

Research Round-Up

Words Are Learned Incrementally Over Multiple Exposures

Steven A. Stahl

We live in a sea of words. Most of these words are known to us, either as very familiar or at least as somewhat familiar. Ordinarily, when we encounter a word we don't know, we skip it, especially if the word is not needed to make sense of what we are reading (Stahl, 1991). But we remember something about the words that we skip. This something could be where we saw it, something about the context where it appeared, or some other aspect. This information is in memory, but the memory is not strong enough to be accessible to our conscious mind. As we encounter a word repeatedly, more and more information accumulates about that word until we have a vague notion of what it "means." As we get more information, we are able to define that word. In fact, McKeown, Beck, Omanson, and Pople (1985) found that while four encounters with a word did not reliably improve reading comprehension, 12 encounters did.

What happens when someone sees a word for the first time in a book? Consider the following paragraph from the *Atlantic Monthly*:

America's permanent election campaign, together with other aspects of American electoral politics, has one crucial consequence, little noticed but vitally important for the functioning of American democracy. Quite simply, the American electoral system places politicians in a highly vulnerable position.

Individually and collectively they are more vulnerable, more of the time, to the vicissitudes of electoral politics than are the politicians of any other democratic country. Because they are more vulnerable, they devote more of their time to electioneering, and their conduct in office is more continuously governed by electoral considerations. (King, 1997)

Although I had seen the word *vicissitudes* before, I did not know its meaning. From the context, one can get a general picture of what it means, something like "serendipitous happenings." My *Random House Dictionary* (1978) says "unexpected changing circumstances, as of fortune," so I was fairly accurate in my guess.

When a word is encountered for the first time, information about its orthography (or spelling) is connected to information from the context, so that after one exposure a person may have a general sense of the context in which it appeared ("It has something to do with..."), or a memory of the specific context ("I remember seeing it in an automobile manual"), but not a generalizable sense of the meaning of the word. Dale and O'Rourke (1986) talk about four "levels" of word knowledge:

1. I never saw it before.
2. I've heard of it, but I don't know what it means.
3. I recognize it in context--it has something to do with...
4. I know it.

In ordinary encounters with a word in context, some of the information that is remembered will be reinforced. The information that overlaps between encounters is what is important about the word. Other information will be forgotten. The forgotten information is more incidental. With repeated exposures, some connections become strengthened as that information is found in repeated contexts and become the way the word is "defined."

Consider the word *vicissitudes* in the above context. The concept of *vicissitudes* will likely be linked to other concepts in the context, such as "politicians," "electoral politics," or possibly to the whole scenario presented. Because of the syntax, we know that *vicissitudes* does not directly mean "politics," but is a characteristic of politics. As the word is encountered repeatedly, it will be associated with other concepts, possibly "romance" or "getting a job." (Or as the mother of one of my students told her repeatedly while growing up, "Beware of the vicissitudes of life.") These become the strong components of the concept, such as might be represented in a dictionary definition (McKeown, 1991). If the links to other concepts are not repeated, they may recede in importance. Given the core meaning of the word *vicissitudes*, the fact that the subject of the essay is politics is incidental and likely would be forgotten with repeated exposures.

As a person encounters the word again and again, word meaning grows at a relatively constant rate, dependent on the features of the context. That is, people show as much absolute gain in word knowledge from an unknown word as they show from a word of which they have some partial knowledge, all other things being equal (Schwanenflugel, Stahl, & McFalls, 1997). We found that students made the same amount of growth in word knowledge from a single reading, whether they began by knowing something about a word or not. Thus, vocabulary knowledge seems to grow gradually, moving from the first meaningful exposure to a word to a full and flexible knowledge.

One does not always need to know a word fully in order to understand it in context or even to answer a test item correctly. Adults possess a surprising amount of information about both partially known and reportedly unknown words. Even when people would report never having seen a word, they could choose a sentence in which the word was used correctly at a level above chance or discriminate between a correct synonym and an

incorrect one (Durso & Shore, 1991). This suggests that people have some knowledge even of words that they reported as unknown, and that this knowledge could be used to make gross discriminations involving a word's meaning. Curtis (1987) found that people who reported only a partial knowledge of a word's meaning ("I've seen it before") could make a correct response to multiple-choice questions.

When a person "knows" a word, he knows more than the word's definition--he also knows how that word functions in different contexts. For example, the definition of the verb smoke might be something like "to inhale and puff the smoke of (a cigarette, etc.)" (Random House, 1978). However, the verb smoke describes distinctly different actions in the following sentences:

- a. He smoked a cigarette.
- b. The psychologist smoked his pipe.
- c. The hippie smoked a marijuana cigarette.
- d. The 13-year-old smoked his first cigarette.

These all fit under the general definition, but the actions vary from a typical smoking action in (a), to a puffing in (b), to a deeper and longer inhaling in (c), to an inhaling followed by coughing and choking in (d). Children cannot learn this information from a dictionary definition. Instead, they need to see the word in many different contexts, to see how the word meaning changes and shifts.

Thus, to understand the word in (d) we need to know that 13-year-olds are generally novices at smoking and that smoking can make one cough, if one is not used to it. Some words are embedded in a single knowledge domain, such as *dharma* or *jib*. To understand *dharma*, one must understand at least some basic concepts associated with Hinduism or Buddhism. To understand *jib*, one must know something about sailing. These words are so

tied to their knowledge domains that they cannot be defined outside of them. (Some people, e.g., Johnston, 1984, have used vocabulary tests to measure domain knowledge.) Most words can be used in multiple domains but have distinct meanings within those domains. The word *obligation*, for example, has a series of related meanings, depending on whether the obligation is a moral one, or a payment due on a loan, and so on. Anderson and Nagy (1991) argue that words are polysemous, containing groups of related meanings, rather than a single fixed meaning. These meanings have a family resemblance to each other. Consider the word *give* in these different contexts (Anderson & Nagy, 1991):

John gave Frank five dollars.

John gave Mary a kiss.

The doctor gave the child an injection.

The orchestra gave a stunning performance.

All of these involve some sort of transmitting, with a giver, a recipient, and something, tangible or intangible, that is given. But the act of giving is radically different in each case.

A full and flexible knowledge of a word involves an understanding of the core meaning of a word and how it changes in different contexts. To know a word, we not only need to have *definitional knowledge*, or knowledge of the logical relationship into which a word enters, such as the category or class to which the word belongs (e.g., synonyms, antonyms, etc.). This is information similar to that included in a dictionary definition. In addition, we also need to understand how the word's meaning adapts to different contexts. I have called this *contextual knowledge*, since it comes from exposure to a word in context. This involves exposure to the word in multiple contexts from different perspectives. Children exposed to words in multiple contexts, even without instruction, can be presumed to learn more about

those words than students who see a word in a single context (Nitsch, 1978; Stahl, 1991).

Steven A. Stahl is professor of Curriculum and Instruction at the University of Illinois at Urbana-Champaign. Stahl's previous positions include senior scientist at the Center of the Study of Reading, principal investigator at the National Reading Research Center, and elementary school reading teacher in New York and Maine. Stahl has published numerous articles on all aspects of reading research and instruction. This article is adapted with permission from *Vocabulary Development*, part of *From Reading Research to Practice: A Series for Teachers*, Brookline Books, 1999.

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Learners size of their SL/FL vocabulary gradually develops in a number of ways, with multiple exposures to target words enhancing the process. We can infer that vocabulary learning is not limited to the meaning facet of word knowledge and that other facets of lexical knowledge are part of the learning process. This implies that the description of vocabulary knowledge based on the meaning aspect is not accurate and does not do justice to the complexity of word knowledge. (2009). Words are learned incrementally over multiple exposures: International Reading Association. Waring, R. (1997). A study of receptive and productive learning from word cards. Word learning happens incrementally; with each additional encounter with a word, depth of understanding accrues. Dale (1965) posited the existence of (at least) four incremental stages of word knowledge: Stage 1: Never having seen the term before. Word knowledge is a matter of degree and can grow over time. Incremental knowledge of a word occurs with multiple exposures in meaningful contexts. "For each exposure, the child learns a little about the word, until the child develops a full and flexible knowledge about the word's meaning. This will include definitional aspects, such as the category to which it belongs and how it differs from other members of the category"; Words and concepts in such material are beyond the everyday experience of children. In order to read, understand, and learn from these more demanding texts, the readers must be fluent in recognizing words, and their vocabulary and knowledge need to expand, as does their ability to think critically and broadly. If children are unable to make the transition from Stage 2 to 3, their academic success is usually severely challenged. Using this developmental stage model of reading, we focused a research study on the critical transition from Stage 2 to Stage 3 "from "learning to read" to "reading to l...". How Words Are Learned Incrementally Over Multiple Exposures (PDF) By Steven A. Stahl. Oral Comprehension Sets the Ceiling on Reading Comprehension By Andrew Biemiller. Multiple Exposures to Target Words A student's likelihood of learning a word increases each time he or she encounters and experiences the word. Word meanings are acquired incrementally over time, and children require multiple exposures to learn a word's meaning (Fukkink & de Glopper, 1999; Stahl, 2003). In Take Aim, students encounter each target word in several instances. They encounter the word each time they read the story, the definition, and the clarifying sentence. They also answer several questions that use the target words and complete activities related to each word. Derived words are extremely numerous in the English vocabulary. Successfully competing with this structural type is the so-called root word which has only a root morpheme in its structure. This type is widely represented by a great number of words belonging to the original English stock or to earlier borrowings (house, room, book, work, port, street, table, etc.), and, in Modern English, has been greatly enlarged by the type of word-building called conversion (e. g. to hand, v. formed from the noun hand; to can, v. from can, Ð). The four types (root words, derived words, compounds, shortenings) represent the main structural types of Modern English words, and conversion, derivation and composition the most productive ways of word-building.

Learners size of their SL/FL vocabulary gradually develops in a number of ways, with multiple exposures to target words enhancing the process. We can infer that vocabulary learning is not limited to the meaning facet of word knowledge and that other facets of lexical knowledge are part of the learning process. This implies that the description of vocabulary knowledge based on the meaning aspect is not accurate and does not do justice to the complexity of word knowledge. (2009). Words are learned incrementally over multiple exposures: International Reading Association. Waring, R. (1997). A study of receptive and productive learning from word cards. These core components include phonemic awareness, phonics and word study, fluency, vocabulary, and comprehension (National Reading Panel, 2000). Vocabulary knowledge is important because it encompasses all the words we must know to access our background knowledge, express our ideas and communicate effectively, and learn about new concepts. "Vocabulary is the glue that holds stories, ideas and content together" making comprehension accessible for children. (Rupley, Logan & Nichols, 1998/99). How Words Are Learned Incrementally over Multiple Exposures. S. Stahl. Psychology. The learners in the experimental group learnt the words through reading texts, and then they repeated them in different reading texts. That is to say, these students had the opportunity to meet the target words in different types of reading texts. Contrary to this, the learners in the control group encountered the words in reading texts only once, and then they repeated them in word lists out of context. A vocabulary test as pre-, post- and delayed post-test was used to measure vocabulary gain and retention. Mahwah, NJ: Lawrence Erlbaum. Stahl, S. A. (2009). Words are learned incrementally over multiple exposures. In M. F. Graves (Ed.), Essential readings on vocabulary instruction (pp.69- 71). Newark, DE: International Reading Association. Multiple Exposures to Target Words A student's likelihood of learning a word increases each time he or she encounters and experiences the word. Word meanings are acquired incrementally over time, and children require multiple exposures to learn a word's meaning (Fukkink & de Glopper, 1999; Stahl, 2003). In Take Aim, students encounter each target word in several instances. They encounter the word each time they read the story, the definition, and the clarifying sentence. They also answer several questions that use the target words and complete activities related to each word.