size, shape, color, odor, texture); 5) functional descriptive cues: cues referring to possible purposes of X, actions X can perform, or potential uses for X; 6) causal/enablement cues: cues referring to possible causes of or enabling conditions for X; 7) class membership cues: cues referring to one or more classes to which X is a member; and 8) equivalence cues: cues referring to the meaning of X or contrasts to the meaning of X. In addition to providing information about a given unknown word in context, these cues can also be used to refer to the sort of information that the unknown word provides about another word or concept in a passage.

The following paragraph, which contains the unfamiliar word trok, illustrates some of the above mentioned cues (Jenkins & Dixon, 1983):

Ann wiped the morning sleep from her eyes, leaned against the sink and lifted her trok from its holder. She squeezed some paste onto its bristles and wet it, but just as she put the trok to her mouth, the phone rang.

It is evident that this paragraph provides many cues about the meaning of trok. There are temporal cues, morning, after arising from sleep, informing the reader when troks may be used; spatial cues, near a sink, probably bathroom, kept in a holder; and a stative descriptive cue, bristles, providing a description of the physical properties of troks. With all of these various cues, it is readily apparent that a reader of this paragraph would be able to figure out that a trok is a toothbrush.

The categories suggested by this system are not mutually exclusive, or exhaustive, nor do they function independently (Sternberg & Powell, 1983). Similarly, not every type of cue will be present in every context and when a cue is present the helpfulness of the cue will be affected by mediating variables. The mediating variables specify those variables that affect how and whether a reader will apply contextual information to figure out a word's meaning. In other words, mediating

variables affect the usefulness of the context cues in a particular passage (Sternberg & Powell, 1983).

Consequently, mediating variables make it either easier or harder to apply the knowledge acquisition processes to the cues (Sternberg, 1986).

There are seven mediating variables that have been considered as important in learning word meanings from context. One is the number of occurrences of the unknown word. That is, multiple occurrences of an unknown word increase the number of available cues and can increase the usefulness of individual cues if a reader integrates the information from the cues surrounding the occurrences of the word. Another variable is the variability of contexts in which multiple occurrences of the unknown word appear. Different types of contexts, for example those provided by different writing styles or by different subject matter, are likely to convey different types of information about the unknown word. Thus, variability of context increases the likelihood that a reader will get a broad picture of a particular word's meaning. Although variability of contexts can be beneficial and facilitate learning meanings of words from context, too much variability can overwhelm a reader and interfere

with learning the meaning of a new word. For instance, if it is presented in such a way that makes it difficult to integrate information across various appearances of a word, then multiple occurrences of a word may actually confuse rather than clarify a word's meaning. However, simply repeating an unknown word in basically the same context is not likely to be as helpful as repeating it in variable contexts in that in the former case the reader is not provided with any new information about the word's meaning.

A third mediating variable is the importance of the unknown word to understanding the context in which it is embedded. If a given unknown word is considered to be critical to comprehending the surrounding material in which it is embedded, a reader is likely to have more incentive for figuring out the word's meaning. If a word is considered to be unimportant to comprehending what one is reading, then one is unlikely to put much effort into ascertaining the word's meaning.

Another variable is the helpfulness of the surrounding context in understanding the meaning of the unknown word. A particular cue can be differentially helpful depending upon the nature of the word whose meaning is to be inferred and the location of the cue in

the text in relation to the word whose meaning is to be inferred. For example, a temporal cue would most likely be of more assistance than a spatial cue when trying to figure out the meaning of "diurnal" which means daily. If a cue is close in the text to the unknown word, then it is more probable that the cue will be noticed as being relevant to inferring the unknown word's meaning than if the cue is located far away from the unknown word.

A fifth mediating variable is the density of unknown words. If there are many unknown words, then a reader might be overwhelmed and be unwilling or unable to use the available cues. It could make figuring out which cues apply to which unknown word extremely difficult. Additionally, in order for the reader to use a given cue for an unknown word he or she may need to figure out the meaning of another unknown word. Thus, the usefulness of the context may be decreased.

A sixth variable is the concreteness of the unknown word and of the surrounding context. Concrete words are generally easier to define than abstract words because concrete words have more straightforward definitions than abstract words. Additionally, the degree of concreteness of abstractness may aid one in determining

what information is relevant to figuring out the meaning of a word. The concreteness of the surrounding context also affects one's ability to determine a word's meaning. Generally, the more concrete the context, the easier it will be to define the unknown word.

The last mediating variable is the usefulness of previously known information in understanding the passage and in cue utilization. An individual's prior knowledge about a topic may be helpful in providing information needed in identifying the meaning of an unknown word. In using prior knowledge, one may seek to find familiar circumstances relevant to the context in which the unknown word appears. Similarly, one may attempt to see if the unknown word seems similar to any other words or combinations of words one has previously encountered. One's past knowledge about a topic is likely to increase the usefulness of a cue and, thus, facilitate inferring a word's meaning. Of course, prior knowledge may not always be helpful in the identification of a word's meaning. For example, if past information is inaccurate or not able to be retrieved, then past knowledge is unlikely to be of any help or may impede one's ability in determining the meaning of an unknown word.

In an empirical test of their theory, Sternberg and Powell (1983) asked high school students to read 125-word passages that contained one to four low-frequency words. Passages were equally divided among four types of writing styles: literary, newspaper, scientific, and historical. The students were instructed to define as best they could each of the low-frequency words. Passages were like the one used earlier in the explanation of Sternberg's and Powell's theory.

The quality of the definitions was measured. Three trained raters independently rated the definitions and an average of their ratings was used as a definition-goodness score for each word for each subject. These averages were then averaged over subjects to obtain a mean goodness-of-definition rating for each word. Ratings of the number of strength of the occurrences of the context cues and mediating variables were taken, too, as a predictor variable.

The results showed that the correlations between the predicted and observed goodness ratings were: .92 for literary passages, .74 for newspaper passages, .85 for science passages and .77 for history passages. All of these values were significant. Although it is not possible to determine which mediating variables had the

most influence, the context cues and mediating variables as proposed by Sternberg and Powell appear to have an empirical foundation.

From Sternberg's and Powell's theory it is evident that when an individual encounters an unknown word in context, the individual should apply the processes of selective encoding, selective combination, and selective comparison to each of the eight kinds of contextual cues (Sternberg, 1986). The mediator variables will make this procedure either easier or harder.

RESEARCH ON LEARNING FROM CONTEXT

What evidence exists for the facilitating effects of context? Research on learning from context has been examined from various perspectives. These perspectives are: learning vocabulary from context, teaching vocabulary using context, differences in the ability of good and poor verbal ability individuals to use context, and instruction in how to use context. Each of these perspectives will be examined.

Learning Vocabulary from Context

Sternberg's and Powell's (1983) test of their theory, described above, provides indirect support that context can facilitate learning of word meanings. Duffelmeyer (1984), in a more direct investigation, examined the effect of context versus no context on the ability to acquire word meanings. Eighth grade students were administered the vocabulary section from a standardized reading test which contained target words presented in isolation. Two weeks later the students were given a new version of the same test. This revised test was composed of the same target words, but the words were not embedded in specially constructed, context-rich sentences. A context-rich sentence was

defined as a sentence that described an experience that the subjects could relate to, that contained words which were familiar to subjects (with the exception of the target word), and that contained a target word near the end of the sentence, so that most of the context cues were seen before the target word. For example, for the word "exceed" the sentence was: "When you are driving, be careful not to exceed the speed limit." The results clearly indicated that context does promote the acquisition of word meanings.

While research has shown that context can facilitate the learning of word meanings, other studies have attempted to investigate how and what factors may affect one's ability to learn from context. For example, Carnine, Kameenui, and Coyle (1984) explored the effect of three factors on learning from context. One was whether the form of the context information in a passage has differential effects on students' learning of unfamiliar words. The three forms of contextual information selected were: 1) synonyms or words that have essentially the same meaning. ("The starfish has a most idiosyncratic way of eating. It certainly is strange.") 2) contrast in which an antonym of the unfamiliar word is preceded by the adverb not. ("The

starfish has a most idiosyncratic way of eating. It certainly is not normal.") 3) inference relationships in which a chain of words allows the information of a deduction. ("The starfish has a most idiosyncratic way of eating. Most animals do not eat this way.")

A second factor was the proximity of the context information to the unfamiliar word. Context clues presented in one of three above mentioned forms were placed either close to or separated from the unfamiliar word. When placed close to the unfamiliar word, the context clues immediately followed the unfamiliar word within the next two sentences. When separated, the context clues appeared three or more sentences following the unfamiliar word.

A third factor was age. It was of interest to investigate whether a developmental trend exists in students' ability to use context information to determine the meanings of unfamiliar words in passages. That is, do students get better at using context as they get older? Fourth, fifth, and sixth grade students were tested.

Students were first given a multiple-choice test wherein they had to determine the correct meaning of the words in isolation. Then students received a multiple-

choice test wherein they had to determine the correct meaning of the words in context from contrived passages in which the explicitness (synonym, contrast, or inference) of the context cue and the proximity of the context cue to the unfamiliar word were varied.

There are several findings from this study. One was that determining the meaning of unfamiliar words was easier when the words appeared in context as compared to when they appeared in isolation. Deriving word meanings from context was simpler when the context information was closer to the unfamiliar word. Context information was also easier to use when it involved a synonym than when an inference was required. Finally, older students responded correctly more often than younger students, whether words appeared in isolation or in context.

From these results, it is evident that the context that surrounds a word in text can give clues that facilitate learning of its meaning. As was shown, there are variables, for example, the type of clues available and the location of the clue in relation to the unknown word, that moderate one's ability to use context. Nevertheless, overall, learning the meaning of unknown words is promoted when the unknown word appears in context rather than in isolation.

Vocabulary Instruction and Context

Many studies have attempted to show that context is an effective instructional means for vocabulary development. Crist and Petrone (1977), for example, had two groups of college students try to learn the meanings of 15 unfamiliar words. One group learned them by going five times through a series of cards that contained the words and their definitions (e.g., heinous-very wicked; extremely offensive; hateful). The second group learned them by examining sentences on cards and attempting to determine from the context the word that would go in the blank space (e.g., A process so heinous that men would spit on it). The word that fit in the blank was located on the back of the card. Subjects saw each sentence five times.

After completion of this task, all subjects were given two measures to assess learning of the definitions of the words. One measure consisted of 15 new contexts. Each context contained one of the target words. These contexts were similar to those studied by the context group, but had not been seen by that group. Subjects attempted to derive the meanings of the words from the new contexts. The second measure was a recall test composed of the definitions seen by the definition

group. Subjects had to write the correct target word next to each definition.

The results indicated that the subjects who studied contexts did better on the context test than did the definition group. Of course, the context group's better performance could be attributed to having experience with context. However, the context group did as well on the recall test as the definition group. These findings suggest that not only can one learn from context, but that an even greater understanding of an unfamiliar word's meaning can be obtained by studying contexts rather than definitions. That is, the conceptual meanings of words may best be acquired through learning them in context.

Gipe (1979) investigated four techniques for teaching word meanings. One method was based on an association between the unknown, or target, word and a familiar synonym or brief definition. The task required subjects to memorize the pairs to the point of being able to write the pairs without referring to the study sheet. For example, a subject might memorize the association, "barbarian-cruel, mean person." Then, along with other parts given to memorize, the subject would be asked to write from memory each pair.

A category method required that subjects add words to a list of words from the same category. Each list provided for the subject contained one target word and three familiar words. Subjects were given several lists at one time. The subjects studied the lists and added words from their own experience to the list. Then a random listing of all the previous words was shown and subjects had to recategorize them without referring to the study lists. For example, one would be given a list of words from four categories, an illustration of a category being, "Bad People" with the following words listed: mean, cruel, barbarian, robber. Subsequently, the subject would add words from their background and include these words on the lists. Finally, subjects would recategorize a random listing of all the words from the different categories.

A context method used target words in meaningful sentences. This technique required subjects to read a three sentence passage in which each sentence used the target word in a defining context. The contexts of the sentences were simple in nature and contained familiar words. At the end of each passage each subject was asked to respond in writing with a word or phrase from his or her personal experience that would further

clarify the meaning of the target word. An example of a target word in context was:

The barbarian kicked the dog and hit the owner in the nose. Any person who acts mean to anybody or to anything is a barbarian. Barbarian means a person who is very mean. Write down something that a barbarian might do at the dinner table.

A fourth method, the dictionary method, instructed subjects to look up the target words in the dictionary, write their definitions, and write sentences containing each new word.

The subjects, third and fifth graders, received all vocabulary learning methods but in different orders. The length of the study was eight weeks and evaluation tasks were given at the end of each week of the study. These tasks were cloze tests, in which subjects filled in the blanks of sentences with the words that had been taught during the previous week.

It was found that the context method was significantly better than all the other methods across all grade levels. For third graders, the association method was better than the dictionary method, but not better than the category method. Also, the category method did not differ from the dictionary method. For

the fifth graders, the association method was better than the category and dictionary methods. The dictionary and category methods did not differ. Generally, while associating new words with familiar synonyms can result in the learning of the meanings of words, the use of context appears to be the most effective of these learning methods.

The results of these studies suggest that teaching word meanings by presenting unfamiliar words in context promotes one's learning of the meanings of these words. The more context clues that are provided about the meaning of the word, for example, explicit definitions or meaningful, detailed descriptions, the better one is able to learn the meanings of unfamiliar words. Additionally, a conceptual understanding of a word seems to be aided by studying a word in context.

Verbal Ability and Use of Context

Learning of definitions of words using context may not be helpful to all individuals. The process of acquiring word meanings from context has been investigated both for high and low verbal ability students. These studies have usually shown that students with high verbal ability are more likely than students with low verbal ability to learn a word's

meaning from context. In other words, high verbal ability students are able to use context better than are low verbal ability students.

McKeown (1985) explored differences between high and low verbal ability fifth grade students in determining word meanings from context. To examine this, a meaning acquisition task was developed based upon a process theory of meaning acquisition. According to this theory (McKeown, 1985), the process begins when a person recognizes a word within context as unknown and selects from the context concepts that constrain the meaning of the word. Then he or she searches for and tests meaning candidates within the context. Meaning candidates are defined as known concepts that appear to fit the limits chosen. Meaning candidates are tested by matching the context constraints with the features of the meanings. A hypothesis about the word is constructed. If decision criteria are not reached, for example, if the hypothesis formed does not include a decision that the word is now known, the process continues with the next encounter of the word in context. With the next encounter, the learner again selects constraints and searches for and tests these meanings. But, between selection and search is the

process of coordination of the constraints of the present and prior context(s). In this manner, information about a word's meaning is compiled and refined until the hypothesis constructed about a word meets the decision criteria.

The meaning acquisition task contained six artificially constructed items, each designed around an artificial word. Each item consisted of a series of sentences composed of an artificial word and clues to its meaning. Subjects went through five steps.

Step 1 involved reading to the subject context sentences containing an artificial word and presenting six choices for the word's meaning. Subjects were asked if each choice could be the meaning of the word and why or why not. Step 1 represented two components of the word-acquisition process. First, the reasons the subjects gave for their choices provided evidence of the context information used to selected meaning limitations. Second, subjects' evaluation of each choice as appropriate or inappropriate and their reasons for their decision represented the testing of meaning candidates.

Step 2 involved providing the subject with two more sentences with the same artificial word. Subjects were

instructed to use information from both sentences to determine if each of the six choices fit the meaning of the word and to state why or why not. This step reflected the coordination of two contexts to select constraints and the testing of meaning candidates within the coordinated constraints.

Step 3 involved three sentences. The sentences were based on one of the earlier sentences. A different detail was added in each sentence. After each sentence, subjects were asked if it told them more information about the meaning of the word, and if so, what. In this step, one sentence contained information that enabled the subjects to make a clearer distinction between their meaning choices. The other two sentences gave clues that allowed a final choice to be made. This was based on the assumption that subjects were on the right track. This step reflected the process that information about a word's meaning is compiled and refined.

Step 4 involved asking the subject what he or she thought the word meant. An additional sentence, with precise and explicit context clues, was presented if the subject was incorrect or unsure of the meaning. After being asked if any more information was known about the word, if subjects were still unsure, the correct meaning was told. This step represented the point in the

acquisition process in which a decision is made as to a word's meaning.

Step 5 involved the subject being presented with six sentences, each containing the artificial word. Subjects were asked if the sentences were true or not true. That is, was the new word used correctly or incorrectly. This step reflected the goal of the meaning acquisition process. It tested the subject's ability to use the knowledge of the word to interpret the meaning of new sentence contexts containing the word.

The results indicated that high ability subjects were significantly better than low ability subjects at selecting constraints from context and in evaluating meaning choices within context constraints. When subjects were presented with two contexts, the high ability subjects were more likely to consider both of them in evaluating a meaning choice. However, when subjects used the two contexts in evaluating a meaning choice no difference was found between high and low ability subjects. Thus, while low ability subjects may not use all available information, when they do they seem to be able to judge the appropriateness of a meaning choice and reach an overall decision about a

meaning choice as well as high ability subjects.

Significant differences in the ability to obtain correct word meaning information from three additional contexts were found between the two groups. In other words, higher ability subjects were more proficient at using additional contexts to refine a word's meaning. Possibly as a result of this, high ability subjects identified the correct meaning of the artificial word, given direct clues, more often than did low ability subjects. Finally, high ability subjects were better at distinguishing between sentences that used the newly learned words appropriately and inappropriately. From these findings, high ability subjects clearly are better at using context, and more successful at learning word meanings from context, than are low ability subjects.

Van Daalen-Kapteijns and Elshout-Mohr (1981) examined the process of word meaning acquisition from context in an effort to define the critical aspects of such a process. To look at this, the responses of high and low verbal ability college students on a word acquisition task were studied. Students were presented with five sentences; in each, a made up word with a common meaning was used. The task of the students was to figure out what the word meant.

An example of an item was: "kolper" which means, "a window that transmits little light because of something in front of it." Subjects had to figure out the meaning of kolper from five serially presented sentences: 1) When you're used to a broad view it is quite depressing when you come to live in a room with one or two kolpers fronting a courtyard. 2) He virtually always studied in the library, as at home he had to work by artificial light all day because of those kolpers. 3) During a heat wave a lot of people all of a sudden want to have kolpers, so the sales of sun-blinds then reach a peak. 4) I was afraid the room might have kolpers but when I went and saw it turned out that plenty of sunlight came into it. 5) In these houses you're stuck with kolpers all summer, but fortunately once the leaves have fallen out that isn't so any more.

After reading a sentence aloud, students were asked what the sentence told them about the meaning of the word and to try to comprehend its general meaning. Students were instructed to think aloud while attempting to deduce this information. When students had inferred something about the word's meaning, they wrote it down. After the fifth sentence, students wrote a definition for the new word using one or two short sentences.

The researchers hypothesized that the process of acquisition of a word meaning for an ideal student would be as follows. The first sentence would be considered an example of the use of the new or made up word on the basis of which a rough idea of the word meaning would be formed. This could be seen as the first version of a model. With subsequent information, extraction of more specific information about the meaning is acquired. The process of gathering this information from the context is called decontextualization. The result of this process is filling in the details of the model or adapting one of the aspects of the model to accommodate the information. When the fifth sentence is processed the now refined model equals the student's conception of the new word's meaning.

The results indicated that both high and low ability students formed a rough idea, or model, of the new word's meaning from the initial contexts, but the manner in which the meaning, serving as a model, was utilized was different for the two groups. The high ability students tended to use the model in an analytic way. The model was seen as a group of components that could be used separately during the decontextualization process. In other words, the high ability students

tended to maintain a certain amount of consistency in meaning among the various contexts, but were flexible enough to refine a word's meaning as needed.

The low ability students tended to use the model in a holistic way. The model was seen as an indivisible whole. In other words, the low ability students constructed a model in such a manner that if information provided was incompatible with the meaning of the word, the entire model had to be revised or a new model formed. In this instance, the meanings and information about the word from context became the controlling factor instead of the model, and this resulted in the model sometimes being replaced or changed.

Overall, the findings suggest that high verbal students' approach to the acquisition of word meanings from context approximates the ideal acquisition process and low ability students' approach approximates the ideal process to a lesser degree. As a result, high verbal students are better at learning word meanings from context than are low verbal students because they are able to use contextual information or clues more effectively.

From these studies, it is evident that low, compared to high, verbal ability students appear not to

be able to extract pertinent information from context and adequately integrate contextual information. Consequently, these students may not learn a word's meaning from context; if they do learn a word's meaning from context they may not have an accurate and thorough comprehension of the word. Low ability students, however, may benefit from instruction in how to use context.

Instruction on How to Use Context

Studies have tested specific instructional procedures for teaching individuals how to use context. One such set of procedures was examined by Sternberg (1987), who believes that teaching people to learn better from context can be an effective way of enhancing vocabulary development. In one experiment, 150 adults of average intelligence were assigned to one of five conditions. There were three training conditions and two control conditions. Subjects in the training conditions and one control condition received the same practice words and passages, but received different instruction, if any, regarding the passages.

In the process-training condition, subjects were taught and given practice using the knowledge acquisition components, selective encoding, selective

combination, and selective comparison, which have been postulated by Sternberg's and Powell's theory to be involved in figuring out word meanings from context. For example, the process of selective encoding was defined as sifting out relevant from irrelevant information. Individuals were presented with several lines of text that contained a rare word. Then, subjects were given a thorough explanation of how selective encoding could be used to discover relevant information about a word's meaning in the text. Practice exercises were then presented in which subjects underlined portions of the text that seemed relevant to the meaning of the unknown word.

In the context-cue training condition, subjects were taught and given practice using the context cues, for example, temporal, upon which the three processes of knowledge acquisition operate. For example, individuals were instructed in what are functional descriptive and causal cues, learned what each one was, and were given examples of them. Then, they were asked to use them to figure out the meanings of unknown words in practice exercises.

In the mediating-variable training condition, subjects were taught and given practice using mediating

variables that affect how well the knowledge acquisition processes can be applied to the cues. For example, for the variable, number of occurrences of an unknown word, subjects were told that multiple occurrences signal a word's importance to a text and provide additional information about its meaning, but they also require one to integrate the information from the cues surrounding each occurrence of the word.

In the vocabulary-memorization control condition, subjects were asked to memorize definitions of extremely rare words that did not appear in the other conditions. Subjects were tested on their ability to acquire the word meanings.

In the context-practice control condition, subjects were given the same practice, using knowledge acquisition components, context cues, and mediating variables, that was given to subjects in the three training conditions, except they did not receive any training.

Subjects in each of these conditions were given a pretest and a posttest measuring skill in figuring out word meanings. In other words, the tests did not just test one's recall of word meanings. All words used were extremely rare words. The same pretest and posttest

words were used in each condition and the training words were the same in all training conditions. Each training session was 45 minutes in length, not including testing, which resulted in sessions being 2-1/2 hours.

The results showed that the mean pretest and posttest gain scores were 7.2 for the process condition, 5.2 for the context-cue condition, 7.6 for the mediating variable condition, 1.1 for the word memorization control condition, and 2.6 for the context-practice condition. It is evident that the training groups showed significantly greater gains than did the control groups. Additionally, the control group receiving practice showed larger gains than did the control group receiving only memorization.

In an effort to move beyond merely describing variables that affect one's ability to use context cues, Carnine et al. (1984) conducted a subsequent study. They looked at three procedures for teaching students to learn the meaning of unknown words from context. The three procedures were: rule-plus-systematic practice, systematic-practice only, and no intervention. Fourth, fifth, and sixth grade students were randomly assigned to one of the three groups. All students had average decoding skills and minimum vocabulary knowledge as

determined by a screening test.

In the rule-plus-systematic practice condition, students read training passages that consisted of 33 low frequency words embedded in 33 different passages constructed to control for context cues, synonym or contrast, and proximity of context cues, close or separated as discussed earlier. Passages were presented over three sessions.

Session 1 used 10 passages wherein the contextual information appeared in synonym form. The subject was given a passage and asked to read it aloud. The experimenter followed along and corrected decoding errors. After reading each of the first six passages, the experimenter had the student point to the low frequency word and read the sentence that contained the low frequency word. The student was informed that the low frequency word either told about a person, how to do something, or what something does, and then the student was given a rule: When there's a hard word in a sentence, look for other words in the story that tell you more about that word. The student was then asked to indicate what information the low frequency word seemed to communicate (did it tell about a person, how to do something, what something does) and to apply the rule by

finding relevant information in the passage. Finally, the student was asked to give a meaning for the word and to choose a response from a list of four alternatives. For the remaining four passages, the same procedure was followed, but with less guidance and prompting.

Session 2 consisted of 13 passages, each of which contained contextual information in contrast form. The first eight passages followed the same procedure as explained in Session 1. Similarly, the last five passages followed the same outline, but with less direction and prompting. Session 3 used 10 passages, 5 in which the context information was presented in synonym form and 5 in which the context information was presented in contrast form. All 10 passages were presented using less guidance and prompting.

After presentation of the last training passage, a transfer test was given. The transfer test consisted of passages similar to those used in training, except that eight new words were used. Each passage was constructed so that each contained one form of the two context cues and the proximity of the context cue was either close or separated. All possible combinations of the context variables were included, resulting in four passages. Students read the passages to themselves and were

provided with help if they could not read a word. Afterwards, students were given a multiple choice test.

Following the transfer test, an embedded passage test was administered. The passage was a narrative story in which 10 new low frequency words were included. Context information was presented in synonym and contrast form. Proximity of the context information to the low frequency word was also varied. Students read the passage aloud. The experimenter followed along and corrected decoding errors. Finally, students took a multiple choice test over the 10 words.

In the systematic-practice only condition, students read the same 33 passages used in the rule-plus-systematic-practice condition. Passages were presented in three sessions following a similar procedure as above with some modifications. The rule was not given, meaning that students were not explicitly told to look at other words to determine the meaning of the low frequency word. Also, after reading a passage students were allowed to refer back to the passage. Correct responses to the meanings of the low frequency words were acknowledged and errors were corrected by the experimenter pointing out the correct answer. The transfer and embedded passage tests were presented after

the last training item in Session 3 following the same procedure as the rule-plus-systematic-practice condition.

In the no intervention condition, no training was provided. Students were given the transfer and embedded passage tests five days after the screening test was given. The same procedures as for the other two conditions was followed.

The results of the transfer and embedded passage test scores indicated that both the rule-plus-systematic practice and the systematic-practice only procedures were more effective than no intervention. The lack of differences between the two training conditions suggests that directly teaching of a rule such as, "When there is a hard word in a sentence, look for other words in the story that tell you more about that word," makes no contribution to students' performance. However, students in the systematic-practice group were told that they could look back in the passage if needed, which may have resulted in students substituting each of the four alternatives from the multiple choice test for the low frequency word in the passage until a suitable meaning was found. Additionally, reading a passage aloud, locating the low frequency word, and being told to refer

to the passage for relevant information, probably alerted students in both groups to look for key words or phrases or to think of words that would be appropriate in place of the low frequency word. As a result of these factors, there may have been no need for the rule. In any event, students apparently were able to be taught how to use context so that it facilitated their learning.

From these results, it is clear that instruction in learning words from context can make a significant and substantial difference in one's ability to learn word meanings from context. These findings are not suggesting that use of context will result in gains as rapid or as large as other methods, for example, the keyword method. From such training, individuals acquire the skills for ascertaining the meaning of unknown words from context. These findings also do not imply that teaching specific vocabulary words should never be done, but do suggest that such teaching should be supplemented by training in vocabulary building skills (Sternberg, 1987). This training should include concentrated, extensive practice, guidance by the instructor, and feedback. It is apparent that children as well as adults could benefit from such training. Poor readers,

who may have difficulty utilizing context, would probably improve their ability to use context as a result of instructional training in the use of context information.

NONSUPPORTING EVIDENCE

Not all researchers support the idea that one can easily learn word meanings from context. Schatz and Baldwin (1986) believe that context does not usually provide sufficient clues to enable readers to determine the meanings of low frequency words. Also, context clues are just as likely to result in confusion as in correct identification of a word's meaning. In some instances, the definition of a word may be misidentified. Similarly, Pressley, Levin, and Miller (1982), and McDaniel and Pressley (1984) support the view that, as a direct teaching technique, the keyword method is a better vocabulary learning technique than is presenting unknown words in context

In a series of studies Schatz and Baldwin (1986) looked at whether context clues help high school students identify the meanings of low frequency words in natural prose. Students were given two tests, a words-in-isolation test and a words-in-context test, respectively. The test items were words that were defined as low frequency for high school students.

The words-in-context test was composed of a series of passages chosen from 10 novels from reading lists for

high school students. Each passage contained a low frequency or target word. After each passage, the target word and five items in a multiple-choice format appeared. Students selected the answer that they thought was the correct meaning of the word. Of the five selections, one was a synonym, and the other four were of the same word frequency level and part of speech as the synonym. An example of a test item was:

He takes out an envelope from a drawer, and takes paper money from it. He looks at it ruefully, and then with decision puts it into his pocket, with decision takes down his hat. Then dressed, with indecision looks out of the window to the house of Mrs. Lithebe, and shakes his head.

RUEFULLY

- A) sorrowfully
- B) thankfully
- C) fearfully
- D) casually
- E) longingly

The words-in-isolation test was identical to the words-in-context test except that the passages were

excluded. It was comprised of only the word and the five alternatives.

In a comparison of the scores on the words-in-isolation test and the words-in-context test, the results indicated no significant differences between the scores. These findings suggest that context did not help students ascertain the meanings of the low frequency words. An analysis of the passages revealed that out of the 25 passages, in six cases the context group performed better than the no context group and the reverse was true in six other cases. Given the number of low frequency words, context seems to have been facilitative 24% of the time, but also misleading 24% of the time. On one passage, every subject in the context group chose an incorrect answer. This suggests that context can sometimes result in the incorrect identification of a word's meaning. It could be argued, however, that context is ineffective and misleading only with respect to the literary style found in novels.

In a subsequent experiment, Schatz and Baldwin (1986) looked at context in four content areas in order to determine whether the effects of context vary across different content areas. The four content areas were: literature (novels), newspapers/magazines, history

textbooks, and science textbooks. Passages were constructed from these four areas. High school students were given a words-in-isolation test and a words-in-context test which were constructed as outlined in the previous study. The only difference was in administration. The words-in-context test, which was composed of 60 items, was given over a period of two days. This was done primarily in order to eliminate subject fatigue.

The results showed no significant differences between the scores on the words-in-isolation test and the words-in-context test for any of the content areas. This implies that context is an ineffective or little used strategy for assisting students in determining the meaning of low frequency words. Findings did indicate, however, that students knew significantly more low frequency words from the history passages than from any other content area. Nevertheless, these experiments suggest that context clues are unreliable predictors of word meanings, especially in revealing the meanings of low frequency words in natural prose. Similarly, context may provide the reader with misleading information about the meanings of unknown words. With training in using context clues, perhaps these results

would be different. Another implications of these findings is that instruction in vocabulary learning based on presenting unknown words in context may not always be an effective approach to vocabulary learning.

Pressley, Levin, and Miller (1982) looked at the imagery and sentence keyword methods as compared to three different contextual approaches to vocabulary learning. College students were randomly assigned to groups and presented with low frequency words and their definitions to learn. In the imagery keyword condition, students were instructed to use the keyword method to learn the meanings of the vocabulary words. They were taught the keyword method, which was discussed earlier, and practiced using the method using two sample words (e.g., carlin-old woman, poten-Irish whiskey). As part of the practice, students were asked to form an interactive image, queried on their image, and told of a possible image (e.g., old woman driving a car).

In the sentence keyword condition, the procedure was the same as in the imagery keyword condition except that students were instructed to construct meaningful sentences in which keywords were related to definitions (e.g., for carlin, "The old woman was driving a car").

In the sentence-provided condition, students were

presented with each vocabulary word in the context of one or two sentences that they were instructed to read because it would aid them in the learning of the vocabulary word. Then, two sample words were presented with a sentence (e.g., for carlin, "The carlin broke several bones when she fell on the ice, because old bones are brittle.").

In the sentence-generate condition, students were told to construct meaningful sentences, not just to restate the definition in sentences, that contained the vocabulary words. Practice doing this was given using the same two words above. After a student attempted the task on his or her own, he or she was given an example (same as in the sentence provided condition). This was done only for the practice words.

In the sentence judgment condition, students were presented with each vocabulary word in a sentence. Students were given practice by being presented with the sample item "carlin" in an incorrect sentence context and the sample item "poteen" in a correct context.

In the control condition, students were instructed to try hard to remember the meanings of the vocabulary words. Practice was given using the two sample items.

After the instructions and sample items, students

in all conditions took a definition recall test with the sample items. Then, the words were presented and subsequently students were tested. They were asked to write down the definition for each word, and if they had difficulty recalling the complete definition, they were asked to write down as much as they could remember.

Three types of scoring systems were used. The strict scoring system was defined as complete recall of a definition. Responses that were not verbatim were accepted if they included parts of the original definition that still conveyed the meaning of the word. For example, "sword" was accepted for claymore, even though "a type of sword" was the complete definition. Synonyms of the complete definition also were acceptable.

An intermediate scoring system was defined by the sum of correct responses using the strict scoring system and essence responses. Two criteria were used to determine essence definitions. One was the agreement of judges on a noun or phrase that captured the essence of the definition. Second, the entire definition had to be an element of the set of items as defined by the meaning of the word. For example, for dottle, which means "half-burnt pipe tobacco," the essence definition was

"tobacco." Essence definitions could not be developed for all items (e.g., claymore).

A lenient scoring system was defined as the sum of correct responses using strict scoring, essence responses, and fragment responses. A fragment response was scored if a student recalled some part or fragment of the meaning, but less than the essence. For example, for bullace which means "purple plum," if a student remembered purple he or she was given credit for a fragment response.

The results indicated that the keyword method, especially the imagery keyword method, was more effective than the context methods and control conditions. With the strict scoring systems, students in the imagery keyword condition performed significantly better than all others except those in the sentence keyword condition. The same pattern of results was evident with the intermediate scoring system, but with the sentence keyword students performing significantly better than students in the control condition; whereas, using the strict scoring system, they did not. With the lenient scoring system, besides the already noted differences, students in the sentence keyword condition performed better than students in the sentence generate

and sentence judgment conditions. The keyword method appears to be superior to presenting vocabulary in sentence contexts. Another notable result is that across all scoring systems learning in none of the sentence context conditions was more effective than the control condition.

McDaniel and Pressley (1984) looked at the keyword method of learning new vocabulary compared to learning new vocabulary when the meaning of the vocabulary had to be inferred from context. To accomplish this, college students were randomly assigned to one of four learning conditions. In the keyword condition, students were instructed in how to use and given practice with the keyword method. Students were also provided with a definition and a keyword for each vocabulary word. For example, LOGGIA sounds like "log" and means balcony.

In the context condition, students were not given an explicit definition for each word, but instead presented with a three sentence text containing the word. The text was written in such a way that the meaning of the word could be easily inferred. Students were provided with illustrations of the procedure. For example, LOGGIA, "We leaned over the loggia during the play. It was on the second floor of the theater. The

loggia was open to the stage below."

In the keyword/context combined condition, students were taught how to use and given practice with the keyword method. Students were presented with a keyword along with the three sentence text for each word. For example, LOGGIA had the keyword from the keyword condition and the context from the context condition. In the no-strategy control condition, students were presented with brief definitions from each vocabulary word and given two examples which served to illustrate the procedure. For example, LOGGIA means "balcony."

After completion of the last item, students were given a recall test. Students were given a list of the 61 vocabulary words and asked to write a definition for each word. Verbal SAT (Scholastic Aptitude Test) scores for each student were gathered. Students in the context and keyword/context combined conditions were asked to reread the texts and write a brief definition for each word. This served as an indicator for each student of the words for which definitions could be determined given the context. Perhaps certain contexts made acquiring word meanings easier than other contexts.

Two scoring criteria were used in compiling the results. Strict recall scores were based on definitions

exactly as presented. Liberal scoring allowed definitions that were close in meaning to the presented definitions. For example, "graceful dancer" was the correct definition for mudra according to the strict criteria. However, "dance" or "fancy dancing" was not correct under the strict scoring criteria but was under the liberal scoring criteria. Strict and liberal total recall scores, and strict and liberal recall scores that were dependent on meaning determination from context, termed conditional recall, were computed.

The results showed that the keyword method, regardless of scoring, was more potent than either the context or combined procedures. However, it was not more effective than the control condition. The liberal recall scores of the combined condition were higher than the scores of the context subjects. That is, using the keyword method in conjunction with a meaningful context improved acquisition of word meanings relative to learning with the context alone.

When recall was conditionalized on definition determination, the results of context were significantly worse than all other conditions. The results of the combined condition improved, however, and no significant differences were found for the combined condition and

the keyword or control conditions. Also, whether or not strict or liberal scoring was used, the combined condition was better than the context condition.

In general, there seems to be no evidence supporting the position that the context method is an effective method of vocabulary learning, either with respect to a no strategy control procedure or to the keyword method. In addition, the keyword method was not significantly better than the control procedure. However, the findings suggests that the keyword method may have interacted with verbal ability. An examination of the verbal SAT scores revealed differences in recall as a function of high and low verbal ability. The superiority of the keyword method occurred with the low ability students, but not with the high ability keyword students. This was true using strict or liberal scoring. There was also a trend for high ability context students to recall more than low ability context students. Large and significant differences in the recall of low and high ability students, in general, were found. These findings suggest that for low ability students instruction in using the keyword method would perhaps be a more effective strategy to facilitate

vocabulary learning than instruction in how to use context.

In a subsequent experiment, primarily designed to replicate the previous findings, McDaniel and Pressley (1984) evaluated the keyword and context methods in terms of how adequately the vocabulary learned from these methods could be used in sentences. It may be the case that use of context would result in a better understanding of how to use vocabulary. College students were randomly assigned to a context or a keyword method instructional condition. The procedure and vocabulary words were the same as in the previous experiment with one difference. After the learning phase of the experiment, students were asked to write two sentences for 11 of the 61 vocabulary words. The 11 words were the ones for which definitions were most frequently determined from context in the previous study. Each sentence produced by the students was to include the particular vocabulary word. The instructions specified that sentences should not simply state the definition, but should be constructed in such a way that someone could figure out the meaning of the word from it. After completion of this task, students were tested for recall of the definitions of the words.

Students in the context condition, as in the study before, were tested for how many definitions were actually determined given the context.

The outcome showed that the keyword method recall exceeded context recall for strict and liberal recall as well as for strict and liberal conditional recall. The number of correct sentences generated also was greater in the keyword condition than the context condition. However, if a word's meaning was recalled, there was a high probability of at least one correct sentence being generated and a high probability of two correct sentences being generated. There were no significant differences between the two conditions in this respect. Similarly, if a word's meaning was not recalled, then the chance of generating even one correct sentence was low. Overall, it appears that the context method is not as effective as the keyword method. The importance of this finding is highlighted in the second result of this piece of research. Construction of adequate sentences was largely determined by whether a student had acquired the meaning of the word. That is, as one would expect, knowing the meaning of a word predicts if it will be used adequately. Since the keyword method resulted in more effective learning of vocabulary words, then it

would seem to be a better approach to vocabulary instruction.

From these studies, it is apparent that context does not always have positive effects. In some instances, context may not provide clues which facilitate the learning of an unknown word, especially in natural prose. As such, it may not be the best approach to use in vocabulary instruction. McDaniel and Pressley (1984) and Pressley et al. (1982) demonstrated that the keyword method is a more effective strategy than contextual approaches to vocabulary instruction. This was evident even though students were provided with meaningful and rich contexts, which is not always the case in natural texts. An implication of such results is that teaching students how to use the keyword method rather than instruction in the use of context may be a more appropriate course of action in the field of vocabulary instruction. This is supported by the finding that low verbal ability students seem to benefit from the keyword method.

METHODOLOGICAL ISSUES

Vocabulary studies have shown context to have facilitating effects. However, many of these studies suffer from major methodological shortcomings. A significant deficiency in numerous context studies is that many researchers have used contrived or unrepresentative text instead of natural prose. In non-contrived, naturally occurring prose, using context clues may be an unsuitable means of learning word meanings. Another design issue is the use of pseudowords instead of low frequency words. This may have resulted in larger claims about the beneficial effects of learning the meanings of unknown words from context than are possible with unknown words in natural context.

Many studies that have looked at context (Crist & Petrone, 1977; Gipe, 1979; Carnine, Kameenui, & Coyle, 1984; Duffelmeyer, 1984; Sternberg & Powell, 1983; Sternberg, Powell, & Kaye, 1982, 1983) have used specially contrived sentences or paragraphs, which give optimized context, instead of using naturally occurring prose. In contrast to these studies, Nagy, Herman, and Anderson (1985) attempted to determine whether students

acquire knowledge about unfamiliar words while reading natural instead of artificially constructed text. Eighth grade students of average and above average reading ability were given a vocabulary checklist test as a measure of vocabulary knowledge, especially of the target words, prior to reading the experimental passages. Students then read either a spy narrative or an exposition on river systems. After reading the passage, subjects completed two vocabulary assessment tasks on the target words from both passages. Thus, subjects served as controls for the passage not read. Subjects were interviewed about their knowledge of the target words. Subjects were asked to say the word and define what it meant or use it in a sentence. Lastly, subjects took a multiple-choice test over the target words. The results showed small but reliable gains in word knowledge from context. For both the interview and the multiple-choice test, a greater proportion of the target words from a given passage were known by the subjects who had read that passage than by the subjects who had not. There were no differences between the passages in terms of learning. That is, the amount of learning from the narrative was the same as that from the exposition. It is evident from these findings that

individuals do learn word meanings from context, even when natural text is used. Additionally, individuals seem to be able to learn word meanings from text, a narrative, that is not specifically designed to explain concepts as in the case of an exposition.

Carroll and Drum (1983) investigated the effects of explicit and implicit context clues on learning definitions of words in natural context. Explicit clues were defined as offering precise definitions, either limited in scope (e.g., On top of this ice were as many feet of snow. It was all pure white, rolling, gentle undulations where the ice jams of the freeze-up had formed.), or complete (e.g., If energy is absorbed in chemical reaction, we call it an endothermic reaction.). Implicit clues were defined as offering only a vague semantic sense of a word's meaning (e.g., Previously, sailors had to depend on landmarks. Now the compass, the astrolabe, and the development of more accurate mapmaking enabled them to navigate...). Five passages were selected from high school texts in five subjects: English, literature, government, biology, and chemistry. The subjects were eleventh and twelfth graders from a rural high school. Students were pretested to provide an indication of their knowledge of the target words.

Two weeks later, the students were post-tested using passages with explicit and implicit clues. The experimental group received passages with both types of clues and the control group received passages with only implicit clues. The results, as anticipated, showed no differences between the groups on the pretest. However, on the post-test the experimental group performed better than the control group. This was due to the difference between explicit clues and implicit clues. That is, explicit clues resulted in more precise and complete definitions than did the implicit clues. The implicit clues, however, did show that subjects had at least a general semantic sense of the target words. Findings also indicated that meanings of words from passages in the physical sciences were more accurately and completely defined due to the prevalence of explicit context clues.

Beck, McKeown, and McCaslin (1983) speculated that the usefulness of natural context in clarifying word meanings falls along a continuum. At one end, there are misdirective contexts, which tend to steer individuals to an incorrect meaning of a word. There are also nondirective contexts, that seem to be of no assistance in ascertaining a particular definition of a

word. Further along the continuum there are general contexts, which provide a sufficient amount of information for one to acquire a general idea about a word's meaning. At the other end, there are directive contexts, from which an individual is most likely to gain the correct meaning for a word. To test this idea, these researchers had adult volunteers employed at a university read stories from two fundamental reading programs. The target words had been blacken out except for common prefixes or suffixes. Subjects attempted to fill in the blanks with the missing words or suitable synonyms. Words that were already a part of the subjects' vocabulary were selected in order to control for differences in decoding ability. The results supported their classification system. Most subjects were able to supply the correct or an appropriate word when the context was directive. This number dropped abruptly when the context was considered to be general and decreased even more when the context was nondirective. When the context was categorized as misdirective, only one subject was able to provide a reasonable word.

From these studies, it is evident that individuals can use context clues to learn the meanings of words

from natural text. As found by Nagy et al. (1985), however, such gains in word knowledge may be small at best. The context clues found seem to depend upon the type of material or text one reads. Subsequently, the efficacy of context in relation to the completeness or quality of the word meaning may be affected. As Beck et al. (1983) stated, it is precarious to believe that naturally occurring contexts are sufficient, or even generally helpful, in providing clues to promote initial acquisition of a word's meaning. In other words, it has not been established that context clues reliably assist readers in ascertaining the meanings of unknown words; nor is evidence sufficient to state that context provides accurate clues. In light of these findings, research whose main focus has been teaching individuals how to use context (e.g., Sternberg, 1987; Sternberg, Powell, & Kaye, 1983) would appear to be somewhat premature.

Studies have also supported the efficacy of context on inferring word meanings by using pseudowords instead of low frequency words (van Daalen-Kapteijns & Elshout-Mohr, 1981; McKeown, 1985; Weiss, Mangum II, & Llabre, 1986). While these pseudowords are orthographically and phonologically correct, and capable of being considered

words, the definitions of these words usually refer to mundane and already known concepts. In McKeown's (1985) study subjects were presented with pseudowords such as "narp," which means ordinary. In such studies, individuals are asked to learn a new word for an old concept. Learning a new label for a familiar concept is most likely easier than learning both a new concept and a new label (Nagy et al., 1985). It seems that studies designed in this manner would tend to overestimate the facilitation of learning word meanings from context.

It is evident from the literature that studies demonstrating the facilitating effects of context suffer from several weaknesses. The most severe and critical being the use of artificially constructed contexts. This seems to have resulted in exaggeration of the benefits of context. When natural prose is used, it is not apparent that context clues consistently or reliably reveal the meanings of unknown words. Similarly, the use of pseudowords has led many to overstate the positive effects of context. The learning of a new label and a new concept may yield less beneficial results of learning from context.

ASPECTS OF CONTEXT WHICH HAVE RECEIVED MINIMAL FOCUS

In the literature, certain aspects of context have received little attention. These aspects include: learning from oral context, the effect of the number of presentations of a word in context on learning, and metamemory and context. Exploration of such facets will help elucidate the influence, effects, and limitations of context.

VOCABULARY LEARNING AND ORAL CONTEXT

A noticeably neglected area of context research has been vocabulary learning from oral context. Research designed to investigate the effects of oral context and vocabulary learning has been sparse at best. In a study by Perfetti, Goldman, and Hogaboam (1979) on reading skill and the identification of words in context, it was found that written context as well as oral context had facilitating effects. Both kinds of context as compared to an isolation condition resulted in lower word identification latencies for less skilled and skilled readers. At the word meaning level, however, no study has explored oral context. A major reason for this is, simply, that it is difficult to investigate. Does a

researcher follow a subject around, tape record his or her interactions with others, and then test him or her over the meanings of unknown words he or she encountered? Nevertheless, from the ubiquitous influence of television, radio, and interactions one has with parents, teachers, and peers, it is very likely that oral context would portray a meaningful and notable role in the acquisition of vocabulary learning. Thus, more research is needed to explore this area of vocabulary acquisition.

VOCABULARY LEARNING FROM CONTEXT AND NUMBER OF PRESENTATIONS

Beck et al. (1983) argued that in order to be successful in increasing the size of children's vocabularies, one should include repeated and varied encounters with the targeted words. Few would disagree that the more times that an individual comes across a word in various contexts the more likely that the individual will learn the meaning of the word. This concept, however, has been the focus of few empirical investigations. One exception is a recent study by Dempster (1987). He looked at the effects of encoding variability and spaced presentations on vocabulary learning. Encoding variability was examined by varying

the number of retrieval routes to uncommon word meanings, using a one-sentence context condition, a three-sentence context condition, and a no context or definitions only control condition. As example of an item from each of the encoding conditions was:

No Context Control

Loggia-balcony

One Sentence Context

Loggia-balcony

1) Juliet stood on the loggia while Romeo declared his love.

Three Sentence Context

Loggia-balcony

1) Juliet stood on the loggia while Romeo declared his love.

2) The upper loggia at the opera house was filled to capacity.

3) Each apartment had its loggia overlooking the courtyard.

According to verbal learning research, the probability of recall varies directly with the number of retrieval routes. The more routes the more likely the information

is to be recalled. The effect of spaced presentations was explored by having the targeted words presented with or without intervening words. Each word was presented three times. In the spaced condition, 37 other words separated each appearance of a target word. In the massed condition each target word appeared three times in succession.

A typical procedure in these experiments was to randomly assign college students to one of the encoding conditions with word presentation being either spaced or massed. The students were told that they would be presented with vocabulary words and their definitions. Students were instructed that their task was to attempt to learn the meanings of each and that if there was any other information, they were to use it in trying to learn the word meanings. After completion of this task, students were given a distractor activity, counting backwards by threes, in order to minimize recall from short-term memory. Following this, students were given a definition recall test.

The results provided no evidence that multiple retrieval routes by means of contextual information are helpful to vocabulary learning. In particular, the three-sentence context condition failed to lead to

better recall than did the one-sentence context condition, and both conditions failed to lead to better recall than the no context control condition. However, the spaced presentations resulted in substantially better vocabulary learning than did the massed presentations.

Overall, these findings indicate, as suggested by theory, students learn material better and retain more when the material is distributed over several sessions rather than presented in one session. Secondly, the addition of context is not necessarily the most effective means of promoting vocabulary learning and multiple sentence contexts may not be better than only one. This would seem to discount Beck et al.'s (1983) postulation that repeated and varied encounters with an unknown word are necessary in order to result in optimal learning of the word. However, if the example item is typical of the items presented, it is apparent that although context is repeated, it is hardly varied. This lack of variance or invariance may explain the failure to find better recall in the three-sentence context condition. In order to adequately examine the effect of repeated presentations, the context should be sufficiently varied in order to provide the reader with

different information about the unknown word. As Sternberg (1986) argued, simply repeating similar contexts does not provide the reader with any additional information. This is unlikely to be of any more benefit to the reader than a single context. To adequately examine the effects of the number of presentations of context, a study which looks at the number of presentations of context should use distinctly varied contexts. Lastly, only a synonym was required on the recall test. Thus, it is not known what else students may have learned, (e.g., the part of speech of the word) about the word from context.

METAMEMORY AND VOCABULARY LEARNING FROM CONTEXT

Another aspect of vocabulary learning that has received little investigation is the role of metamemory. Do individuals know when they know they have learned a meaning of a word from context?

The area of metamemory is a subcategory of metacognition (Zechmeister & Nyberg, 1982). Metacognition refers to knowledge about cognitive processes, their products, and anything related to them. When one monitors the processes of his or her cognitive system and output, one is engaging in metacognition. Metamemory is not directly related to the structures of

memory or to the specific processes, encoding, storage, and retrieval. Metamemory is the part of metacognition that examines how information gets into and out of memory (Flavell & Wellman, 1977).

Tulving and Madigan (1970) argued that effective learning and retention depends upon proficient metamemory skills. Metacognitive differences have been shown to be one of the distinguishing attributes between skilled and less skilled readers. Less skilled readers do not use metacognitive skills to help their reading comprehension (Paris & Myers, 1981; Smiley, Oakley, Worthen, Campione, & Brown, 1977). Research on metamemory can contribute much knowledge about what abilities and ingredients are crucial in learning. Thus, this issue and its relationship with vocabulary learning from context needs more exploration.

Zechmeister and Hill (1987) had college students derive the meanings of unfamiliar words from context and rate their confidence in knowing the meanings. The unfamiliar words had appeared in articles from a popular newsmagazine. After being pretested for their knowledge of the unfamiliar words, students were given different amounts of context from the articles, ranging from sentences to entire articles in which the word appeared.

The effect of the title of an article was examined, too. Thus, some students received only the titles of the articles, while other students either did or did not receive the title of the article, along with other information. A control group simply received a list of the unfamiliar words. Each students' task was to read the information, if any, given about each word, write a definition for the word, and rate their confidence in knowing the meaning of the word. The results indicated that the learning of a word's meaning from context was optimal for the students who received the paragraph and title of the article. Notably, regardless of the amount of context, students generally knew when they knew a word's meaning.

It is evident that metamemory is an important and valuable part of the learning process. Individuals appear to be able to use their metamemory skills accurately when learning vocabulary from context. Such research could have implications for how students study vocabulary on their own and for vocabulary instruction. For example, if further studies demonstrate the accuracy of metamemory skills in learning vocabulary from context, then this would suggest that vocabulary instruction programs should teach individuals how to

more effectively use these skills or at the very least be aware of the existence of these skills. Therefore, the ability of individuals to monitor their vocabulary knowledge would seem to warrant further research.

EXPERIMENT 1

The goals of Experiment 1 were: 1) to examine the effects of written and oral context, using natural text, in deriving definitions of words; 2) to examine the effect of multiple (massed and distributed) and varied context presentations upon the learning of word meanings from written and oral context; and 3) to study the relation between the accuracy of one's derived meaning for a word and his/her awareness of this knowledge. College students attempted to derive the meanings of uncommon words from paragraphs immediately after they were presented. For half of the students, paragraphs were presented in written form; for the other half of the students, paragraphs were presented orally. Within each paragraph was a target word. Target words appeared either once or twice in separate paragraphs. After writing definitions for all the target words, students were administered a multiple-choice test over the words-in-context as well as words not appearing in context (control items). Students rated their confidence in the accuracy of their responses on both tests. It was expected that students exposed to either written or oral context would be able to ascertain the meanings of

uncommon words from natural text. Students in the written context condition were hypothesized to perform better than students in the oral context condition. Additionally, it was hypothesized that on the multiple-choice test students would select more correct definitions for words that had appeared in context than words that had not appeared in context. It was also hypothesized that when students were presented words twice in a distributed manner that their performance would be better than when words were presented twice in a massed manner. Lastly, it was anticipated that students would be highly accurate in predicting or monitoring their knowledge of having derived the meaning of a word-in-context. That is, students would know when they had and had not ascertained the meaning of a word from context.

METHOD

Design

Experiment 1 was a mixed 2 x 3 factorial design. The between-subjects variable was written vs. oral context conditions. Paragraphs were presented either on pages of a test booklet or via a tape recorder. In the written condition, students read 25 paragraphs and were instructed to try to define the uncommon word in each paragraph immediately after it was presented. In the oral condition, students followed the same procedure only they listened to the 25 paragraphs. The within-subjects variable was type of presentation and it had three levels. Within each of the oral and written conditions, words appeared once or twice. Twice-presented words were in different paragraphs. Presentation of the twice-presented words was either in a massed (MP) or distributed (DP) fashion. After all the paragraphs had been presented, students were given a multiple-choice test from which a definition for each target word was selected from four alternatives. One-half of the words on this test had not appeared in study paragraphs. These control words served as the critical items for the other half of the students. Thus, a

student also served as a control subject. All students rated their confidence both for their definitions and for their choices on the multiple-choice test.

Materials

Twenty-four uncommon English words were selected as target vocabulary items. Words were chosen from text appearing in recent issues of Time magazine and The New York Times, and from words listed in The Quintessential Dictionary (1978). A word was selected primarily if it was judged by the experimenter to be unknown by the sample. Forty-eight paragraphs from the above sources were also chosen so that there were two different verbal contexts for each of the 24 words. Paragraphs that contained uncommon words other than the target word were not selected. An attempt was made to select two paragraphs such that each provided different information about the target word. Paragraphs were edited so that each was no longer than six sentences.

Two different random sets of 12 words were constructed. Each set was systematically assembled into three experimental lists. This resulted in a total of six experimental lists. Each experimental list included 12 critical words-in-context items arranged into one block of 20 items. Of the 12 critical items, four

appeared one time (one presentation) and eight appeared twice. Four of the twice-presented items were presented in a massed manner and four were presented in a distributed manner. Specifically, massed presentation was defined as two consecutive presentations of a word in two different paragraphs; distributed presentation was defined as two spaced presentations of a word in two different paragraphs. The lag between the presentations of the distributed items varied nonsystematically with 4, 5, or 6 items between the two presentations of a given distributed item. The second paragraph for twice-presented items was determined randomly and always appeared in that position (i.e., second). Within the two random sets of 12 items, words-in-context were assigned randomly to positions in the three lists and then systematically rotated so that across the three lists, a word-in-context was used once as a single, MP, and DP item. The second presentation of a twice-presented item was used in the single presentation. A buffer of five items, three presented once and one presented twice, was also used at the beginning of each list. The buffer items were the same for all lists.

Booklets were prepared for the written context condition. One paragraph with a target word was typed

on each page. The to-be-defined word was typed on the back of each page. Words-in-context appeared once or twice, with presentation of the twice-presented words in either a massed or distributed manner.

Audio cassette tapes were prepared for the oral context condition. The construction of the lists for presentation of the paragraphs was the same as for the written condition. Paragraphs were read by a male at a normal rate and tone. The to-be-defined word was pronounced at the end of each paragraph. Each recording of a paragraph was separated from the next by an interval of 30 seconds in order to allow each subject time to write a definition and rate his or her confidence in the accuracy of the definition.

For written and oral conditions, sets of 25 recall sheets were constructed which contained numbered spaces for subjects to write a definition. A scale for rating confidence in the accuracy of definitions also appeared next to the spaces for each word. The confidence rating scale ranged from 1 to 5, with 1 meaning "I am not confident at all that my response is correct," and 5 meaning "I am absolutely sure that my response is correct." The target words were not on the recall sheets.

A 24-item multiple-choice test was also constructed. For the written condition, each item consisted of a target word and a list of four alternatives. The four selections consisted of a synonym, a word that appeared as if it could be derived from the target word, a word that was grammatically appropriate in the paragraph but whose meaning was in contrast to the meaning of the context, and an irrelevant word. All the alternatives were the same part of speech as the word-in-context. The 24 items as well as their alternatives were ordered randomly. There was also a confidence rating scale below each item. A cassette tape was used to pace subjects on the multiple-choice test. The sound of a bell at 20-second intervals signaled subjects when to move to the next item.

For the oral condition, the multiple-choice test was constructed in the same manner, except that the target words did not appear on the test sheets. A tape recording of the list of words was also prepared to be used with the multiple-choice test for the oral condition. The same order of the words was used as in the written condition. For the multiple-choice test first the number of the word was announced, then each target word was pronounced three times in succession, at

the beginning of a 20-second interval, so that each subject could select an answer from the four alternatives and rate confidence. The words were pronounced by the same male who read the paragraphs.

Subjects

Subjects were 72 Loyola University undergraduates enrolled in introductory psychology courses who participated in order to earn course credit. They were tested in either oral or written context groups in small groups using a block randomization procedure. This resulted in 36 subjects in each of the two between-subject conditions.

Procedure

All subjects were informed that they were to participate in a study about vocabulary learning. Subjects in the written context condition were given booklets containing the experimental paragraphs and a set of recall sheets. They were informed that each paragraph was from a newspaper or news magazine and contained an uncommon word, and that their task was to read each paragraph carefully and try to define any uncommon words that they read. Subjects were instructed that after reading the paragraph they should turn over the paragraph and define the word typed on the back of

the paragraph, and to rate their confidence. Subjects were told that once they had turned a paragraph over they were not to turn it back over again. Since some of the words were repeated, subjects were told to use all the information available to them in defining the words. They were encouraged to guess if they were uncertain of the definition of a word. Subjects were told that if they finished and others were still working, that they were to sit quietly with booklets turned over until everyone was done.

Approximately 3 minutes after the last subject in a small group had completed the definition task, they were given the multiple-choice test and a cover sheet. They were told that they would hear a tone at 20-second intervals and that during this time they were to choose an answer and to rate their confidence. They were informed that each time they heard the bell they were to move the cover sheet down to the next word. Subjects also were instructed that some of the words on the test were not presented in the paragraphs, but that they should try to determine the meanings of all the words, guessing if necessary.

In the oral context condition subjects were given a set of recall sheets and instructed that they were to

listen to a series of paragraphs from newspaper and news magazine articles. Subjects were told that in each paragraph there was an uncommon word that they would have to define. Thus, while listening to the passages, they were to try to determine the meanings of any unknown words. At the end of each paragraph, subjects heard the word pronounced that they were to define. Subjects were informed that they would have 30 seconds in which to write a definition and to rate their confidence. Then, as in the written condition, subjects were made aware that some of the words were repeated and to use all available information to define the words.

After all subjects finished the definition task, there was an approximate waiting period of 3 minutes. Then, subjects were told to turn over their recall sheets and were tested using the multiple-choice format. They were told they would hear a number and then the target word would be pronounced three times. Subjects were told they would have 20 seconds to select an answer and rate their confidence for each word. They were told that some of the words were not in the paragraphs, but to attempt to determine the meanings of all words. Subjects were encouraged to guess on both tests.

Scoring

For the recall test two raters independently scored each definition. Meanings were scored either as a 2, 1, or 0. A 2 indicated correct identification of the denotative meaning of a word, which was suitable to the context in question, or was an appropriate synonym; 1 was given to definitions which suggested a general understanding or idea about the meaning of a word; 0 indicated no meaning or an incorrect meaning of a word. Inter-rater reliability in terms of percent agreement was .92. Discrepancies in scoring were discussed and resolved among the raters by agreement to score a definition as a 2, 1, or 0.

RESULTS

For the written context condition, the proportion of responses (out of a possible 432) that received a score of 1 was .197, and .215 received a score of 2; for the oral context condition, the proportions were .204 and .132, respectively. For purpose of analyses both 1- and 2-point scored definitions were counted as correct. Thus, a liberal scoring procedure was used.

Recall Test

The mean number of words correctly defined for each of the presentations for the two context conditions is presented in Table 1. In order to determine whether any differences between levels of context and levels of presentations were present, a 2 (Written/Oral Context) X 3 (1 Presentation, 2MP, 2DP) X 6 (for the six experimental lists) mixed analysis of variance (ANOVA), with presentation being the repeated factor, was performed. (Although Lists were included in this analysis, the effects associated with Lists were not examined.) A statistically significant main effect for Context was found, $F(1,60) = 4.92$, $p < .03$. The mean number of correctly defined words, summed across presentations, was 2.51 and 1.87 for the written and oral groups,

Table 1

Mean Number of Definitions Correct on Recall Test
(Written and Oral Context Conditions)

	<u>PRESENTATION</u>		
	1P	2MP	2DP
<u>Context</u>			
Written	2.56	2.33	2.64
Oral	1.69	1.89	2.03

respectively. As predicted, subjects were able to derive the meanings of words from natural context; however this was true for written context to a greater degree than for oral context. In contrast to expectations, there was no effect for presentation, $F(2,120) = .70$, n.s. Also, there was not an interaction between context and presentation, $F(2,120) = .50$, n.s.

Multiple-Choice Test

Due to the differences in the number of control items, 12, and the number of items at each level of presentation, 4, on the multiple-choice test, items correct were converted to proportions. The mean proportion of items correct at each level of presentation for written and oral context is shown in Table 2. To examine the effects of context and presentation, the proportions were transformed to arc sines and a $2(\text{Context}) \times 4(1 \text{ Presentation, 2MP, 2DP, No Presentation}) \times 6(\text{lists})$ mixed ANOVA (again, presentation was the repeated variable) was performed. (Also, Lists were included in the analysis, but effects of this and including this variable were not investigated.) Results revealed a significant main effect for Presentation, $F(3,180) = 9.06$, $p < .01$ (See Table 2 for means). A significant Context X

Table 2

Mean Proportion Correct on Multiple-Choice Test
(Written and Oral Context Conditions)

	<u>PRESENTATION</u>			
	1P	2MP	2DP	Control
<u>Context</u>				
Written	.479	.638	.576	.363
Oral	.444	.458	.513	.357

Presentation interaction, $F(3,180) = 3.02, p < .05$, however, qualified this effect. Probing of this interaction by examining the effects of different presentations within each level of context revealed two different patterns of performance between the oral and written context groups. Planned comparisons of means (See Table 2) for the written context group indicated significant differences between having words presented in context and no context, $F(1,140) = 18.47, p < .01$. There were no significant differences in performance between words-in-context presented in a distributed fashion and a massed fashion, $F(1,140) = 1.76, n.s.$, nor between words-in-context presented once and no context, $F(1,140) = 3.21, n.s.$ In other words, as predicted, when subjects were presented words in context, they performed significantly better than when words were not presented in context. Contrary to what was expected, receiving two distributed presentations of a word-in-context did not result in better performance than receiving two massed presentations of a word-in-context. Similarly, a single presentation of a word-in-context was not any better than no context in assisting subjects in defining an uncommon word.

Planned comparisons for the oral context group

revealed that subjects performed just as well when words appeared in context and when they did not, $F(1,140) = 2.22$, n.s.; and when words-in-context were presented once and no context, $F(1,140) = 2.00$, n.s. There was also no difference between two distributed presentations compared to two massed presentations of words-in-context, $F(1,140) = .31$, n.s. These findings are in contrast with the proposed hypotheses.

Confidence Ratings

To investigate confidence judgment accuracy for correct identification of word meanings, the proportions correct as a function of confidence level were computed. The results for the written definitions are shown in Table 3 for the Written and Oral Context conditions for each level of presentation and collapsed across presentation levels. As predicted, it can be seen that the probability of correctly defining a word increases with the degree of confidence; although, subjects did know some word meanings when they said they were guessing and did not know quite as much as they thought when they were sure they had defined a word correctly.

In order to provide a more quantitative measure of this finding a 2(written/oral context) X 2(mean confidence for right/wrong answers of twice-presented

Table 3

Proportion Correct as a Function of Confidence Level on Recall Test (Written
and Oral Context Conditions)

	1	2	3	4	5
Written Context					
1P	.21 (6/28)	.34 (12/35)	.44 (21/48)	.65 (17/26)	.86 (6/7)
2MP	.16 (3/18)	.42 (13/31)	.33 (15/45)	.44 (16/36)	.64 (9/14)
2DP	.22 (6/27)	.29 (8/28)	.33 (13/39)	.66 (24/36)	.64 (9/14)
Total	.21 (15/73)	.35 (35/44)	.37 (49/132)	.58 (57/98)	.71 (24/35)
Oral Context					
1P	.19 (12/62)	.32 (10/31)	.40 (10/25)	.44 (7/16)	.63 (5/8)
2MP	.13 (7/52)	.34 (11/32)	.47 (15/32)	.48 (10/21)	.66 (6/9)
2DP	.28 (16/57)	.34 (11/32)	.32 (8/25)	.55 (10/18)	.58 (7/12)
Total	.20 (35/171)	.34 (32/95)	.40 (33/82)	.49 (27/55)	.62 (18/29)

(continued)

Table 3 (continued)

Note. Number in parentheses refers to the frequency of items correct out of the total of correct and incorrect items at each level of confidence for each level of presentation as well as across presentation levels.

words) mixed ANOVA (with mean confidence being the within-subjects variable) was performed. (Due to the low number of correct once-presented words which could lead to inaccurate results being concluded about subjects' confidence, only confidence for twice-presented words were used in this analysis.) Results revealed significant main effects for written and oral context, $F(1,70) = 10.34$, $p < .001$ (overall means 2.97 and 2.30, respectively) and overall mean confidence for correct and incorrect responses, $F(1,70) = 19.10$, $p < .001$ (means 2.87 and 2.41). The interaction was not significant $F(1,70) < 1$. In other words, subjects that were exposed to written context gave significantly higher confidence ratings than subjects exposed to oral context. Nevertheless, subjects in both groups were able to significantly discriminate when they either had or had not figured out a word's meaning from context.

The accuracy of the confidence judgments for correct selection of word meanings on the multiple-choice test was analyzed in the same manner as for the written definitions. Findings are reported in Table 4. Generally, as with the written definitions, subjects did know when they knew or did not know the definition of a word. A 2(written/oral context) X 2(mean confidence for right/wrong answers of twice-presented words) mixed

Table 4

Proportion Correct as a Function of Confidence Level on Multiple-Choice Test(Written and Oral Context Conditions)

	1	2	3	4	5
Written Context					
1P	.13 (2/15)	.29 (7/24)	.53 (20/38)	.41 (15/37)	.83 (25/30)
2MP	.62 (8/13)	.41 (9/22)	.63 (24/38)	.64 (25/39)	.81 (26/32)
2DP	.09 (1/11)	.35 (9/26)	.41 (12/29)	.81 (26/32)	.78 (36/46)
Total	.28 (11/39)	.35 (25/72)	.53 (56/105)	.61 (66/108)	.81 (87/108)
Oral Context					
1P	.43 (19/44)	.30 (12/40)	.38 (9/24)	.46 (7/15)	.81 (17/21)
2MP	.33 (10/30)	.26 (9/35)	.56 (14/25)	.50 (14/28)	.73 (19/26)
2DP	.34 (16/47)	.50 (10/20)	.50 (18/32)	.64 (7/11)	.76 (23/30)
Total	.37 (45/121)	.33 (31/95)	.48 (41/81)	.52 (28/54)	.77 (59/77)

(continued)

Table 4 (continued)

	1	2	3	4	5
Control Items					
Written Context	.30 (35/118)	.37 (41/112)	.37 (40/108)	.41 (22/54)	.70 (30/43)
Oral Context	.27 (46/169)	.35 (38/109)	.28 (19/67)	.46 (19/41)	.74 (34/46)

Note. Number in parentheses refers to the frequency of items correct out of the total of correct and incorrect items at each level of confidence for each level of presentation as well as across presentation levels.

ANOVA (again, mean confidence was the within-subjects variable) was computed. Findings indicated main effects for written and oral context, $F(1,70) = 6.47, p < .05$ (overall means 3.28 and 2.71, respectively) and mean confidence for correct and incorrect selections, $F(1,70) = 41.83, p < .001$ (means 3.32 and 2.67). Again, the interaction was not significant $F(1,70) < 1$. Thus, as with the written word meanings, the written context group gave significantly higher ratings than did the oral context group. Both groups, however, were able to accurately determine when they had either correctly or incorrectly defined a word from context.

Overall, consistent with the prediction, the results of Experiment 1 indicated that subjects were able to determine the meanings of uncommon words from written context; this effect of context was less for subjects in the oral context condition. In terms of distributed presentations leading to better performance in deriving word meanings than massed presentations, this was not supported in either the written or oral context conditions. As hypothesized, subjects' metacognitive awareness or skill in monitoring whether or not the meaning of a word had been acquired from context was generally accurate.

EXPERIMENT 2

Results of Experiment 1 demonstrated that one can derive word meanings from context. However, once an individual has acquired this knowledge, how long is it retained? That is, does an individual remember the knowledge he or she has gained from context? One of the purposes of Experiment 2 was to investigate this issue. Also, subjects in Experiment 1 were aware that each paragraph contained an uncommon word. Would subjects perform just as well if they were not cognizant that each paragraph contained an uncommon word? Perhaps it is the case that individuals take a different approach when reading a passage when they know it contains an uncommon word. That is, individuals may read a passage more carefully and thoroughly. Another purpose of Experiment 2 was to examine whether being aware of the presence of an uncommon word would have any effect on ascertaining word meanings. Lastly, the comprehension of the paragraphs was of interest. Is it essential to adequately understand a paragraph in order to accurately acquire the meaning of an uncommon word contained within the paragraph or vice-versa? The design for Experiment 2 differed from Experiment 1 in three respects: 1)

subjects did not attempt to derive the meanings of the words from paragraphs until all paragraphs had been read or heard (depending upon the condition); 2) one-half of the subjects (Informed Condition) in both context conditions were told that the paragraphs each contained an uncommon word that later they would be asked to define and one-half (Uninformed Condition) were not told of a later definition test; and 3) subjects rated their comprehension of each paragraph. It was hypothesized that there would be an effect of presentation consistent with the findings in Experiment 1. Whether this effect would depend upon subjects being informed or not about the presence of the uncommon word within each paragraph was uncertain. That is, the relationship between presentation and being informed or uninformed about the uncommon word in each paragraph was not posited. However, subjects' comprehension ratings were expected to relate to or vary with the acquisition of meanings of words from context. As in Experiment 1, subjects' metacognitive ability was hypothesized to be quite good.

METHOD

Design

Students were given the same 25 paragraphs as in Experiment 1 and instructed to rate their comprehension of each paragraph. There were four between-subjects conditions. Target words were presented in paragraphs either in a written or oral manner. One-half of the students in both the written and oral conditions were informed that the paragraphs each contained an uncommon word that later they would be asked to define. One-half were not informed of a later definition test. As in Experiment 1, each target word appeared in one or two paragraphs, either in a massed or distributed fashion. Thus, the design was a 2 (oral and written) X 2 (informed and uninformed) X 3 (type of presentation: 1P, MP, DP) factorial. A definition and multiple-choice test were administered after reading or listening to all the paragraphs. Each student was also a control subject for one-half the words on both tests and rated his or her confidence in both the definitions and selections on the multiple-choice test.

Materials

Materials were the same as those used in Experiment

1 except for the following changes. For Experiment 2, the booklets for the written context conditions did not have the to-be-defined word on the back of each page. On the audio cassette tapes used for the oral context conditions, each recording of a paragraph was now separated from the next by an interval of 10 seconds in order to allow each subject time to rate his or her comprehension. The target word was not pronounced.

An answer sheet was constructed for subjects to indicate their understanding of each paragraph. The sheet had an explanation of the comprehension rating scale as well as directions for the task. The scale ranged from 1 to 4, with 1 meaning "very little understood," and 4 meaning "understood very well."

For the written conditions, a 24-item recall test was constructed which contained spaces for subjects to write a definition. The words were randomly ordered and the resulting order was used. A 5-point scale for rating confidence in the accuracy of definitions also appeared next to each word. A cassette tape with recordings of a bell at 30-second intervals was used to signal subjects when to move to the next item.

The tape recording of the list of words used with the multiple-choice test for the oral condition in

Experiment 1 was used in Experiment 2. Also, a similar recording was made for the recall test. For the recall test, each word was repeated 3 consecutive times. The words were also presented at 30-second intervals to allow subjects time to write a definition and rate their confidence.

Subjects

Subjects were 120 Loyola University undergraduates enrolled in introductory psychology courses, who participated in order to earn course credit. They were tested in small groups in one of the four between-subject conditions according to a block randomization procedure. This resulted in 30 subjects per condition.

Procedure

Subjects were informed that they were to participate in a study about either reading or listening comprehension, depending upon whether they were in the written or oral condition. Subjects in the written context conditions were given booklets containing the paragraphs from newspaper and news magazine articles. They were instructed that their task was to read each paragraph carefully, one time, and to rate their comprehension of each paragraph. Subjects were told that if they finished and others were still working,

they were to sit quietly until everyone was done. One-half of the subjects were also told that each paragraph contained an uncommon word that they later would be asked to define (informed condition) and one-half were not told about the definition task until after completing the comprehension task (uninformed condition).

To determine whether there might be large differences in reading time between subjects in the Informed and Uninformed written context groups, estimates of time for these groups to complete the rating of the paragraphs were randomly taken on 8 occasions (4 for each condition). The mean completion time for the Informed written group was 27 minutes and the mean completion time for the Uninformed written group was 25 minutes.

After completing the comprehension task, subjects were then given the recall test sheets and a cover sheet. They were told that they would hear a bell at 30-second intervals and that during this time they were to write a definition for a word and rate their confidence in the accuracy of their response. They were told that each time they heard the bell they were to move the cover sheet down to the next word. Subjects

were also informed that some of the words were not present in the paragraphs, but were instructed to try to define all the words and to rate their confidence in their definition. After the test sheets were collected, subjects were given the multiple-choice test and received the same instructions regarding the cover sheet and the nature of the words on the test. They were told they would have 20 seconds to choose an answer and to rate confidence. Subjects were encouraged on both tests to guess if they were uncertain of a definition for a word.

In the oral context conditions subjects were instructed that they were to listen to a series of paragraphs from newspaper and news magazine articles and to indicate how well they understood the paragraphs. Subjects were told that after each paragraph they would hear a bell and that they would have 10 seconds to rate their comprehension of the paragraph. As in the written condition, one-half of the subjects were told that each paragraph contained an uncommon word that later they would have to define and one-half were not told this until after the comprehension task. Subjects were not told which specific words they would have to attempt to define. All subjects then were given the recall test

following the comprehension task. Subjects were told they would hear the number of the word and then the target word pronounced three times. They were informed that they would have 30 seconds to determine the meaning of the word and to rate their confidence. They were also told that some of the words were not in the paragraphs, but were to attempt to define all the words and rate their confidence. Again, subjects were encouraged to guess on both tests.

Scoring

Definitions were scored according to the same criteria used to score the definitions in Experiment 1. Inter-rater reliability was .98.

RESULTS

Recall Test

The mean proportion correct definitions for the Informed and Uninformed Conditions at each level of Presentation is shown in Table 5. (Because of the differences between the number of control and presentation items, data were converted to proportions.)

To determine whether context, presentation, and knowledge of the uncommon word being in the paragraph had any effect on the acquisition of word meaning, the proportions were transformed to arc sines and a 2 (context) X 2 (informed/uninformed condition) X 4 (presentation) X 6 (list) mixed ANOVA was done. (Presentation was the repeated variable. Lists were also included in this analysis, but effects associated with Lists were not examined.) Results indicated that there were no significant interactions or main effects for Context, Presentation, or for being informed or uninformed, $F(3,288) < 1$.

The lack of an effect for presentation was likely due to the poor reliability of the measure for presentation. For words that appeared in context, there were only 4 target items at each level of Presentation.

Table 5

Mean Proportion of Definitions Correct on Recall Test
Informed and Uninformed Conditions

	<u>INFORMED CONDITION</u>			
	<u>PRESENTATION</u>			
	1P	2MP	2DP	Control
<u>Context</u>				
Written	.158	.208	.175	.097
Oral	.175	.166	.150	.081
	<u>UNINFORMED CONDITION</u>			
	<u>PRESENTATION</u>			
	1P	2MP	2DP	Control
<u>Context</u>				
Written	.083	.100	.116	.089
Oral	.142	.183	.142	.087

Additionally, the number of subjects that responded to 1P, 2MP, and 2DP words-in-context was 5 for each list. This appears to have resulted in extreme variability among the scores across Presentation levels.

Consequently, paired t-tests were performed to examine the effect of presentation of words-in-context compared to words not presented in context. The three levels of presentation, 1P, 2MP, and 2DP were collapsed together to obtain a total score for words-in-context for each subject. This score was compared to the total score for words not appearing in context, or the control items. The effect of presentation compared to no presentation was investigated at each level of context. Results indicated that for the Written Context condition, subjects performed significantly better when words were presented in context than when words were not presented in context, $t(59) = 2.54$, $p < .01$, with means of 2.35 and 1.63, respectively. The same finding was evident for subjects in the Oral Context condition, $t(59) = 3.75$, $p < .001$, with means of 3.04 and 1.62, respectively.

In sum, due to the extreme variability in the scores across the levels of presentation, the ANOVA performed resulted in no significant interactions or

main effects. However, an attempt was made to reduce this variability by collapsing the three levels of presentation of words-in-context together and comparing this value to the value obtained for the control items. Results revealed that subjects were able to ascertain the meanings of words significantly better when words appeared in context than when words did not appear in context. In other words, subjects were able to remember the meanings of words they had acquired from context. This was evident for both written and oral context conditions. These results were consistent with predictions.

Multiple-Choice Test

The mean proportion of items correct for the Informed and Uninformed conditions at each level of Presentation is shown in Table 6. Data were transformed to arc sines and a 2(context) X 2(informed/uninformed) x 4(presentation) X 6(list) mixed ANOVA was performed in order to examine the effects of context, presentation, and whether or not prior knowledge of the uncommon word being present in context had on acquiring the definitions of words. As with the recall test, results indicated no significant interactions or main effects

Table 6

Mean Proportion Correct on Multiple-Choice Test Informed
and Uninformed Conditions

<u>INFORMED CONDITION</u>				
<u>PRESENTATION</u>				
	1P	2MP	2DP	Control
<u>Context</u>				
Written	.425	.466	.466	.361
Oral	.375	.391	.391	.369
<u>UNINFORMED CONDITION</u>				
<u>PRESENTATION</u>				
	1P	2MP	2DP	Control
<u>Context</u>				
Written	.375	.333	.350	.325
Oral	.350	.408	.467	.371

for Context, Presentation, or informed or uninformed, $F(3,288) < 1$.

As with the results of the ANOVA for the written definitions, there was no effect found for presentation. Again, this was probably due to the low reliability of the measure for presentation. Thus, the data for the multiple-choice test were modified in the same manner as the data for the recall test. Paired t-tests were used to analyze the effect of presentation of words-in-context compared to words that did not appear in context within Written and Oral Context conditions. Results showed that in the written context condition, subjects performed significantly better when words were presented in context than when words were not presented in context, $t(59) = 2.56$, $p < .01$, with means of 4.83 and 4.15, respectively. However, in the Oral Context condition no difference between having words presented in context and no context was found, $t(59) = 1.02$, n.s., with means of 4.77 and 4.48, respectively. The findings for the written context condition support the hypothesis that subjects can ascertain and retain the meanings of words when they are presented in context. Findings for the oral context condition do not support the assertion that context is an effective method for acquiring and

remembering the meanings of uncommon words.

Confidence Ratings

An examination of confidence judgment accuracy for correct definitions of words was done by calculating the proportion correct for each level of confidence. Findings for the written definitions for the written and oral informed and uninformed conditions for each level of presentation and across presentation levels are reported in Tables 7 and 8. As can be seen, because of the low number of correct identification of word meanings confidence is low. To assess the significance between subjects' ability to discriminate when they either had or had not correctly defined the meaning of a word from context a $2(\text{written/oral context}) \times 2(\text{informed/uninformed}) \times 2(\text{mean confidence for right/wrong answers for twice-presented words})$ mixed ANOVA (mean confidence was the within-subject variable) was conducted. (Because the low number of correct once-presented words could lead to a distorted view of confidence judgment accuracy if included, only confidence for twice-presented words were used in this analysis.) Results revealed no significant main effects or interactions, $F(1,116) < 1$. (Overall means for written/oral context were 1.65 and 1.46, respectively

Table 7

Proportion Correct as a Function of Confidence Level on Recall Test (Informed and Uninformed Conditions)

	1	2	3	4	5
Written Informed					
1P	.08 (6/80)	.29 (7/24)	.22 (2/9)	.66 (2/3)	.50 (2/4)
2MP	.11 (7/63)	.31 (9/29)	.20 (3/15)	.50 (4/8)	.40 (2/5)
2DP	.08 (4/53)	.14 (4/29)	.23 (5/22)	.42 (4/11)	.75 (3/4)
Total	.09 (17/196)	.24 (20/82)	.22 (10/46)	.48 (10/22)	.54 (7/13)
Oral Informed					
1P	.04 (3/83)	.33 (5/15)	.54 (7/13)	.50 (3/6)	1.00 (3/3)
2MP	.08 (7/85)	.08 (1/13)	.46 (6/13)	.60 (3/5)	.75 (3/4)
2DP	.06 (5/80)	0 (0/18)	.25 (2/8)	.71 (5/7)	.86 (6/7)
Total	.06 (15/248)	.13 (6/46)	.44 (15/34)	.61 (11/18)	.86 (12/14)

(continued)

Table 7 (continued)

	1	2	3	4	5
Written Uninformed					
1P	.03 (3/87)	.21 (3/14)	0 (0/9)	.50 (4/8)	0 (0/2)
2MP	.08 (7/93)	.15 (2/13)	.13 (1/8)	.50 (1/2)	.25 (1/4)
2DP	.05 (4/83)	.13 (3/24)	.40 (2/5)	.60 (3/5)	.66 (2/3)
Total	.05 (14/263)	.17 (8/51)	.14 (3/22)	.53 (8/15)	.33 (3/9)
Oral Uninformed					
1P	.06 (5/87)	.27 (4/15)	.20 (2/10)	.66 (2/3)	.80 (4/5)
2MP	.07 (6/84)	.10 (1/11)	.30 (3/10)	.82 (9/11)	.75 (3/4)
2DP	.01 (1/81)	.28 (5/18)	.20 (2/10)	.86 (6/7)	.75 (3/4)
Total	.05 (12/252)	.23 (10/44)	.23 (7/30)	.81 (17/21)	.77 (10/13)

Note. Number in parentheses refers to the frequency of items correct out of the total of correct and incorrect items at each level of confidence for each level of presentation as well as across presentation levels.

Table 8

Proportion Correct as a Function of Confidence Level for Control Items on Recall Test (Informed and Uninformed Conditions)

	1	2	3	4	5
Control Items					
Written Informed	.06 (16/258)	.15 (9/62)	.26 (7/27)	.30 (3/10)	.33 (1/3)
Oral Informed	.05 (14/296)	.13 (4/31)	.13 (2/16)	.42 (5/12)	.40 (2/5)
Written Uninformed	.05 (14/276)	.15 (8/54)	.31 (5/16)	.38 (3/8)	.50 (3/6)
Oral Uninformed	.04 (10/271)	.02 (1/46)	.43 (10/23)	.50 (5/10)	.60 (6/10)

Note. Number in parentheses refers to the frequency of items correct out of the total of correct and incorrect items at each level of confidence for each level of presentation as well as across presentation levels.

and for informed/uninformed conditions were 1.67 and 1.44, respectively.) The mean confidence for correct definitions was 1.62 and the mean confidence for incorrect definitions was 1.49, $F(1,116) = .943$, n.s. In other words, contrary to the hypothesis, subjects showed no skill in accurately discerning when they had correctly or incorrectly defined words presented in context.

The accuracy of the confidence judgments for correct selections on the multiple-choice test was investigated in the same manner as for the written definitions. Results are presented in Tables 9 and 10. Although it is not a perfect relationship, it appears that the chances of knowing the correct meaning of a word increases as the level of confidence increases. That is, subjects were basically accurate when knowing whether or not they had acquired a word's meaning. A $2(\text{written/oral context}) \times 2(\text{informed/uninformed}) \times 2(\text{mean confidence for right/wrong answers for twice-presented items})$ mixed ANOVA (mean confidence was the within-subject variable) was performed in order to inspect this relationship between confidence accuracy and correct/incorrect responses in a quantitative manner. Results revealed a significant main effect

Table 9

Proportion Correct as a Function of Confidence Level on Multiple-Choice Test
(Informed and Uninformed Conditions)

	1	2	3	4	5
Written Informed					
1P	.33 (11/33)	.29 (8/28)	.49 (19/39)	.57 (8/13)	.71 (5/7)
2MP	.27 (7/26)	.48 (12/25)	.51 (20/39)	.41 (7/17)	.77 (10/13)
2DP	.36 (9/25)	.35 (12/34)	.41 (9/22)	.57 (12/21)	.77 (14/18)
Total	.32 (27/84)	.37 (32/87)	.48 (48/100)	.53 (27/51)	.76 (29/38)
Oral Informed					
1P	.28 (17/61)	.27 (7/26)	.55 (10/18)	.54 (4/7)	.88 (7/8)
2MP	.28 (16/57)	.35 (8/23)	.42 (8/19)	.44 (4/9)	.92 (11/12)
2DP	.28 (14/50)	.26 (8/31)	.37 (7/19)	.77 (7/9)	1.00 (11/11)
Total	.28 (47/168)	.29 (23/80)	.45 (25/26)	.60 (15/25)	.94 (29/31)

(continued)

Table 9 (continued)

	1	2	3	4	5
Written Uninformed					
1P	.34 (12/35)	.30 (12/40)	.36 (8/22)	.42 (5/12)	.73 (8/11)
2MP	.26 (11/42)	.21 (7/33)	.30 (6/20)	.53 (9/17)	.88 (7/8)
2DP	.31 (13/42)	.22 (8/37)	.44 (8/18)	.50 (6/12)	.64 (7/11)
Total	.30 (36/119)	.25 (27/110)	.37 (22/60)	.49 (20/41)	.73 (22/30)
Oral Uninformed					
1P	.38 (14/36)	.16 (7/44)	.46 (11/24)	.63 (5/8)	.63 (5/8)
2MP	.21 (6/29)	.26 (11/42)	.47 (9/19)	.60 (6/10)	.85 (17/20)
2DP	.48 (19/40)	.32 (13/41)	.53 (9/17)	.40 (4/10)	.92 (11/12)
Total	.37 (39/105)	.24 (31/127)	.48 (29/60)	.54 (15/28)	.83 (33/40)

Note. Number in parentheses refers to the frequency of items correct out of the total of correct and incorrect items at each level of confidence for each level of presentation as well as across presentation levels.

Table 10

Proportion Correct as a Function of Confidence Level for Control Items on Multiple-Choice Test (Informed and Uninformed Conditions)

	1	2	3	4	5
Control Items					
Written Informed	.32 (31/98)	.31 (30/97)	.30 (28/93)	.55 (29/53)	.68 (13/19)
Oral Informed	.34 (60/176)	.25 (20/79)	.42 (22/53)	.54 (15/28)	.71 (17/24)
Written Uninformed	.30 (39/132)	.26 (32/121)	.41 (22/54)	.31 (10/32)	.71 (15/21)
Oral Uninformed	.32 (39/122)	.32 (39/122)	.36 (26/72)	.54 (14/26)	.94 (17/18)

Note. Number in parentheses refers to the frequency of items correct out of the total of correct and incorrect items at each level of confidence for each level of presentation as well as across presentation levels.

for mean confidence for right/wrong responses, $F(1,116) = 39.89$, $p < .01$. However, a significant written/oral context X informed/uninformed interaction also was obtained, $F(1,116) = 5.63$, $p < .05$. The overall means for the written informed and uninformed conditions were 2.70 and 2.28, respectively; means for the oral informed and uninformed conditions were 2.06 and 2.41, respectively. In short, subjects overall were able to significantly distinguish when they had correctly and incorrectly defined a word from context. This finding was in accordance with the postulated hypothesis. However, subjects in the informed condition had significantly higher ratings when the context was in written than in oral form. Subjects in the uninformed condition had significantly higher ratings when the context was in the oral rather than written form.

Comprehension Ratings

Subjects' rated comprehension for paragraphs at each level of presentation was examined. Using the comprehension ratings of the paragraphs that contained once presented words-in-context and the second paragraph of twice-presented words-in-context for each subject, $2(\text{written/oral context}) \times 2(\text{informed/uninformed}) \times 3(1P, 2MP, 2DP)$ mixed ANOVA (Presentation was the within-

subjects variable) was done. There were no significant main effects or interactions.

To assess the relationship between paragraph comprehension and deriving the meaning of a word in the paragraph, mean comprehension ratings of the paragraphs that contained once presented words-in-context and the second paragraph of twice-presented words-in-context were correlated with the mean proportion of correct definitions for words within those paragraphs. Separate Pearson product-moment correlation coefficients were computed for written and oral context groups collapsed across informed and uninformed conditions for the written definitions and the multiple-choice test. The correlations for the written context group were $r(22) = .13$ and $r(22) = -.07$ respectively; for the oral context group $r(22) = .15$ and $r(22) = .15$. None of these values was significant. In other words, comprehension of the paragraph appeared not to be a crucial determinant in whether subjects would correctly identify the meaning of a word from context or vice-versa.

Overall, the findings for Experiment 2 indicated that probably due to the poor reliability of the dependent variable, the ANOVAs performed on the scores for the recall and multiple-choice tests failed to show

any significant interactions or main effects. Consequently, the posited hypotheses for the differences in performance due to the different types of presentation were not supported. No differences in performance were found for words presented in context compared to no context. Words-in-context shown in a distributed manner did not lead to better acquisition of the meanings of words than words-in-context shown in a massed manner. An attempt to reduce this extreme variability by treating the three levels of presentation of words-in-context as one variable and comparing it to words not presented in context revealed an effect of presentation. Specifically, for the written definitions both written and oral context groups were able to derive and recall the meanings of words when the words appeared in context. On the multiple-choice test, the written context group performed just as well. They selected more correct definitions for words that had been seen in context than for words that had not been seen in context. Again, this showed that subjects were capable of determining the meanings of words from context and remembering the knowledge acquired. These results are consistent with predictions. Contrary to predictions, however, was the finding that on the multiple-choice

test the oral context group did not show a significant difference between knowing the meanings of words that had been presented in context and words that had not been presented in context. The results for subjects' knowledge of whether they have acquired a word's meaning from context were mixed. While subjects were able to accurately monitor or keep track of when they correctly defined a word on the multiple-choice test, they were not able to accurately distinguish when they had correctly defined a word when they had to write out a meaning for a word. This is in partial confirmation of this hypothesis. In contrast to expectations, it seems understanding the contents of a paragraph is not an important factor when attempting to define an uncommon word in that paragraph.

DISCUSSION

A standard strategy given to students for determining the meanings of unknown words has been to use the surrounding context to deduce meaning. This approach has been supported as well as postulated by many researchers to account for much of an individual's growth in vocabulary (e.g., Carnine, Kameenui, & Coyle, 1984; Crist & Petrone, 1977; Duffelmeyer, 1984; Sternberg, Powell, & Kaye, 1983). One of the major reasons for this continued support in a learning by context method has been results of research using contrived passages to examine the effectiveness of context. However, this use of artificially constructed context has been a principal shortcoming of such research. The main intent of the present research was to demonstrate the facilitating effects of learning word meanings from context by employing naturally occurring passages that contained uncommon words. Findings in Experiment 1 supported this postulation that individuals can derive word meanings from context.

When students wrote definitions for words-in-context there was a main effect found for context. As hypothesized, students in the written context condition

performed better than students in the oral context condition. When administered a multiple-choice test however, context interacted with presentation. The effectiveness of deriving word meanings from written context was further supported by the planned comparison indicating that students were significantly better at deriving word meanings when the words appeared in context than when the words did not appear in context. Contrary to expectations, this comparison for the oral context group was not significant. In short, when asked to immediately define uncommon words from context, students can be quite accurate in ascertaining a word's meaning. When words appear in oral context, this accuracy is less. A likely explanation for this finding may be that when uncommon words appear in written context, individuals can read the text as slowly and as many times as needed to figure out a word's meaning. But, when words appear in oral context, individuals generally have only one opportunity to hear the context for an uncommon word.

Another purpose of Experiment 1 was to show that when students were presented words in two distributed contexts that they would perform better than when words were presented in two massed contexts. This hypothesis

was not supported either when students were instructed to write definitions for or were given a multiple-choice test over the uncommon words-in-context. These results are in contrast to Dempster's (1987) findings. In his examination of this issue, he found that distributed or spaced presentations led to substantially higher levels of vocabulary acquisition than massed presentations. Perhaps the size of the task, to read or listen to and retain the information from 25 paragraphs, was too large for students. Consequently, when words were presented in paragraphs in a distributed fashion, students may have been unable to remember and thus, not effectively integrate the information about a word from the first paragraph with the information contained in the second paragraph. In Dempster's experiments context consisted of either one or three sentences, which would appear to be easier bits of information to intellectually manage and remember. Another possible explanation may be that the lag between the two presentations of a distributed item was not large enough. Thus, the distributed items had the same effect as the massed items.

Experiment 1 demonstrated that students are reasonably accurate at monitoring their understanding of

a word's meaning as it is found in natural context. That is, students are able to discriminate when they have and have not acquired a word's meaning from context. Discrimination was just as accurate across both methods of assessment of vocabulary acquisition as well as context conditions.

Having shown that students can derive word meanings from written and oral context, Experiment 2 sought to investigate students' retention of word knowledge gained from context and whether or not students' awareness that each paragraph contained an uncommon word would affect acquisition of its meaning. Results revealed no difference in performance between context groups. Also, being cognizant that an uncommon word was present in each paragraph did not differentially affect students' performance in ascertaining word meanings from written or oral context. This pattern was evident for both the written definitions and the multiple-choice test.

In Experiment 2 the ANOVAs conducted did not show any significant effects for presentation, the dependent variable. This was the case across both methods of assessment of vocabulary acquisition. The reason for such findings appeared to be due to the poor reliability of the measurement of the effect of presentation which

resulted in much variability between the scores for levels of presentation. Reduction of the variability was achieved by treating the three levels of words presented in context as one variable and combining the values into a single presentation score. The resulting score was compared to the score for words that were not presented in context. These scores were examined within each context condition. Regardless of the method of measurement, subjects in the written context condition were able to acquire and remember the meanings of words when they appeared in context. These results were in line with predictions. Findings for subjects in the oral context condition were mixed. On the written definition test, subjects were able to determine and recall the meanings of words when they were presented in context. On the multiple-choice test, subjects showed no difference in performance between words-in-context and no context. Such results partially confirm hypotheses. Apparently subjects are able to retain and retrieve the knowledge they gain about the meanings of words learning from context. This is true for words presented in written as well as oral context.

This demonstration in Experiments 1 and 2 of the benefit of acquiring word meanings from oral context

shows the importance of hearing as well as reading uncommon words in context. This effect for oral context illustrates and supports the idea that other individuals and the various forms of media (e.g., radio, television) have an influence and impact on one's vocabulary acquisition. It appears that oral context plays a crucial and vital part in the development and shaping of an individual's vocabulary.

The analysis of the relationship between paragraph comprehension and deriving the meaning of a word in the paragraph indicated no significant correlation between the two variables. This suggests that understanding of a passage is not a crucial element in correctly defining a word from context. Conversely, it may be that when one correctly defines a word from context, it is not an indication that one has a suitable understanding of the passage in which the word appeared.

As in Experiment 1, Experiment 2 examined students' metacognitive ability when it comes to deriving word meanings from context. When students had to write definitions, students showed no skill in accurately discerning when they had correctly or incorrectly defined words presented in context. There were no significant main effects or interactions when the

accuracy of confidence judgments was assessed. But, the accuracy of confidence judgments for correct selections on the multiple-choice test revealed a significant main effect for mean confidence for right/wrong responses and a significant written/oral context X informed/uninformed interaction. Students in the informed condition had significantly higher ratings when the context was written rather than oral. Students in the uninformed condition had significantly higher ratings when context was oral rather than written. A possible reason for students in this experiment not being very accurate at discriminating between right and wrong answers when having to write a definition for a word may be due to a combination of three factors. These factors are the size of the task, the assessment of word meanings derived taking place after all the paragraphs had been presented, and the higher degree of difficulty of a written definition test than a multiple-choice test. Given the amount of information that had to be remembered for each word and the length of time this information had to be retained, students most likely believed that they would not perform well on a written definition test over the words presented in context. Therefore, on this test, students may have rated low

definitions they considered to be possibly correct as well as definitions they considered to be incorrect. This explanation is further supported by the fact that students' overall mean confidence ratings on the written definition test in this Experiment were the lowest of all mean confidence ratings in both Experiments across the two types of vocabulary tests administered.

Although when subjects wrote definitions for words-in-context in Experiment 2 they were not able to discriminate when they had and had not acquired a word's meaning, the majority of findings in Experiments 1 and 2 do indicate that subjects are reasonably accurate at monitoring their understanding of the meanings of words as they are found in natural context. This ability to evaluate what is known and what is not known might be considered an essential element for efficient study. If an individual is aware of what material has been successfully learned, then he or she can focus more attention on material that has not been that well learned. In other words, students should not only learn the material presented to them, but should also be able to determine when study should be ended or directed elsewhere, such as to unlearned material.

From an educational perspective, these results have

several implications. They imply that presenting to-be-learned words in written and oral context is an effective vocabulary acquisition strategy. Such findings would appear to weaken the argument of researchers such as Pressley et al. (1982) and McDaniel and Pressley (1984) whose studies have failed to show any significant effect for acquiring word meanings from context. Consequently, they contend that the use of the keyword method rather than the context method may be a more beneficial approach to vocabulary acquisition and that the prevalent use of the context method to teach vocabulary is questionable. The findings of these studies are not meant to suggest that the keyword method should not be considered as or is not an effective approach to vocabulary acquisition but that, in contrast to Pressley et al.'s (1982) and McDaniel and Pressley's (1984) view, students can acquire the meanings of uncommon words when they are presented or occur in context.

Of course, if a vocabulary building program is taking a contextual approach, then it should also provide training in how to use context. Thus, secondly, these experiments suggest that instructional procedures for teaching individuals how to use context such as the

one posited by Sternberg and Powell (1983) should be taught to students as well as a focus of further scrutiny and development. Such instructional programs have already shown that they lead to a significant increase in one's ability to acquire word meanings from context (Sternberg, 1987).

Lastly, we not only need to teach students the techniques for acquiring word meanings from context, but we should also teach them ways in which they can evaluate or monitor the effectiveness of their use of these techniques. That is, when instructing students on how to use context cues to discover the meaning of a word, an emphasis should also be put on students' metacognitive judgments about this process. This can best be achieved by teaching individuals how to better use their metamemory skills.

There are, as with any piece of research, limitations that should be taken into account when examining its results. These series of experiments are no exception. First, is the issue of generalizability. The paragraphs used cannot be considered representative of all natural contexts. These findings are limited to the effect of context as found in newspapers and news magazines.

Another limitation is that the knowledge that an individual may have had concerning a target word was not examined beforehand. In other words, individuals may have known the meaning or had some knowledge about a word before it was presented in context. If this was the case, this would have led to a spurious effect for context.

It is also possible to criticize these experiments on the grounds of its sample size of words. The number of words used was not very large. However, pretesting with 24, instead of 12, target words within written or orally presented paragraphs resulted in the task being too overwhelming for students. That is, being exposed to such an amount of uncommon words proved to be too much information for students to try to encode in such a small amount of time (approximately 50 minutes). This approach also appeared to be unrealistic too. Individuals would not usually encounter that many uncommon words in that period of time.

Future research examining acquiring word meanings from context should focus on several aspects. One is that more research should be designed to look at the effects of acquiring word meanings from other kinds of natural context (e.g., Carroll & Drum, 1983; Nagy,

Herman, & Anderson, 1985). Similarly, the issue of what can be gained from hearing uncommon or unfamiliar words in oral context should be addressed. This is one of the first pieces of research, if not the first, to this author's knowledge to scientifically investigate the effectiveness of ascertaining word meanings from oral context. Finally, the relationship, as revealed by these studies, between metamemory and vocabulary acquisition from context needs more study. Such research should investigate ways to further develop and refine individuals' metacognitive skills in relation to defining words from context.

REFERENCES

- Beck, J., McCaslin, E., & McKeown, M. (1980). The rationale and design of a program to teach vocabulary to fourth-grade students. Pittsburgh: University of Pittsburgh, Learning Research Center.
- Beck, I. L., McKeown, M. G., & McCaslin, E. S. (1983). Vocabulary development: All contexts are not created equal. The Elementary School Journal, 83(3), 177-181.
- Bergman, K. R. (1977). Reducing reading frustration by an innovative technique for vocabulary growth. Reading Improvement, 168-171.
- Carnine, D., Kameenui, E. J., & Coyle, G. (1984). Utilization of contextual information in determining the meaning of unfamiliar words. Reading Research Quarterly, 19(4), 188-204.
- Carroll, B. A., & Drum, P. A. (1983). Definitional gains for explicit and implicit context clues. In J. A. Niles & L. A. Harris (Eds.), Searches for meaning in reading/language processing and instruction. Thirty-second yearbook of the National Reading Conference. Rochester, NY: National Reading Conference.

- Crist, R. L., & Petrone, J. M. (1977). Learning concepts from contexts and definitions. Journal of Reading Behavior, 9(3), 301-303.
- Dempster, F. N. (1987). Effects of variable encoding and spaced presentations on vocabulary learning. Journal of Educational Psychology, 79(2), 162-170.
- Duffelmeyer, F. A. (1984). The effect of context on ascertaining word meaning. Reading World, 24, 103-107.
- Flavell, J. H., & Wellman, H. M. (1977). Metamemory. In R. V. Kail, Jr., & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, NJ: Erlbaum.
- Gipe, J. P. (1978). Investigating techniques for teaching word meanings. Reading Research Quarterly, 14(4), 624-644.
- Jenkins, J. R., & Dixon, R. (1983). Vocabulary learning. Contemporary Educational Psychology, 8, 237-260.
- McDaniel, M. A., & Pressley, M. (1984). Putting the keyword method in context. Journal of Educational Psychology, 76(4), 598-609.

- McKeown, M. G. (1985). The acquisition of word meaning from context by children of high and low ability. Reading Research Quarterly, 20(4), 482-496.
- McKeown, M. G., & Curtin, M. E. (Eds.) (1987). The nature of vocabulary acquisition. Hillsdale, NJ: Erlbaum.
- Nagy, W. E., Herman, P. A., & Anderson, R. C. (1985). Learning words from context. Reading Research Quarterly, 20(2), 233-253.
- Paris, S. G., & Myers, M. (1981). Comprehension monitoring, memory, and study strategies of good and poor readers. Journal of Reading Behavior, 13, 5-22.
- Perfetti, C. A., Goldman, S. R., & Hogaboam, T. W. (1979). Reading skill and identification of words in discourse context. Memory & Cognition, 7(4), 273-282.
- Pressley, M., Levin, J. R., & Miller, G. E. (1982). The keyword method compared to alternative vocabulary-learning strategies. Contemporary Educational Psychology, 7, 50-60.
- Schatz, E. K., & Baldwin, R. S. (1986). Context clues are unreliable predictors of word meanings. Reading Research Quarterly, 21(4), 439-453.

- Smiley, S. S., Oakley, D. D., Worthen, D., Campions, J. C., & Brown, A. L. (1977). Recall of thematically relevant materials by adolescent good and poor readers as a function of written versus oral presentations. Journal of Educational Psychology, 69, 381-388.
- Smith, M. K. (1941). Measurement of the size of general english vocabulary through the elementary grades and high school. General Psychological Monographs, 24, 311-345.
- Sternberg, R. J. (1986). Intelligence applied. Orlando, FL: Harcourt, Brace, Joranovich.
- Sternberg, R. J. (1987). Most vocabulary is learned from context. In M. G. McKeown, & M. E. Curtis (Eds.), The nature of vocabulary acquisition. Hillsdale, NJ: Erlbaum.
- Sternberg, R. J., & Powell, J. S. (1983). Comprehending verbal comprehension. American Psychologist, 38, 878-893.
- Sternberg, R. J., Powell, J. S., & Kaye, D. B. (1982). The nature of verbal comprehension. Poetics, 11, 155-187.
- Terman, L. M. (1916). The measurement of intelligence. Boston, MA: Houghton Mifflin.

- Tulving, E., & Madigan, S. A. (1970). Memory and verbal learning. Annual Review of Psychology, 21, 437-484.
- Van Daalen-Kapteijns, M. M., & Elshout-Mohr, M. (1981). The Acquisition of word meanings as a cognitive learning process. Journal of Verbal Learning and Verbal Behavior, 20, 386-399.
- Weiss, A. S., Mangrum II, C. T., & Llabre, M. M. (1986). Differential effects of differing vocabulary presentations. Reading Research and Instruction, 25(4), 265-276.
- Zechmeister, E. B., & Hill, E. J. (1987). Do you know when you know the meaning of a word learning in context? Presented at the meeting of the Psychonomic Society, 1987.
- Zechmeister, E. B., & Nyberg, S. E. (1982). Human memory: An introduction to research and theory. Monterey, CA: Brooks/Cole.

APPROVAL SHEET

The thesis submitted by Ernie Hill has been read and approved by the following committee:

Dr. Eugene B. Zechmeister, Director
Professor, Psychology, Loyola

Dr. James W. Hall
Professor, Psychology, Northwestern

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

12/5/88
Date

Eugene B. Zechmeister
Director's Signature