With respect to reading vocabulary knowledge and deafness, this article addresses two broad questions: (1) Why is vocabulary knowledge related to reading comprehension ability? (2) How is reading vocabulary (i.e., word meanings) acquired? The article argues that the answers to these questions are best addressed by a vocabulary acquisition model labeled the knowledge model. In essence, this model asserts that both breadth and depth of vocabulary knowledge are critical. It is necessary to teach vocabulary, especially to poor readers, who are not likely to derive many word meanings from the use of context during natural or deliberate reading situations. On the basis of theoretical and research syntheses, the article offers implications for vocabulary instruction for deaf children and adolescents.

The low English reading achievement level of deaf students (i.e., with severe to profound hearing losses) has been well documented in the research and scholarly literature (e.g., see research syntheses in King & Quigley, 1985; Paul & Quigley, 1994; Paul, forthcoming). It is suspected that these low levels are attributed to several language variables, one of which is reading vocabulary knowledge (Davey & King, 1990; LaSasso & Davey, 1987; Paul & Gustafson, 1991; Paul & O'Rourke, 1988). Although it is generally accepted that good readers have large reading vocabularies, there is much debate on two broad questions: (1) Why is vocabulary knowledge related to reading comprehension? (2) How is reading vocabulary (i.e., word meanings) acquired?

This article addresses these two questions relative to both hearing and deaf children and adolescents. Although each question, by itself, has been the focus of much research activity (at least for students with normal hearing), there is a need to synthesize these broad research activities, especially for understanding and improving the reading vocabulary knowledge of deaf children and adolescents. The intent here is to show that the knowledge model of vocabulary acquisition is most tenable for understanding and increasing the reading vocabulary knowledge of students, which, in turn, should lead to an improvement of their reading comprehension ability.

With respect to vocabulary instruction, a synthesis of current theory and research does not support the bulk of practices used with both hearing (e.g., Beck & McKeown, 1991; Nagy, 1988) and deaf students (e.g., Conway, 1990; Dolman, 1992; Paul, 1989; Paul & Gustafson, 1991). In many instances, teachers might provide the students with a list of words and require them to pronounce or sign the words and to use them in short sentences. The assumption is that the students need to know the word and its meaning only as it is used in a particular story. “Knowing a word” means being able to pronounce or sign the word and to use it in a short sentence. Nevertheless, these procedures yield only a “partial” knowledge of words (Nagy, 1988). Very little time is spent on discussing words and their
meanings in depth. For example, there might be little or no discussion about the additional meanings of a word, its relations to other words, or its metaphorical or figurative usage. From another perspective, teachers influenced by a pure whole-language philosophy might spend little or no time on vocabulary instruction. Specifically, they do not present or discuss vocabulary words prior to a reading activity (e.g., for deaf students, see Dolman, 1992).

These prevalent approaches above ignore the merits of starting with what students know about the target words and using this information to expand students' overall vocabulary knowledge and understanding of other concepts in the reading materials. In other words, in order to deal with unknown information, students should be encouraged as much as possible to discuss and relate this difficult information to what they already know (e.g., Nagy, 1988; Pearson, 1984, 1985). An in-depth discussion of words (both known and unknown) and related concepts is important for helping many poor readers and some good readers activate, enrich, and apply relevant prior knowledge before and during reading to maximize their understanding of the text. Often overlooked is the fact that an in-depth discussion of words provides more than just an understanding of the words themselves.

The plan for this article is as follows. First, relative to the first question, there is a brief discussion of the three major vocabulary acquisition theories. Next, a representative sample of research on vocabulary is synthesized, especially in relation to vocabulary instruction and the use of context in deriving word meanings. The research on vocabulary instruction provides additional insights into the first question. With respect to the second question, the research on the use of context cues addresses when and why direct vocabulary instruction is important for students. Finally, based on the theoretical and research syntheses, I present implications for vocabulary instruction for deaf children and adolescents.

Vocabulary Knowledge and Reading Comprehension

There is no general consensus on why vocabulary knowledge is important for reading comprehension (see research reviews in Anderson & Freebody, 1979, 1985; Paul, forthcoming; Stahl & Fairbanks, 1986). Only a few experimental studies have been conducted on the effects of vocabulary instruction on reading comprehension (for hearing students, see reviews in Beck & McKeown, 1991; Stahl & Fairbanks, 1986; for deaf students, see Paul, 1984, forthcoming; Paul & O'Rourke, 1988). It should be kept in mind that the effect of vocabulary instruction is also complicated by on-going debates concerning the answers to questions such as these: What is a word? What is a meaning? What does it mean to know a meaning? What does it mean to know a word? (Anderson & Nagy, 1991; Beck & McKeown, 1991).

Beck and McKeown (1991) offer an interesting perspective on the question of what it means to know a word:

The question of what it means to know a word draws two kinds of responses: One pertains to how information about word meanings is represented in memory. The other response involves the extent or dimension of knowledge that people may have about individual words. (p. 791)

The latter response has been the focus of the work of Beck and McKeown (1991) and is of relevance here because of the implications for understanding the notion and value of vocabulary instruction and its importance for developing reading ability.

Three basic models have been proffered to explain the relationship between word knowledge and reading ability: instrumentalist, aptitude, and knowledge (Anderson & Freebody, 1985; Mezynski, 1983). Underlying these three positions is an access condition, which is critical for all vocabulary models (Mezynski, 1983). The access condition refers to the word identification skill of readers, which, albeit important for reading vocabulary knowledge, is beyond the scope of this article.

The salient tenet of the instrumentalist model is that individuals who are good readers possess large vocabularies. This is evident by the relationship between high vocabulary scores and high reading comprehension scores on standardized tests. This model suggests a causal relationship between word knowledge and reading ability. That is, the more words an individual knows, the easier it is for that person to comprehend reading materials. Within this framework, a great deal
of emphasis is placed on the direct instruction of and exposure to as many words as possible. Instrumentalists have not adequately explained how and why the vocabulary knowledge is acquired; they have only emphasized the effects of such knowledge on reading ability as determined by the scores on standardized tests.

Proponents of the second model, the aptitude position, argue that individuals with large vocabularies possess excellent mental agility, and this, in turn, facilitates the comprehension of reading materials. The influence of this model can be seen in what used to be a common practice: the use of vocabulary tests as measures of intelligence (Anderson & Freebody, 1979, 1985). Because aptitude proponents are likely to favor the effects of heredity, they do not place much stock in vocabulary instruction as a tool for improving reading comprehension ability. Anderson and Freebody (1985) provide a good description of this position with reference to the results of a standardized vocabulary test:

The essential claim of the aptitude hypothesis is that persons with large vocabularies are better at discourse comprehension because they possess superior mental agility. A large vocabulary is not conceived to be involved in a direct way in better text understanding in this model. Rather vocabulary test performance is merely another reflection of verbal ability and it is verbal ability that mainly determines whether text will be understood. (p. 346)

The third position, the knowledge model, has been influenced by a group of reading theories known as schema-interactive theories (Anderson & Freebody, 1985; Paul forthcoming; Paul & O’Rourke, 1988). This model attempts to address both of Beck and McKeown’s notions about words: representation in the mind and extent of knowledge about words. The basic tenets of this model are that (1) knowledge is structured or integrated and consists of conceptual sets of interrelationships, not of isolated or independent lists of facts, and (2) understanding of new information is dependent upon the relation of this new information to old information, that is, what is already known by the reader.

To illustrate these points, consider a reader who encounters a simple word such as cat. The reader is not likely to think about the dictionary definition of this word. To come to an understanding of this word as it is used in a story, a reader will retrieve some or all conceptual associations (i.e., interrelated knowledge structures) this word has for the concept (or object) cat. Conceptual associations include aspects such as examples (i.e., Siamese, Persian, or pet names—Buster, Allegro), class (e.g., feline, mammals), characteristics (e.g., having fur and four legs), and properties (e.g., meows, ingests oxygen and food).

The notion of conceptual associations, or interrelated knowledge structures, especially as used in instructional situations involving multiple exposures and meaningful interactions, has been employed in several models of language and text processing (e.g., Just & Carpenter, 1987; Nelson, 1991; Sharkey, 1990). Conceptual, or interrelated knowledge, associations have also been known by several labels in the theoretical and research literature: beta structure, plan, schema, frame, and script (e.g., Bobrow & Collins, 1975; Rumelhart, 1980; Schank & Abelson, 1977). Returning to the example above, the concept of cat becomes instantiated or represented through the reader’s retrieval and application of the interrelated associations of knowledge links (e.g., meanings, nuances, and related concepts). This representation is a reflection of the reader’s personal and world experiences (real or imaginary) with the “word” (i.e., object, picture, etc.) in conjunction with his or her interpretation of the use of this word in a particular context.

Within a knowledge model, vocabulary knowledge is viewed as the integration of conceptual or interrelated associations of a particular word, which is interpreted as an in-depth knowledge of the word. According to the model, an extensive and in-depth knowledge of words is critical for and reflective of reading comprehension ability. One way to characterize this extensive and in-depth knowledge of words is to discuss readers’ “ownership” of words or a movement toward ownership (Pearson, 1984, 1985). Ownership is a lifelong activity and refers to readers’ attempts to develop a deep working knowledge of words. As readers move toward ownership, they acquire a number of meanings, concepts, nuances, examples, uses, and associations related to individual words. It is this totality of knowledge that plays a critical role in the comprehension of written texts. Thus, it is not only the individual meanings of words that are important but also the en-
tire "conceptual framework" surrounding the words and their meanings. For example, if readers know the phrase *squeeze play*, it is also likely that they know many concepts about the game of baseball.

As mentioned previously, these conceptual frameworks are also known as prior or background knowledge of readers (e.g., see Anderson & Pearson, 1984). There is substantial research showing that prior knowledge of a topic, particularly an extensive knowledge of key vocabulary words, is a better predictor of text comprehension than any other measure of reading achievement (Johnston, 1984; Johnston & Pearson, 1982; see also review in Pearson, 1985). It can be argued that prior knowledge and vocabulary development go hand in hand. Readers' vocabulary knowledge serves as a means for labeling ideas (or knowledge structures, or schemata) that already exist in their minds. In any case, one of the most important implications of the knowledge model is that "knowledge" of words refers to more than just "partial" knowledge of single, individual meanings.

Vocabulary and Reading Comprehension: Hearing Students

Relative to hearing students, there have been several experimental investigations on the effects of familiar and unfamiliar text vocabulary on reading comprehension. If text word knowledge is critical for text comprehension, at least two hypotheses can be tested (Anderson & Freebody, 1979, 1985). One, texts should either be easier or more difficult to understand based on the substitutions of easier or more difficult words. Two, teaching students about the more difficult, unfamiliar vocabulary words should enhance text comprehension. In these studies, easy words were operationally defined as those of high frequency levels whereas difficult words were those of low frequency levels.

In general, the early studies on direct text vocabulary instruction showed that there are positive effects on increasing word knowledge and this, in turn, enhances sentence comprehension (e.g., Pany, 1978). However, the effect of vocabulary instruction on connected discourse (i.e., story comprehension) was equivocal. A few researchers reported beneficial effects of instruction on text comprehension (e.g., Kameenui, Carnine, & Freschi, 1982; Marks, Doctorow, & Wirtrock, 1974). On the contrary, much of the research seems to indicate little or no substantial improvement (Pany & Jenkins, 1978; Pany, Jenkins & Schreck, 1982; Tuinman & Brady, 1974).

More recently, there have been a number of investigations that have documented the effects of direct text vocabulary instruction on both sentential and text comprehension (Baumann, 1986; McKeown, Beck, Omanson, & Perfetti, 1983; McKeown, Beck, Omanson, & Pople, 1985; Stahl & Fairbanks, 1986; Wixson, 1986; see also the reviews in Beck & McKeown, 1991; Heimlich & Pittelman, 1986; Nagy, 1988). Researchers have suggested several factors that might have contributed to the discrepant findings between the early and later studies. Some of these factors include proportion of words taught, number of times the words are encountered in passages (e.g., word frequency), degree of word difficulty, depth of word knowledge (e.g., multimeaning words), passage length, and method of instruction (Beck & McKeown, 1991; McKeown, 1985; Wixson, 1986). In addition, two of the strongest factors influencing the discrepancy were word frequency and depth of word knowledge. With respect to these two major factors, it has been argued that the research on vocabulary knowledge and reading comprehension can best be explained within a knowledge framework, which, as discussed previously, avers the importance of both breadth and depth of vocabulary knowledge for reading comprehension ability (e.g., see discussion in Pearson, 1994, 1995; Paul, forthcoming; Paul & O'Rourke, 1988).

An in-depth knowledge of words (i.e., both breadth and depth) might be related to the type of vocabulary instruction employed. For example, a major reason why text vocabulary instruction in the studies discussed above failed to demonstrate measurable gains in reading comprehension is that this instruction did not lead to a sufficient depth of vocabulary knowledge. At best, students only obtain a partial knowledge of words because of the use of methods such as definitions, with some combination of looking words up, writing them down, memorizing them, and using them in sentences. Another common method, known as context cue analysis, involves inferring the meaning of a new word from the context. That is, words were often situated in con-
trived (or naturally occurring) sentences; and students were expected to derive the meaning by analyzing the context surrounding the word (i.e., the rest of the sentence).

Several of the studies discussed above, which show benefits of text vocabulary instruction, promote an in-depth knowledge of words based on instructional methods influenced by the knowledge model, for example, semantic maps, semantic feature analyses, word maps, and other semantic elaboration techniques (see examples in sources such as Heimlich & Pittelman, 1986; Johnson & Pearson, 1984; Nagy, 1988). I argue that the instructional use of semantic elaboration techniques is effective because these techniques reflect how knowledge is organized in the mind, according to the basic tenets of the knowledge model. As discussed previously, word concepts might be arranged in memory in categorical structures that are hierarchical in nature. Deep knowledge of words also represents knowledge of other related concepts, many of which might be associated with the topic of a reading passage. Relative to hearing children, there are a number of studies that have documented the superiority of semantic elaboration techniques, particularly semantic mapping, over any other vocabulary instructional technique (e.g., see research reviews in Heimlich & Pittelman, 1986; Johnson, Toms-Bronowski, & Pittelman, 1982; Nagy, 1988).

Vocabulary and Reading Comprehension: Deaf Students

Similar findings can be found in the few research studies on text vocabulary knowledge and deaf students. Based on the results of standardized reading tests, several researchers have documented a correlational relationship between text vocabulary knowledge and reading comprehension. A typical task for assessing text vocabulary knowledge in these studies involves items in which target words are presented in sentences, and students are required to select the correct meaning (usually a synonym or short phrase) from a list of alternatives (i.e., responses). For example, in an investigation that is representative of this pattern, Balow, Fulton, and Peploe (1971) studied students who were between 13 and 21 years old and whose hearing losses ranged from 40 dB to 100 dB or greater (i.e., based on a pure-tone average of the better unaided ear). The findings reveal both low text vocabulary scores and low reading achievement scores on the Metropolitan Achievement Test. Balow et al. suggested that a correlational relationship existed between these two areas. That is, the researchers observed that students who obtained low scores on the Vocabulary subtest also obtained low scores relative to an overall reading comprehension level.

In another representative study, Quigley, Stein-kamp, Power, and Jones (1978) documented the results of the Stanford Achievement Test (SAT), normed on hearing students. The subjects in this study were students with profound hearing losses between the ages of 10 to 18 years, inclusive. On the Word Meaning subtest (i.e., text vocabulary knowledge), the authors reported that the gain score for the nine-year period (10 to the end of 18 years) was 1.1 grade. The SAT reading grade equivalent of the oldest students was 3.6. Despite the adaptations and norms developed for the Stanford Achievement Test-Hearing Impaired Version (SAT-HI), these low text vocabulary scores (based on the vocabulary subtests) and low reading achievement scores (overall reading scores) have persisted into the 1970s, 1980s, and 1990s (e.g., Allen, 1986; CADS, 1991; King & Quigley, 1985; Paul & Quigley, 1994; Trybus & Karchmer, 1977). These results continue to show a strong correlation between vocabulary knowledge and reading comprehension.

Similar to the studies on hearing students, researchers on deaf students have also been interested in whether direct text vocabulary instruction leads to improved reading comprehension on both the sentential and text (i.e., connected discourse) level. Compared to the research on hearing students, there are few studies in this area. In one early representative study, Letourneau (1972) evaluated the effects of two instructional methods for teaching words with multiple meanings. Eighty students, with at least a 70 dB loss in the better unaided ear and in grades four through six, served as subjects. The students were selected from one oral school and three schools that used simultaneous communication (i.e., speaking and signing simultaneously). Students and instructors were randomly assigned to one of six experimental or control groups. Students in the experimental groups were provided with specific
instructions and exercises on the words with multiple meanings that appeared in their reading selections. Instructions included discussing the various meanings of words and using them in different sentences. In addition, the students had a number of exposures to the words in the exercises. Students in the control group also read the same materials' containing these multimeaning words; however, they were not provided with any special instructions or exercises.

Letourneau (1972) reported that instruction of multimeaning words had a positive effect on the students' ability to comprehend the passages (i.e., connected discourse) containing the words. The beneficial effects, however, were dependent upon the need for numerous experiences and exercises in dealing with the multimeaning words. This focus on multimeaning words, in conjunction with the type of instruction employed, supports the importance of depth of vocabulary knowledge, as indicated by the knowledge model.

On the contrary, in a later representative study, no positive effects of text vocabulary instruction on sentential text comprehension were found. Robbins and Hatcher (1981) administered reading comprehension tests to 36 students whose hearing losses ranged from severe to profound (better unaided ear) and whose ages ranged from 9 to 12 years. One half of the students were placed in an experimental group, in which they received vocabulary training. In retrospect, this training could be labeled as the definition-and-sentence approach or the definition-and-contextual approach (Nagy, 1988; Paul & Gustafson, 1991; see also, the discussion in the Implications section of this article). In this approach, the focus was on single meanings of words. The authors concluded that the reading comprehension scores of the experimental group did not improve with training. No specific reason for this lack of improvement was proffered.

The discrepancy between these two representative studies has been addressed by a more recent study. For example, LaSasso and Davey (1987) argued that the findings of the Robbins and Hatcher (1981) study were due to a small sample size and to the task of reading comprehension used—that is, “single, unrelated sentences” (p. 212). These researchers examined the relation between text vocabulary knowledge and reading comprehension in students with a profound hearing loss (85 dB or greater in the better unaided ear) and between the ages of 10 and 18 years, inclusive. The measures used were the Vocabulary subtest of the Gates-MacGinitie Reading Tests, 1972 edition, and the reading comprehension subtests of the SAT, the 1973 norms. The tasks included a cloze procedure and four question-answering conditions—multiple choice, free response, look back condition (i.e., subjects could read the passage as often as necessary), and no look back condition (i.e., subjects could not read the passage more than once).

The researchers documented a strong correlation between text word knowledge (i.e., breadth of knowledge) and reading comprehension. Similar to the finding for hearing students, it was shown that vocabulary knowledge was a strong predictor of reading comprehension ability. One of LaSasso and Davey’s (1987) conclusions was:

Practitioners should be aware that there appears to be more of a relationship between lexical knowledge and reading comprehension for hearing-impaired students than previously empirically established. Although this relationship has yet to be established as causal, practitioners should not ignore the lexical abilities of their students. (p. 218)

The findings of LaSasso and Davey have been supported and elaborated upon by the work of Paul and his collaborators (Paul, 1984, 1987, 1989; Paul & Gustafson, 1991; see also reviews in Paul & Quigley, 1994; Paul, forthcoming; for related research on hearing children, see Paul, Stallman, & O’Rourke, 1990). For example, Paul and Gustafson (1991) examined both hearing (aged 8 to 10 years, inclusive) and deaf students’ (90 dB or more in the better unaided ear and aged 10 to 18 years, inclusive) comprehension of 45 words with multiple meanings on a picture vocabulary test. On this test, each item contained one target word and five possible responses (i.e., contextual illustrations, or pictures). Subjects were required to select the best answer(s) that illustrated the meaning(s) of the target word. Similar to previous studies (e.g., Letourneau, 1972; MacGinitie, 1969), Paul and Gustafson selected high-frequency, multimeaning words, that is, words that were within the 10,000th frequency level (Carroll, Davies, & Richman, 1971). These high-
frequency multimeaning words were considered important because of their prevalence in commonly used reading materials for both young hearing and deaf students (e.g., see discussions in Johnson, Moe, & Baumann, 1983; Paul, 1984). Examples of the selected words included ball, change, fountain, quarter, and weave.

Paul and Gustafson were interested in the performances of both hearing and deaf students on selecting one meaning and two meanings of the same words. They were also interested in whether text vocabulary knowledge (i.e., knowledge of single or multiple meanings) increased with age and was related to reading comprehension ability (i.e., scores on standardized achievement tests). As expected, the hearing subjects performed significantly better than the deaf subjects on selecting one meaning and two meanings of the same words. In addition, both groups selected the primary meanings more often than the secondary meanings. Surprisingly, the scores of the subjects on selecting two meanings of words did not improve with age. Finally, Paul and Gustafson documented a strong correlation between both breadth and depth of vocabulary knowledge (scores on the picture vocabulary test) and reading comprehension (overall reading scores from the standardized achievement test). Because of the prevalence of multimeaning words in reading materials (e.g., Dale & O'Rourke, 1986; Johnson, Moe, & Baumann, 1983; Searls & Klesius, 1984), the researchers argued for direct instruction of common multimeaning words within a knowledge framework (see the discussion in the Implications section of this article).

Acquisition of Word Meanings: Instruction versus Context

Prior to discussing the debate on instruction versus context, it is necessary to identify two broad types of learning from contexts: deliberate and incidental (Jenkins, Stein, & Wysocki, 1984; Nagy, Herman, & Anderson, 1985). Deliberate learning refers to the situation in which an individual is asked to read a passage and derive the meanings of certain words, presumably unfamiliar words. Incidental learning refers to the natural situation of reading, in which an individual is acquiring meanings of words. There is some contentious debate on the relative merits of different types of vocabulary instruction (e.g., definition plus context vs. semantic elaboration techniques) and the two different types of learning from context.

It is becoming evident that text vocabulary learning is so complex that neither instruction (including semantic elaboration techniques) nor context can account for what readers know about words and how they acquire this knowledge (Beck & McKeown, 1991; Paul, forthcoming; Paul & O'Rourke, 1988). There is some speculation that scholars have underestimated the contributions of oral and speaking contexts (i.e., via the conversational form of a language) to the growth of word knowledge. There have been several studies on hearing students' learning of words during reading (i.e., context), either via incidental learning (e.g., Herman, Anderson, Pearson, & Nagy, 1987; Nagy, Anderson, & Herman, 1987; Nagy, Herman, & Anderson, 1985) or deliberate learning (e.g., Beck, McKeown, & McCaslin, 1983; Schatz & Baldwin, 1986). Only a few such studies exist for deaf students (e.g., deVilliers & Pomerantz, 1992; MacGinitie, 1969).

Acquisition of Word Meanings: Hearing Students

There is some evidence that incidental learning of words from context is more effective than any type of text vocabulary instruction (e.g., Nagy & Anderson, 1984; Nagy, Herman, & Anderson, 1985). Vocabulary instruction is said to account for only a small portion of words good readers learn from grades 3 through 12. Even poor readers are able to learn words from context. For both good and poor readers, the learning is said to occur in small increments.

The distinction between good and poor readers, however, is a critical one and has been clarified in a line of research on deliberate learning. If learning from context does occur, it is more evident for good readers rather than for poor readers, who are not likely to engage in wide reading, a condition necessary for the beneficial effects of context. In addition, it is not easy to learn difficult words from natural reading because much of the context does not provide sufficient information on the meanings of the words (Beck & McKeown, 1991; Graves, 1986; Graves & Slater, 1987; Schatz & Baldwin, 1986).

The problem with natural contexts becomes even
more apparent for words with multiple meanings. A word might be difficult if a secondary or less common meaning is encountered in reading materials. For example, in a classic study using hearing students in third and fourth grades as subjects, Mason, Kniseley, and Kendall (1979) explored the effects of multimeaning words on reading comprehension on a sentential level. For each of the 20 words selected, two sentences were created, one supporting the primary meaning and the other, the secondary meaning. Results indicated that the subjects selected the primary meanings more often than the secondary meanings. The subjects could not select the correct secondary meanings of words even in sentences providing adequate contextual information. The authors concluded that the subjects either did not know the secondary meaning or they did not pay sufficient attention to context. The findings of this study indicated that some hearing children seem to have problems selecting the most appropriate meanings of multimeaning words on a sentential level. In essence, the findings of Mason et al. (1979) have been supported by more recent studies on hearing students (e.g., Graves, 1980, 1986; Graves & Slater, 1987; Graves, Slater, & Cooke, 1980; Stahl & Fairbanks, 1986; see reviews in Beck & McKeown, 1991; Paul, forthcoming).

Acquisition of Word Meanings: Deaf Students

Not surprisingly, the use of context cues has presented pervasive problems for deaf students, many of whom are poor readers. In an early study on deliberate learning, MacGinitie (1969) evaluated the effects of context on both deaf and hearing students. The deaf subjects, selected from oral programs, ranged in ages from 9 to 20 years, and the mean dB level of the entire group was 88 dB in the better unaided ear. Examples of four test items were as follows:

(1) BEAR forest wild paw animal
(2) BEAR forest wild paw carry
(3) BEAR burden weight land carry
(4) BEAR burden weight land animal

In these examples, the two common meanings of bear are “animal” and “carry.” MacGinitie hypothesized that the students might most likely recognize “carry” as one meaning in a supportive context, as in Item 3 rather than Item 2. The context of the second item should persuade the students to select a meaning that is different from the present one.

Thus, the researcher compared the number of correct responses to items with misleading contexts to the number of correct responses to items with supportive contexts. MacGinitie reported that context (misleading or beneficial) had no effect on the performance of the deaf subjects. On the other hand, the scores of the hearing students were depressed by the misleading contexts. The implication is that the deaf students might not have had the ability to use context cues effectively.

In a more recent study, deVilliers and Pomerantz (1992) examined students whose unaided hearing loss was prelingual and ranged from 71 to 120 dB (better ear average). The ages of the subjects ranged from 10 years, 11 months, to 18 years, 7 months. The researchers conducted two studies relative to the school level of the students. In Study 1, the students were selected from an upper level (i.e., high school) of an oral school. In Study 2, the oral students were from a middle level of the oral school, and the total-communication (i.e., Signed English) students were selected from a school for the deaf. The reading comprehension (SAT-HI) grade level of the upper school students ranged from 2.8 to 12.4 (mean = 5.7). The reading grade level of the oral middle school students ranged from 1.6 to 3.9 (mean = 2.8), whereas the reading grade level of the total-communication middle school students varied from 2.2 to 4.8 (mean = 3.1).

DeVilliers and Pomerantz studied the abilities of the students to derive both lexical (i.e., meaning) and syntactic (i.e., form class) information for unknown words embedded in short passages reflective of three types of context: lean, rich, and explicit. The lean contextual condition provided very little information about the word whereas the rich contextual condition provided a great deal of information. The explicit contextual condition provided “a clear contrast or equivalence statement” (p. 414). Examples of these conditions for the middle school group were as follows:

Study 2—Middle School—Eerie

Lean

The boy painted a picture of an eerie house in his art class. He took it home to show his mother and father.
The old house on the hill was an eerie place. It was dark and it had broken windows, and it looked like ghosts lived in it.

In the daytime the woods look safe and friendly, but at night they can be an eerie place. The trees look strange and scary in the dark. (p. 415)

The results indicated that students with hearing losses could use the highly informative contexts (i.e., rich or explicit) to derive a partial meaning of the words. This ability was strongly related to their reading comprehension level; that is, good readers performed significantly better than poor readers. It was observed that poor readers had difficulty with the explicit contextual condition. The researchers hypothesized that this might be due either to their inability to use the syntactical information in the sentences or to the use of an inadequate reading strategy (e.g., location of a key word or phrase). It should be noted that both good and poor readers had difficulty inferring syntactic information about the words (e.g., form class or correct syntactic usage).

DeVilliers and Pomerantz, like the researchers discussed previously who studied poor readers who can hear, remarked that:

many hearing-impaired students are caught in a vicious circle: their impoverished vocabularies limit their reading comprehension, and poor reading strategies and skills limit their ability to acquire adequate vocabulary knowledge from context. (p. 428)

In sum, some hearing and many deaf students have difficulty inferring meanings of words from context, either in an incidental or deliberate learning situation. For good readers and for some poor readers, it appears that the use of context cues is most effective or facilitative when the target words are redundant with the rest of the passage (i.e., in context-rich or explicit environments) and when these words contribute little information to the story. One of the most effective compensatory strategies is to read extensively and widely, something poor readers do not attempt either inside or outside the school setting. In addition, the inadequate ability to use context cues reflects difficulty in other written language variables, notably, orthography, morphophonology, syntax, and breadth and depth of vocabulary knowledge (for deaf students, see research summaries in Hanson, 1989, 1991; Leybaert, 1993; Paul, forthcoming; Paul & Quigley, 1994).

The issue of use of context and text vocabulary instruction should not be construed as an either-or issue. Context skills can be most effective when they are combined with direct text vocabulary instruction and classroom discussions of words, word meanings, and related concepts (for hearing students, see Car- nine, Kameenui, & Coyle, 1983–1984; Carroll & Drum, 1983; Jenkins, Pany, & Schreck, 1978; Stahl, 1986). The types of direct text vocabulary instruction that seem to be most effective are those that emphasize semantic elaboration and fit, as discussed in the next section.

Implications

Based on the syntheses of the research on the relationship between text vocabulary knowledge and reading comprehension level and that on the acquisition of word meanings from context, it must be concluded that text vocabulary instruction, at least, is necessary for poor readers, which includes many deaf readers. This does not mean, of course, that deaf students do not need instruction in other areas of reading. However, one of the most important goals of instruction is to enable deaf and poor readers who can hear to become independent word learners.

It should be emphasized that text vocabulary instruction for deaf and other students needs to move away from the traditional approaches, for example, definition or definition-and-contextual (or -sentence) approaches (e.g., see discussions in Nagy, 1988; Paul, 1989; Paul & Gustafson, 1991; Paul, forthcoming). In traditional definition-and-contextual approaches, the teacher might have a list of words that are important for students to "know the meanings of" prior to a language or reading lesson. After practice with pronouncing and signing the words and learning the particular, common meanings, students might be required to use the words in sentences. For example, the student might write "very sad" as a meaning for the word tragic and create a sentence such as the following: "This is a tragic event."
Pearson (1984) and others (e.g., Nagy, 1988; Paul, 1989) have argued that the preceding example indicates only that students can repeat a particular definition and are probably guessing that tragic can supplant very sad in sentences such as: This is a ______ story; Susan is a ______ girl. Obviously, supplanting tragic for very sad is not appropriate for all sentences. More important, students have not really moved toward ownership of the word and are likely to be confused by the following example (Nagy, 1988, p. 5): "Too bad! The tragic poet is ill again. It must be a bad fever this time, for they're trying smoke fumes instead of medicine."
The focus on single meanings in traditional text vocabulary lessons does not facilitate the development of depth of vocabulary knowledge. In addition, as argued previously, these approaches do not have substantial theoretical or research support.

The use of traditional vocabulary approaches with deaf students has also been noted and criticized by Conway (1990):

Traditional programs of learning definitions for lists of words should give way to learning words in semantically rich contexts. The contexts can serve as bridges to old information and as foundations for developing further conceptual interrelationships. . . . Such rich contexts should also include use of semantic mapping . . . and adaptations of networking strategies. (p. 346)

Conway's remarks are based on the major tenets of the knowledge model, as discussed previously.

Similar remarks have been echoed by Paul and Gustafson (1991):

Vocabulary instruction should help broaden and deepen students' understanding of a word and its conceptual framework by (a) relating the word to students' previous experiences, (b) providing numerous opportunities for encountering the word so that the word and its meanings become easily accessible during reading of texts and (c) creating numerous opportunities for students to use the word meaningfully. The three terms associated with these concepts are, respectively, integration, repetition, and meaningful use. . . . (p. 59)

The word integration refers to the use of "networking strategies" (Conway, 1990) such as semantic maps, word maps, and semantic features analyses. Numerous examples of these techniques can be found in several sources (Heimlich & Pittelman, 1986; Johnson & Pearson, 1984; Nagy, 1988). Repetition and meaningful use refer to the encounters of words in deliberate and natural learning contextual situations. However, to maximize the benefits of context, deaf students will need instruction in other aspects of the reading process, as well as in reading vocabulary knowledge.

Conclusion

In this article, I argue that the knowledge model offers the most plausible explanation for understanding the relationship between vocabulary knowledge and reading comprehension and, in part, how reading vocabulary word meanings are acquired. The knowledge model avers that both breadth and depth of vocabulary knowledge are important for reading comprehension. It is critical to underscore the facilitative effects of depth of vocabulary knowledge, which, in effect, refers to the storehouse of knowledge pertaining to words and their meanings. This storehouse represents organized, interrelated information, which includes meanings, nuances, figurative usages, and related concepts.

I also argue that, for some hearing students and for most deaf students, it is important to "teach" vocabulary. To develop depth of vocabulary knowledge, teachers should avoid the use of traditional definition-and-contextual approaches and focus on approaches that can be labeled semantic elaboration. Semantic elaboration approaches enable readers to move toward ownership of a word. According to Pearson (1984), these approaches emphasize where a word fits in children's semantic repertoire rather than what it means or how it is used in sentences. That's what it means to own a word—to know what it is like and how it is different from other words that a child already knows. (p. 16)

References


Austin, TX: The Psychological Association for Children and Adults with Learning Disabilities, Indianapolis, IN. (ERIC Document Reproduction Service ED 301 983).


primary students and ways to teach them. Reading Psychology: An International Quarterly, 5, 55–63.