DOCUMENT RESUME

ED 399 511 CS 012 593

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TITLE Contextual Analysis in Naturally Occurring Prose: Effects of Passage Length, Word Frequency, and Grade.
PUB DATE 2 Nov 90
NOTE 46p.; Portions of this paper were presented at the Annual Meeting of the Northeastern Educational Research Association (21st, Ellenville, NY, October 31-November 2, 1990).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Analysis of Variance; *Context Clues; Elementary Education; Grade 3; Grade 6; *Inferences; *Reading Comprehension; Reading Improvement; *Reading Processes; Reading Research; *Reading Skills
IDENTIFIERS Contextual Analysis; *Meaning Conditions; Word Learning

ABSTRACT

A study was conducted which addressed the following questions: (1) Do elementary school children infer word meanings from context?; (2) Are older students more successful in using context to infer the meanings of new words than younger students?; and (3) Is a longer context more facilitating to word meaning inference than a shorter context?; and (4) Is context more facilitating to the inference of high frequency words than to low frequency words? Eighteen children in grade 3 and 18 children in grade 6 were randomly assigned to 1 of 2 conditions: words-in-isolation and words-in-context. Students in the words-in-context conditions read long passages containing high frequency words, long passages containing low frequency words, short passages containing a high frequency word, and short passages containing a low frequency word. Students in both the words-in-isolation (no passages) and the words-in-context conditions wrote definitions to the target words. An analysis of variance comparing the performance of the words-in-isolation group to the words-in-context group revealed a significant difference between the performances, in favor of the words-in-context group. A repeated measures analysis of variance revealed differences by grade, passage length, and word frequency, as well as interaction effects. Results suggest that older students are better able to use context than younger students and that shorter passages are more facilitating to inferring word meanings from context than longer passages. (Contains 2 tables of data, 2 figures, and 50 references; 2 sample forms are appended.) (Author/CR)

# Contextual Analysis in Naturally Occurring Prose: Effects of Passage Length, Word Frequency, and Grade

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The authors wish to thank Dr. Paul Luce and Dr. Sam Weintraub for their comments on earlier versions of this manuscript. Portions of this manuscript were presented at the 21st annual conference of the Northeastern Educational Research Association, October 31 - November 2, 1990, Ellenville, NY.

Running head: CONTEXTUAL ANALYSIS

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Abstract

A study was conducted which addressed the following questions: (1) Do elementary school children infer word meanings from context? (2) Are older students more successful in using context to infer the meanings of new words than younger students? (3) Is a longer context more facilitating to word meaning inference than a shorter context? (4) Is context more facilitating to the inference of high frequency words than to low frequency words? Eighteen children in grade three and eighteen children in grade six were randomly assigned to one of two conditions: words-in isolation and words-in-context. Students in the words-in-context conditions read long passages containing high frequency words, long passages containing low frequency words, short passages containing a high frequency word, and short passages containing a low frequency word. Students in both the words-in-isolation (no passages) and the words-in-context conditions wrote definitions to the target words. A 2 X 2 ANOVA comparing the performance of the words-in-isolation group to the words-in-context group revealed a significant difference between the two, in favor of the words-in-context group. A 2 X 2 X 2 repeated measures ANOVA revealed differences by grade, passage length and word frequency, as well as interaction effects. The results suggest that older students are better able to use context than younger students and that shorter passages are more facilitating to inferring word meanings from context than longer passages.

## Background

Knowledge of word meanings is closely related to both reading comprehension and intelligence, as they are typically measured. Historically, researchers have found strong relations between knowledge of word meanings and reading comprehension skill (Anderson & Freebody, 1985; Davis, 1944; Stahl & Fairbanks, 1986). In addition, vocabulary knowledge has long been recognized as a good predictor of general intelligence (Sternberg, 1985). It has been found that children acquire the meanings of new words very rapidly. Nagy and Herman (1984) suggest that children may increase their vocabularies by as many as 3,000 words between third- and twelfth-grade. Investigations of this phenomenon have focused primarily on various forms of direct instruction, morphological analysis, and contextual analysis as possible explanations for the rapid rate at which word meanings are acquired (Jenkins & Dixon, 1983; Wysocki & Jenkins, 1987).

Systematic, direct instruction in specific word meanings has been found to increase students' knowledge of word meanings and reading comprehension (Clark, 1984; Jones, 1982; Gipe, 1978-79; Kameenui, Carnine, & Freschi, 1982; Levin et al., 1984; Pany & Jenkins, 1974; Roser & Juel, 1982; Stahl & Fairbanks, 1986; Strackbein, 1984). However, in order for direct instruction to have significant effects, it must be intensive and long term (Beck, Perfetti, & McKeown, 1982; Becker, 1977; Draper & Moeller, 1971). Beck et al. (1982), for example, found significant generalized effects as a result of teaching 104 words over a five month period. While these results are striking, the reality of time

constraints and the large number of words unknown to children make such a program unrealistic.

Durkin's (1978-79) well-known observational study of classroom comprehension instruction suggests that a very small percentage of time is spent on the teaching of word meanings. In her first study of fourth grade classrooms, Durkin observed 2.62% of 4,469 minutes of instruction devoted to word meanings (including instruction, review, and application). In her second study, involving grades three through six, Durkin observed only 2.35% of 2,174 minutes of instruction devoted to word meanings. According to Jenkins and Dixon (1983), the learning of no more than 200-300 words per year may be attributed to vocabulary instruction.

Lack of evidence to support direct instruction as the primary means to word meaning acquisition has led to the contention that individuals acquire most word meanings from written and oral context (Nagy, Herman, & Anderson, 1985; Sternberg, 1987). According to schema theory, word inferencing involves the search for and use of relevant schemata (Rumelhart, 1983). The search for a likely candidate schemata is by its nature sensitive to the context in which the process is occurring and influenced by the nature of the contextual cues involved (Li, 1988). In order to infer the meanings of unknown words, readers must recognize the relationships within the text and determine the relevance of these relationships to what they already know (Wittrock, 1974). This process was explored in an investigation conducted by Eller, Pappas and Brown (1988). The authors analyzed kindergarteners' "readings" of picture books to identify patterns of vocabulary

growth. The results of this study indicate that children as young as five years of age were able to learn new words through written contexts.

Sternberg and Powell (1983) assert that inferring the meanings of unfamiliar words from context or learning from context is central to overall verbal comprehension which explains why vocabulary is the single best predictor of overall verbal intelligence test scores. A preliminary test of this theory required 123 high school students to read 32 passages containing one to four low frequency nouns. The average passage length was 125 words. Each student was to define to the best of his/her ability each target word. Responses were given "goodness-of-definition" ratings by three raters. The average of the three ratings was then used as a predictor variable in three simple correlations. Definition goodness was correlated with scores on standardized tests of intelligence, vocabulary, and comprehension. All three correlation coefficients (.62, .56, and .65 respectively), were statistically significant.

While these results suggest that measures of intelligence, vocabulary, reading comprehension, and use of context to acquire word meanings tap overlapping verbal abilities in high school students, they do not suggest that individuals actually acquire word meanings from context. Since the study contained no control group, it is impossible to know whether students actually used context to obtain the meanings of the target words. In addition, the authors failed to provide an operational definition of "low frequency words", making it impossible to estimate whether they were unknown to the subjects prior to treatment. Also, the task demands were clear to the students in this study, a factor which may not exist under natural reading conditions.

Shatz and Baldwin (1986) conducted three studies with tenth and eleventh graders to determine the extent to which context helps students infer the meanings of unknown words. Arguing that previous studies have used high frequency words, the authors used low frequency words in their experiments. The authors defined low frequency words as those which appear no more than four times in a million running words. In the first experiment, subjects were randomly assigned to one of two conditions: words-in-context and words-in-isolation. Students in the words-in-context condition were given 25 passages taken from 10 novels. Each test item consisted of a three-sentence passage followed by the target word and five choices. Students in the words-in-isolation group received a test identical to the words-in-context test excluding the passages.

A t-test for independent observations comparing mean test scores across conditions showed no significant difference between groups. The results of this experiment suggest that in naturally occurring prose, context does not facilitate vocabulary acquisition. In order to determine the effectiveness of context in forms of text other than prose fiction, a second experiment was conducted in which passages were taken from newspapers, magazines, history textbooks, and science textbooks. Again, no significant differences were found between scores on the words-in-context and on the words-in-isolation tests. In a third experiment, conducted in the same manner as the first but requiring students to write definitions for the target words instead of completing multiple-choice items, the results of the first experiment were confirmed.

The fact that all three experiments resulted in null findings is logically and intuitively perplexing. Shatz and Baldwin's findings may have been influenced by

the use of three-sentence passages test for context effects. Such passages are not representative, in length, of passages of naturally occurring prose encountered by high school students. Of the passages given as exemplars in the research report, the longest contains 92 words and the average length is 52 words. In a study of intra-text word frequency, Goodman and Bird (1984) analyzed complete texts at the fifth, sixth, eighth, and twelfth grade levels and at the adult level. They found that general word frequency lists alone cannot account for the word frequency within a text, as text constraints play a large role in determining the wording of any given text. Such constraints allow for a certain degree of predictability within texts.

A second problem with this study is cited by the authors themselves as a limitation. No attempt was made to identify or to control for subjects' abilities to use context as a strategy for determining the meaning of an unknown word. Many studies in the field of reading have shown that when teachers "teach" a skill they are actually assessing competence using the skill [see for example Durkin (1978-79) on comprehension or Alvermann & Hayes (1989) on critical thinking]. Sternberg and Powell's (1983) work suggests that if decontextualization strategies had been taught, they may not have been taught effectively.

Contrary to Shatz and Baldwin (1986), Nagy, Anderson, and Herman (1987) report a small but significant effect of learning from context. In their study, 418 third, fifth, and seventh grade students read two of a total of four texts at his/her grade level. The target words in each text were not highlighted in any way and were those selected as the most difficult in the text by seven reviewers. Prior knowledge of word meanings was assessed with a checklist vocabulary test requiring subjects to tell whether they knew the meaning of each item by checking

"yes" or "no". Nonwords constructed from real English stems and suffixes were used to compute a correction factor for each subject. One week after reading, students were given a multiple-choice test comprised of the target words contained in all four passages. A significant difference was found between the mean score of subjects who read each passage and the mean score of subjects who did not. Nagy, Anderson, and Herman conclude that a sufficient amount of wide reading can result in large-scale vocabulary growth.

Much recent research has focused on factors which may influence the use of context in the acquisition of word meanings. McKeown's (1985) study focused on differences in the process of acquiring word meanings from context in learners at different levels of reading achievement. High and low achieving fifth graders were presented with six sets of sentences containing an artificial word in a context. For each pseudoword, subjects were individually taken through a five-step task. Each step of the task was designed to represent an aspect of meaning acquisition. McKeown found that low-ability students had difficulty understanding the relation between the target and the context and that all students evidenced semantic interference when considering two contexts simultaneously.

Previous research on the ability to use contextual cues has indicated that poor readers compensate for insufficient word recognition abilities by using context to identify unknown words (Allington & Fleming, 1978; Krieger, 1981). Unfortunately, this strategy is ineffective and results in low comprehension (Stanovich, Nathan, & Vala-Rossi, 1986). Automaticity and fluency in the decoding process appear necessary for establishing a context that facilitates word meaning inferencing. Even when the context is provided orally, low achieving

students have difficulty using it effectively (McKeown, 1985). These results are, no doubt, influenced by students' lack of practice in establishing logical connections in a text, a necessary process in inferring meanings. Knowledge of textual conventions plays a role in deriving word meanings from context. Jenkins, Haynes & Stein (1983) found that brief instruction about certain types of context cues significantly improved performance in word meaning acquisition using such cues. Jenkins, Matlock, & Slocum (1989) found that subjects taught a strategy for deriving word meanings from context outperformed subjects taught individual word meanings. Thus, the facilitating effect that context cues can provide in acquiring word meanings is affected by both reading ability and practice.

Another factor influencing the use of context cues is the strength or adequacy of the context (Li, 1988). In a study testing the ability of fourth, sixth, and eighth graders to determine the meanings of unknown words based on morphological generalization and contextual information, Wysocki and Jenkins (1987) found that strong context was more helpful to all subjects than was weak context in the use of contextual information. However, sixth- and eighth-graders received more help from a stronger context than did fourth-graders. Although the authors predicted that the older subjects would be better at using the combined strategy of contextual analysis and morphological generalization than the younger subjects, such differences were not found. Instead of combining strategies, subjects seemed to use just one method to determine word meanings.

In summary, it appears that while extensive gains in the acquisition of meaning vocabulary is an expected phenomenon during the academic years, an understanding of just how this learning occurs is as yet undetermined. It is doubtful

that children acquire the majority of their knowledge of word meaning via direct instruction. The intensive, long term nature of successful programs appears to be unrealistic for contemporary classrooms. However, Sternberg's notion that most word meanings are learned from context is equally questionable. Sternberg & Powell's (1983) examination of learning from context finds significant correlations among related factors. It does not indicate whether word meanings are acquired from context. Evidence to support the claim that individuals learn the meanings of unfamiliar words from written context is scarce and contradictory (Jenkins & Dixon, 1983; Shefelbine, 1990).

## Purpose of the Study

The purpose of this study is to determine whether children do acquire word meanings from context and, if so, what factors may influence their ability to do so. Thirty-six students from grades 3 and 6 were assessed on their acquisition of high and low frequency words in isolation or within the original contexts. Previous studies differ in the length of context provided and in the relative frequency of the target words. To control for such inconsistencies, this study includes both the length of the context and the frequency of the target words as factors within the design. In addition, much of the research cited in this area has involved older students and/or failed to assess prior knowledge. Since reading experience may be a strong intervening variable, this study includes subjects that are differentiated by grade. Another important control of this study is the inclusion of only good readers. Failure to account for contexts that are at the readers' frustrational levels, may have contributed to misleading results reported in earlier works. A further

criticism of studies that examine the effects of context is that the provided context is contrived and not reflective of a natural reading condition. Only contemporary children's literature was used as both the source of the target words and the contexts that were given in this study, thereby making it unique in this respect.

## Statement of the Problem

This study addresses the following questions: (1) Do elementary school children infer word meanings from context? (2) Are older students more successful in using context to infer the meanings of new words than younger students? (3) Is a longer context more facilitating to word meaning inference than a shorter context? (4) Is context more facilitating to the inference of high frequency words than to low frequency words?

## Method

### Subjects

The upper semi-probability sample was comprised of four intact elementary classrooms, two each at grades three and six, from a large urban school. From each of these classrooms, nine students were randomly selected and assigned to either a context or no-context condition. Both treatment groups contained eighteen subjects; nine third grade students and nine sixth grade students. Only those students scoring above the 50th percentile on the California Achievement Test administered at the beginning of the school year were included in the study. Since the research was conducted in late spring, additional growth in reading was expected. All subjects were performing well above average in reading achievement

and are considered a fair representative sample of good readers. The inclusion of only good readers in this study controls for any confounding effects of reading ability, but not for any effects resulting from previous experience. It was hypothesized that differences in performance in using context to acquire word meanings would appear for grades three versus six because of the increased opportunities to practice using context, either incidentally or through direct instruction.

Materials

A criticism of earlier studies is that the passages used to test for context effects were contrived and not representative of the facilitating effect that passages within books can have (Jenkins & Dixon, 1983; Shatz & Baldwin, 1986; Shefelbine, 1990). In an attempt to illustrate any effects of real narration, this study used the naturally occurring prose found in four children's books. The books were chosen because they were considered good literature by the experts in the field and because they were interesting for ages 8 to 12 (Huck, 1979; Rudman, 1984).

The readability levels of the passages is an important control. A text that is either too easy or too difficult can confound the student's ability to process it fluently. Initially, the readability level of each book was attempted using the Fry and Dale-Chall readability formulas (Harris & Sipay, 1985). However, these formulas are based solely on surface characteristics of the text such as the number of syllables and sentence length. Such procedures fail to take into account aspects of natural prose such as dialogue, technical vocabulary, conceptual difficulty and prior knowledge. Consequently, inflated readability levels emerged. The reading

levels of the four trade books identified for use in the study were the readability levels previously computed by and listed as such by leading experts in the field (Norton, 1987; Rudman, 1984). Two of the books had a grade 3 reading level and two books had a grade 4 reading level. Since all students were reading above average, it was assumed that the readability of the text would not interfere with the use of context. Three passages were selected from each book; two short and one long. All passages were retyped with the target words typed in uppercase and underlined.

An additional criticism of studies addressing the influence of context has been that of what constitutes enough words to be considered context. A typical design is one in which the target word is found in the second sentence of a three sentence context. However, research in comprehension has found that the inference of a word meaning requires forward and backward referencing and that any facilitating effect that other words provide may not be in the two surrounding sentences. This study examines both the contextual effects of short three sentence passages and longer passages ranging from 8 to 15 sentences. All short passages contained the target word in the second sentence and were controlled for length. The average number of words for short passages was 32. To control for any confounding effects of test length, only 4 long passages were used. Each long passage contained two target words of the same frequency interspersed within the passage. Passage length was controlled with the average length being 129 words in 11 sentences. Each target word appeared only one time within its passage.

A factor that can influence the ability to use context to infer a word meaning is the frequency of the target word. To investigate word frequency effects, the 16

target words consisted of 8 high frequency (HF) and 8 low frequency (LF) words. Both high and low frequency words were equally represented across passage length. The only low frequency words in the low frequency word passages were the target words. The Dale List of 3,000 Familiar Words was used to identify those target words considered high frequency (Dale & Chall, 1948). Low frequency words were those words which occurred no more than five times in five million for grades three through eight. The Carroll, Davies, Richman (1971) Word Frequency Book was used to select the low frequency words for this study.

Two 16-item tests, a words-in-context test and a words-in-isolation test, were designed to test the effects of context on determining unknown word meanings. Sixteen target words were selected from twelve passages, four of which were long and eight of which were short. The words-in-isolation test merely listed the 16 target words and asked students to write a definition for each word. The words-in-context test displayed the word in its original context. Each target word was underlined in the passage to make sure that the student processed it.

In summary, 12 passages (4 long and 8 short) containing 16 target words of high and low frequency were selected from 4 children's literature books. All passages were controlled for length and readability and all target words were underlined within each passage. The 12 passages were placed in a random order to form the words-in-context test packet (see Appendix A). Following each passage, the student was asked to write a definition of the underlined target word which was rated on a scale from 0 to 2. The words-in-isolation test (see Appendix B) listed the same 16 words and asked for a definition of each. A total of 32 points could be

achieved for either test. An overview of word frequency and passage factors are provided in Table 1.

Insert Table 1 about here

Procedure

Eighteen students (9 third graders and 9 sixth graders) comprised the no-context condition and were administered the words-in-isolation test. Eighteen different students of the same grade composition comprised the context condition and were given the words-in-context test. Those in the context condition received all 12 passages and all conditions of passage length and word frequency.

Students were directed to read each paragraph then write the definition for the underlined word in the passage. Students in the no-context condition were directed to read each word then write the definition for the word. Both tests were group administered and supervised by one of the researchers. The directions were read to the students and both tests were untimed.

All definitions of the words were rated on a scale from 0 (low) to 2 (high); with 2 being the contextual definition of the word, 1 being a semantically appropriate interpretation, and 0 being inaccurate and inappropriate. Success in using context is, in part, dependent upon the reader's ability to make inferences that are consistent with and related to elements of his/her own schematic structures (Langer, 1982). Because meaning is only partially represented by its context, the background knowledge of the reader must be considered in determining the accuracy of the response (Adams & Bruce, 1972). This rating scale allows for

varying degrees of knowledge and lets the reader relate the inferred meaning to his/her background knowledge, rather than prescribing a denotative definition (Shefelbine, 1990). A total score of 32 could be achieved for either test. Blind ratings were given for all tests by two independent raters. The interrater reliability was .79.

Design

A two factor fixed effects design was employed to determine whether context facilitates word meaning acquisition. A 2 (Grade: Three, Six) X 2 (Condition: Context, Isolation) analysis of variance (ANOVA) was computed to determine if there were any significant differences between grade levels and the two treatment conditions. The dependent measure for this analysis was the total rating score achieved from either test condition. A three factor mixed design was employed for the second analysis with one between groups factor and two within-subject factors. This investigation used a 2 (Grade: Three, Six) X 2 (Passage Length: Long, Short) X 2 (Word Frequency: High, Low) repeated measures design with subjects nested within grade and the second two factors fully crossed. To determine whether grade level or passage length had an influence on the effect of the context condition, an ANOVA was conducted to examine the main effects on the first two factors. An examination of the interaction effects between passage length and word frequency illustrates the effects that word frequency has on the ability to use context. The dependent variable for the three way ANOVA was the total rating for words by frequency and passage length resulting in four scores per student: a total rating score for 1) long passages-high frequency words (L-HF); 2) long passages-low

frequency words (L-LF); 3) short passages-high frequency words (S-HF); and 4) short passages-low frequency words (S-LF).

## Results

A two-way ANOVA was performed on the total rating score for the context and no-context condition and for the two grade levels. There was a statistically significant difference between the mean of the no-context group (18.17) and the mean of the context group (20.22), $F_{(1,32)} = 4.34$, $p < .05$. As expected, there was a significant difference between the two grade levels, with grade six yielding a mean of 21.9 and grade 3 a mean of 16.4, $F_{(1,32)} = 31.02$, $p < .001$. There was no significant interaction between grade level and context condition, $F_{(1,32)} = .079$, $p > .10$. On the average, students who received the target words within sentences were able to infer more accurate word meanings than students given words in lists. Students in grade six did better than students in grade three, a difference which held constant across the context conditions. The means and standard deviations for grade levels across context conditions is provided in Table 2.

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Insert Table 2 about here

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This initial analysis illustrates that students can infer new word meanings from context. The remaining analysis serves to determine what conditions have a facilitating effect. Specifically, the influences that passage length and word

frequency have on the ability to use context across the two grade levels will be examined.

The design contained three fully crossed fixed dimensions, one between-groups factor (Grade: three, six) and two within-subject factors (Passage: long, short; Word Frequency: high, low) with repeated measures on the last two factors. Subjects were random, nested within grade and crossed with passage length and word frequency. Every student received all conditions which resulted in four separate rating totals for each condition: L-HF; L-LF; S-HF; and S-LF. Using the experimental data, a 2 X 2 X 2 analysis of variance was employed on the partialled rating scores.

There was a statistically significant difference between the means of grade three (4.33) and grade six (5.78), $F_{(1,16)} = 16.36$, $p < .01$. On the average, the older students were able to use the context better than the younger students. On the factor of passage length, there was a significant difference between the means of the long passage (4.56) versus the short passage (5.56), $F_{(1, 16)} = 14.21$, $p < .01$. The fact that short passages had a greater facilitating effect than long passages was a surprising result since it was hypothesized that shorter prose provided limited context. The lack of any significant interaction effects between grade and passage, $F_{(1, 16)} = .1752$, $p > .10$, indicate that these effects were consistent across conditions. Higher scores were achieved on short passages over long for both grade three and grade six, although the older students performed better overall. The means for the grade levels across passage conditions are given in Table 2.

A statistically significant effect was found for word frequency, $F_{(1,16)} = 105.5$, $p < .001$, with a mean of 7.0 for high frequency words and a mean of 3.11

for low frequency words. This result is not surprising and confirms the validity of the words chosen. By definition, low frequency words are more difficult since students rarely encounter them in reading. High frequency words, on the other hand, are those words students see repeatedly in natural prose.

There is a statistically significant interaction effect between grade level and word frequency, $F_{(1, 16)} = 6.98$, $p<.05$. This interaction is illustrated in Figure 1. In examining the interaction, it appears that the meanings of HF words were known equally as well by students in grades three and six. This was an expected result since those HF words chosen are ones mastered by the average third grader. However, the LF words resulted in different performances between grade levels. Sixth graders performed reasonably well (4.44) while third graders had a difficult time inferring the meanings of LF words from the context given (1.9). A one-tailed protected t-test indicated that this difference between third and sixth grade students' ability to infer the meanings of LF words from context was statistically significant at the .001 level , $t_{(16)} = 6.34$. The interaction effect between grade level and word frequency supports the earlier conclusion that sixth graders are better able to use context than younger students.

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Insert Figure 1 about here

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A second interaction was found for passage and word frequency, $F_{(1, 16)} = 5.95$, $p<.05$; as illustrated in Figure 2. Across grade levels, HF words yielded high responses for both long and short passages. Students were able to infer LF

words better in short passages (3.94) than in long passages (2.28). A post hoc analysis indicated that the facilitating effect of long versus short passages for LF words was statistically significant for a one-tailed t-test , $t_{(16)} = -4.319$, $p<.001$ . There was no statistically significant three way interaction, $F_{(1, 16)} = .00$, $p>.10$.

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Insert Figure 2 about here

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## Discussion

The purpose of this study was to examine whether naturally occurring prose has a facilitating effect on obtaining the meaning of unknown words. The results of this study indicate that students can infer the meanings of unknown words better when given the words in the context in which they occur. Unlike other studies addressing contextual effects, this study examined the effects of natural narration and thereby more closely resembles real reading. It has been shown that ample opportunities to engage in real reading activities has beneficial effects for reading rates, fluency in applications of comprehension strategies, and improved student attitudes toward the reading process (Harris & Sipay, 1985). It would appear that, in addition, real reading provides students with opportunities to acquire new word meanings as suggested by Nagy, Anderson, and Herman (1987).

As expected, older students were better able to get unknown word meanings than their younger counterparts. As with other skills used during reading, the process of decontextualization is influenced by practice and direct instruction. The

sixth grade students had several years of additional practice in inferring word meanings during reading, as well as additional instruction in reading. In addition, older good readers have greater vocabulary knowledge than younger good readers, a factor which can have a significant influence on the ability to use context for word acquisition (Shefelbine, 1990). These experiential differences may account for the two grade level effects. What is evidenced by this grade level effect is that through experience, either direct or incidental, students are able to make gains in their ability to use context to infer new word meanings. As with other reading strategies, the more students are exposed to the process, the more proficient they become in using it. Teachers can feel confident that providing students with opportunities to actively engage in using context to infer word meanings, either through instruction or through silent reading, will help students develop their vocabularies.

Although the two grade levels differ in terms of their ability to use context, the students' knowledge of high frequency words was similar. There was little difference between third and sixth graders in performance on high frequency words despite passage length. This result was not surprising, since, by definition, these words should be the ones students have had repeated exposure to. These results do, however, suggest that when students know a word, lexical access will be immediate and context uninfluential.

The low frequency words were much more illustrative of context effects. The older students were able to infer unknown meanings of LF words better than younger students. Specifically, context had a noticeable facilitative effect for third graders on only one of the low frequency words: lolling. The evidence suggests that the meanings of some words are more difficult to grasp than others, even at the

sixth grade level. The word times for example was difficult for sixth graders to define even though it is a high frequency word. In fact, more students in the words-in-isolation condition correctly defined it than in the words-in-context condition. This is probably because students in the control condition could choose any of the word's multiple meanings, whereas students in the experimental condition were limited to the meaning implied by the passage. In addition, times is an abstract word, and words with abstract referents are more difficult to define than those with concrete referents (Sternberg & Powell, 1983). The variation in the ability to define words with abstract referents and multiple meanings has immediate implications for classroom planning. Teachers often preview vocabulary to identify which words may need preteaching. It appears that teachers may need to consider whether the word has an abstract referent and/or multiple meaning when making a decision about inclusion for instruction. The fact that students' can get meanings of unknown words from the passages they are found in suggests that perhaps many words identified as requiring introduction may not need this attention. This would allow more time for actual reading and for elaboration of tenative definitions after the story has been read.

Another observation that has implications for the classroom stems from the nature of the dependent measure. Because we asked students to write what they thought the meanings of the words were, we were able to observe variation in performance as it related to abstract words. There were words that were difficult to define, difficult to put into words. It is clear that, in some cases, these words were well established in the students' oral vocabulary, such as the word down. Teachers need to be sensitive to those words that can be known, but yet remain

undefined. Many of these words may represent complex concepts that require discussing and thinking about, while others may not need anything more than a mere glance.

The fact that context facilitated the acquisition of low frequency words runs counter to Finn's (1977-78) transfer feature theory which states that the words that are the most difficult to supply in a cloze task are also the most critical contributors to the meanings of the context. According to Finn, this results in an inverse relation between the information level of a given word and its "cloze easiness". In other words, context works best when it is needed least -- that is, when the unknown word has little meaning to add to the passage.

A surprising result of this study was that short passages had a greater facilitating effect than long passages. Although explanations of this effect are purely speculative, they may shed some light on other variables affecting the ability to use context, not addressed in this study. First, it may be that the length of long passages resulted in the students merely skimming the passage for the relevant information. The proximity of the context cue for one of the two L-LF passages may have influenced the students to do just that. For the target words, helterskelter and lolling, found in the same long passage, the context cues were found in the surrounding sentences. In these instances, the reader had only to read the sentence before and after the target word appeared in order to infer its meaning. Such an allocation of attention would change the long passage into two short passages and reduce the contextual effect to that provided by the short passages of three sentences. Interestingly, the students' inference of the meaning of lolling was greatly facilitated by this passage while inference of the meaning of helterskelter

was not. Proximity of cues seems to have had an effect in one case but not in the other.

Other words facilitated by context were grimaced and contemptuous. Context helped students in the experimental condition to accurately define grimaced, which appeared in a short passage, so as to receive ratings of 2. In the case of contemptuous, however, the longer context helped students to get only an idea of the word's meaning so as to receive ratings of 1. Therefore, proximity of cues seems to be a viable explanation for some of the observed contextual effects for low frequency words. It is also quite possible that contemptuous is conceptually more abstract than grimaced and is, therefore, more difficult to define. Finally, it should be noted that the low frequency word aspirins was correctly defined by half of the third graders and all of the sixth graders regardless of treatment condition. Perhaps this is because its referent is familiar to students and/or because it is not a low frequency word in verbal language.

Another possible explanation of the short passage effects relates to the fact that this task mirrors normal reading and hence may be influenced by the expectations of and typical behaviors associated with normal reading. Even though the task demands were explicit, under normal reading conditions students may merely skip unknown words, especially if they look unfamiliar and/or long. Sternberg and Powell (1983) point out the important distinction between competence in using context and performance in doing so. In their study, they distinguish among factors that influence the *ability* to infer word meanings, rather than those aspects or conditions which might *encourage* students to use context. Results of previous studies suggest that under natural conditions, readers can often

get by without figuring out a word's meaning and thus, may not bother to try (Jenkins & Dixon, 1983).

A final explanation for the passage effects may involve aspects of working memory. If both long and short passages possess adequate context cues, then logic suggests that it would be more difficult to make the logical connections necessary for inferencing across longer selections. Since short passages are processed faster, there is a benefit of recency effects. Jenkins and Dixon (1983) have indicated that individual differences in working memory, and reasoning skills have their greatest influence when meanings must be derived from the context. Shefelbine (1990) examined the effects of reasoning ability on the ability to use context and found null results. However, there is some question as to whether the task demands in that study really required the students to make any decisions or connections independently, since so much directed attention was given by the researchers during instruction. Reasoning ability may be a major influence on longer passages which require student to establish relationships within parts of the text across several sections.

In summary, the results of this study challenge the findings of Shatz and Baldwin (1986) and support the conclusion that context does have a facilitating effect on unknown words. While older students are more proficient in using context than younger students, they performed in a similar fashion when the words encountered occur frequently in natural prose. In this case, because lexical access is immediate, there are little to no contextual effects. Short passages appear to have a greater facilitating effect for word meaning inference than long passages, although there is some question as to whether the long passages may have been influenced

by the proximity of the context cues. In any case, this study provides evidence that naturally occurring prose does facilitate the inferring of unknown words. In light of the large number of words that students must learn, and the lack of evidence that direct instruction can account for a large proportion of the words learned by students, it appears that incidental word learning is both logically and empirically reasonable.

## Limitations

One of the goals of this study was to approximate a natural reading situation more closely than previous studies. However, there are limitations in the experimental procedures. While the passages used in the context condition were representative of those encountered by elementary school children in reading real literature, the directions given may have acted as a cue to use the passages to determine word meanings. Directing the students to read the passage in order to define a word is not a reflection of a normal reading condition. The attention devoted to certain pieces of the text and the strategies used during the process may have been different if the students were asked to read the passage and discuss it afterwards. The use of story retelling as a measure of vocabulary knowledge gained during reading is worthy of future exploration.

In addition, there was no attempt to identify or control for differences among subjects in exposure to and practice using strategies for obtaining word meanings from context. A future study should examine whether there are contextual effect differences among students who may receive differential treatment in exposure to and instruction in the use of context to infer word meanings. This could be

accomplished by examining students of differing ability groups. There was no way to control for equivalence of contexts across passages used in the context condition and still keep the children's literature used in tact. However, contexts vary in the degree to which they facilitate the learning of unfamiliar words (Finn, 1977-78; Sternberg & Powell, 1983). It is quite possible that differences in performance on specific words is a result of differences in facilitation power of the contexts in which they appeared not related to passage length. Finally, in an attempt to keep the length of the context test reasonable, only four long passages were used each of which contained two target words. It is possible that the inclusion of two target words confounded the effects of the long passage. In fact, one of the reasons for the difference in effects of long and short passages may be attributed to the fact that long passages contained two target words while short passages contained only one.

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Table 1 Target words and passage factors

| Target Words | Word Frequency | Passage Length | Words per Passage | Sentences per Passage |
|---|---|---|---|---|
| MOVIE | H | Long | 130 | 15 |
| RAIN | H | | | |
| HOUR | H | Long | 124 | 10 |
| DOWN | H | | | |
| CONTEMPTUOUS | L | Long | 134 | 10 |
| CATAPULTED | L | | | |
| HELTERSKELTER | L | Long | 128 | 8 |
| LOLLING | L | | | |
| FAT | H | Short | 35 | 3 |
| SILENT | H | Short | 26 | 3 |
| TIMES | H | Short | 35 | 3 |
| ROOM | H | Short | 33 | 3 |
| SLOUCHING | L | Short | 29 | 3 |
| ASPIRINS | L | Short | 25 | 3 |
| GRIMACED | L | Short | 26 | 3 |
| ELEGANCE | L | Short | 42 | 3 |

N =16

| Avg Wds/Pass | Avg Sent Lgth |
|---|---|
| Long = 129 | Long = 11 |
| Short = 32 | Short = 3 |

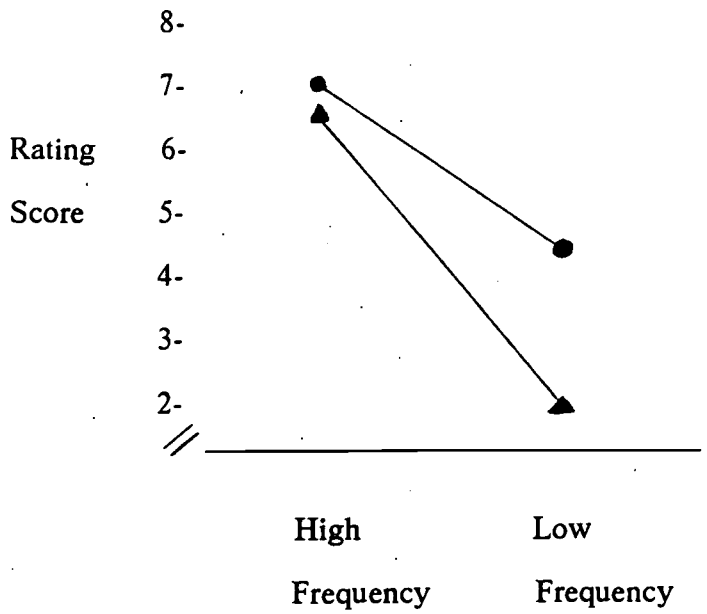
Table 2 Means, standard deviations and (standard error) for grade levels across context and passage conditions

| | No Context n=18 | | Context n=18 | | Long Passage | Short Passage |
|---|---|---|---|---|---|---|
| | M | SD | M | SD | M | M |
| Grade Three | 15.6 (.90) | 2.70 | 17.3 (1.13) | 3.39 | 3.778 | 4.889 |
| Grade Six | 20.8 (.80) | 2.39 | 23.1 (1.09) | 3.26 | 5.333 | 6.222 |
| | 18.17 | | 20.22 | | 4.556 | 5.556 |

## Figure Captions

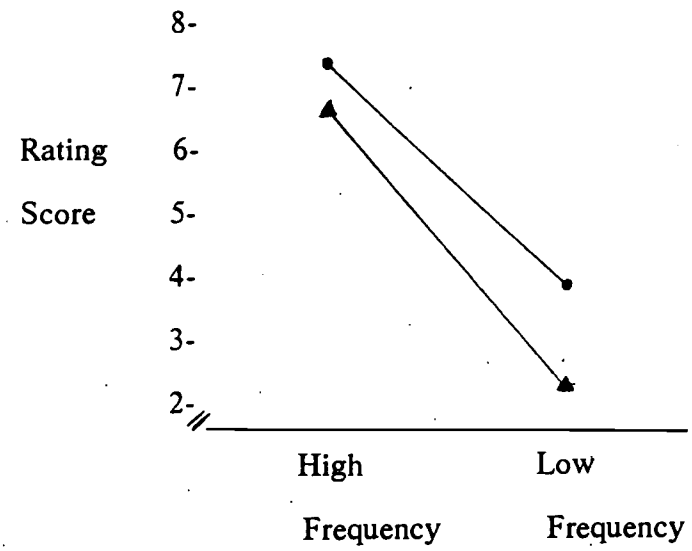
Firgure 1. Grade X word frequency interaction

Figure 2. Passage X word frequency interaction




▲ - Grade Three

● - Grade Six




▲ - Long Passage

● - Short Passage

# APPENDIX A

Name:_____ Grade 3 or 6 (circle one)

Directions

Below you will find 16 words underlined in different sentences. Read each paragraph carefully then write what you think the word means in the space provided. Do one at a time. Take your time and do your best.

Rachel looked completely taken aback. She stood her ground, but she remained silent. Only her eyes, which watered suddenly, let Harriet know that she was afraid.

1. SILENT means_____

By one o'clock we were ready to go. All three of us wore our raincoats and rubbers and my father took his big, black umbrella. One thing about New York--it's hard to get a cab when it's raining. But the movie theater wasn't very far away. My father said the walk would do us all good. There were a lot of puddles. It was realy pouring. I like to walk in the rain. Especially if it isn't too cold out. It feels nice when it wets your face. I jumped over the puddles. My father avoided them too. But not Fudge. He jumped right into every one and splashed around like a little duck. By the time we got to the movie theater the bottoms of his pants were soaked.

2. RAIN means_____

3. MOVIE means_____

She pulled the pillow over her head, but she could not block out the noises. Oddly, it was the restless sounds from Charlie's room which seemed loudest. Charlie was not a good sleeper.

4. ROOM means_____

There was something painfully beautiful about the swans. The whiteness, the elegance of them on this dark lake, the incredible ease of their movements made Sara catch her breath as she and Charlie rounded the clump of pines. "There they are, Charlie."

5. ELEGANCE means_____

Sometimes my mother laughs like crazy at my jokes. Other times she pretends not to get them. And then, there are times when I know she gets them but doesn't seem to like them.

TIMES means_____

"I'm coming to it," said Joe, wiping his nose. "But I wanted to show you how important it was, my father nearly killed me and all." He sneezed. And then Alan began to sneeze and finally had to hobble off into one of the horse stalls, hugging his stomach, to recover. "Anyway," said Joe, wiping his nose again and hitching up his Levi's, "so my father told my mother he thought I'd eaten a worm. 'A what?' says my mother, dropping her apron and clutching the sides of her head. 'A worm,' says my father, nodding solemnly. So my mother fainted, collapsed all helterskelter right there in the doorway, and lay still, her tongue lolling out of her mouth, her red hair spread out beautifully over the doorsill."

7. HELTERSKELTER means _____

8. LOLLING means _____

My mother flopped down in a chair. Grandma brought her two aspirins and a glass of water. "Here, dear," she said, "Maybe these will help."

9. ASPIRINS mean _____

Mrs. Welsch raised her shoulders and looked helplessly at the cook. The cook grimaced. "Set in her ways," the cook said firmly and left the room.

10. GRIMACED means _____

"I'm *terribly* sorry, Harriet. I must have tripped. I *really* am sorry." Her eyes were shining so much that Harriet knew she was one minute from falling on the floor in helpless laughter. Harriet threw her a contemptuous glance and looked down at her blue legs. Pinky and Sport were scrubbing away, one on each leg, as Miss Elson tried to squeeze some of the ink out of the dress into a small cup. Suddenly Harriet couldn't stand it anymore. She grabbed her notebook and wrenched herself away from them all, flinging ink all over everyone as she did. She catapulted herself out of the door. She could hear their little flurries and shouts dimly behind her as she ran down the big steps, her feet making slush, slush noises in her ink-filled shoes.

11. CONTEMPTUOUS means _____

12. CATAPULTED means _____

Other kids' parents were always nagging them to eat, eat; his had begun to worry about *how much* he ate. Not that he was fat. He just hadn't worked off all his winter blubber yet.

13. FAT means _____

He knew something was up. Otherwise Joe wouldn't have come back, slouching in the doorway pretending to be gazing up at the clouds. But Billy noticed he kept glancing at Alan and him.

14. SLOUCHING means _____

Mary and Sara were up in the field by the woods. They had been searching for Charlie for an hour without finding a trace of him. Mary said, "I don't care how I look. I am taking off this scarf. It must be a hundred degrees out here." "Charlie!" Sara called as she had been doing from time to time. Her voice has begun to sound strained, she had called so often. "Charlie!" "Sara, do you know where we are?" Mary asked after a moment. "Of course. The lake's down there and the old shack's over there and you can see them as soon as we get up a little higher." "If we get up a little higher," Mary said in a tired voice.

15. HOUR means _____

16. DOWN means _____

# APPENDIX B

Name:_____ Grade 3 or 6 (circle one)

Directions

Below you will find 16 words. Read each word carefully then write what you think the word means in the space provided. Do one at a time. Take your time and do your best.

1. SILENT means_____

2. RAIN means_____

3. MOVIE means_____

4. ROOM means_____

5. ELEGANCE means_____

6. TIMES means_____

7. HELTERSKELTER means _____

8. LOLLING means_____

9. ASPIRINS mean_____

10. GRIMACED means_____

11. CONTEMPTUOUS means _____

12. CATAPULTED means_____

13. FAT means_____

14. SLOUCHING means_____

15. HOUR means_____

16. DOWN means_____

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