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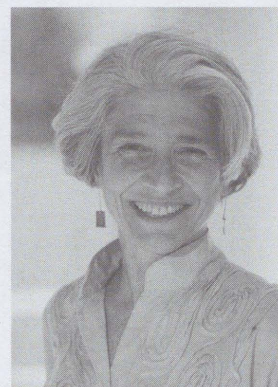
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The Role of Developmental Word Knowledge in Achieving Fluency

by Marcia Invernizzi



Marcia Invernizzi



What does it mean to be fluent in a language? Fluent speakers of a language can communicate easily without stumbling, mispronouncing words, or saying the wrong thing unintentionally. Language fluency also entails accurate, fluid understanding of what others say to you. A fluent listener can understand the words that are spoken, follow the conversation, ask questions, and interact with others in dynamic language exchanges. To be fluent in a language requires a large vocabulary, spontaneous understanding of discourse and sentence-level structures, and a nuanced understanding of metaphors and idiomatic expressions (e.g. *All the world's a stage; don't beat around the bush!*).

To be a fluent reader and writer of a language requires the same expertise. Fluent readers and writers have accurate, fluid understanding of what is written or what needs to be written to communicate effectively. They can readily read, write, and understand individual words in a text, follow or create the syntax of the narrative or exposition, monitor comprehension, and interact with text in dynamic intellectual exchanges. Fluent readers and writers can also apprehend and capitalize on the multiple meanings of words to understand and communicate through abstract, metaphorical, and idiomatic expressions.

Facility with discourse and sentence-level structures in narrative or expository texts, the ability to understand the meaning of words, idiomatic expressions and metaphors, and the ability to engage in dynamic intellectual exchanges of ideas all involve *word knowledge*. Sentences are made up of words. Ideas and information are communicated through words. Jokes, metaphors, and idiomatic expressions are all made possible by the multiple meaning, or polysemy, of words. Without word knowledge, fluency in speaking, listening, reading, or writing a language would not be possible.

Word knowledge can be defined as a constellation of linguistic information about words and the concepts they represent. Such information includes a concept of what a word is (as opposed to, say, a phrase), word meanings, pronunciations, the way they are used in sentences and texts, and all the connotations and concepts that might be associated with a word. The word *leg*, for example, might refer to a body part or a part of a piece of furniture. It is pronounced in most dialects as /l/-/ɛ/-/g/ but in some dialects as /l/-/e/-/g/. The word can be used as the subject of sentences like "*My leg hurts*" or metaphorically in sentences like "*I was just pulling your leg!*" Written word knowledge encompasses all of these elements plus information about the word's written form—what it looks like in print and how it is transcribed in writing. Regardless of which meaning, pronunciation, or use of the word *leg* is in play, it is always spelled l-e-g. Once the meanings, pronunciations, and variations of usage have been associated with l-e-g, the mere sight of that word's spelling spontaneously activates all of the existing information about that word known by the individual reader at that time. Word knowledge is key to developing fluency in reading and writing (Invernizzi & Hayes, 2004).

We aren't born with all the word knowledge we need to become fluent in a language, as speakers or as readers and writers. We acquire it gradually over time in response to language interactions that develop and refine word meanings, practice that exercises word use, and experiences that help us continuously hone our word concepts. Researchers have referred to this gradual process as *developmental word knowledge*. To understand fluency in reading and writing, we must understand:

(a) how written word knowledge develops—how it is that we develop an initial concept of word; (b) how our understanding of the way written words work to represent pronunciations and meanings can lead to sight word acquisition; and (c) how incremental increases in word knowledge, specifically orthographic or spelling knowledge, serve as a “bootstrapping” mechanism for self-teaching, independence, and fluency.

In the Beginning was the Word

As literate adults, we take the word “word” for granted. But did you know that in cultures that have no written language, there is no word for “word?” *Word* is a term specific to print and, as such, presents the first hurdle to overcome in order to access the highway of fluency. When we speak and listen, our mind is focused on the meaning of the communicative intent—not on the individual units of the speech production. But to learn to read, we must become aware of those units and figure out how they match up to print. This entails: (a) becoming aware that print can, in fact, represent speech; (b) becoming aware that speech can be divided into smaller segments, such words, syllables, onsets and rimes, etc.; and (c) achieving the alphabetic principle, the insight that words in speech can be divided into tiny units of sound (phonemic awareness) and that those sound segments can be represented systematically by letters of the alphabet (alphabet knowledge). These three things must coalesce through developing a concept of what a word is in print.

Unfortunately, this is not so easy. Early research by Karpova (1955), Holden & MacGinitie (1972), and others demonstrated that young children who do not yet read cannot reliably segment even spoken sentences into words; they confuse phrases such as *once upon a time* for words and they combine articles such as *a* or *the* with the noun that follows—*abird* or *thebed* is one word! (Of course! Since *a* or *the* have no meaning in and of themselves, they must be part of the bit that does mean something!) To add to the confusion, words can be made up of more than one syllable, they can have more than one meaning unit or morpheme, and the size of the referent may have no relationship to the size of the word. The word *grasshopper*, for example, consists of three syllables (*grass-hop-per*) and two morphemes

(*grass-hopper*) but it's only one word. In addition, *Grass-hopper* is a big word but refers to a very small insect. No wonder it is hard for emergent learners to understand what a word is, much less point accurately to words in a simple line of printed text—even a line they have memorized! To learn to read, children must reconcile these aspects of oral and written language.

Fortunately, learning about print concepts and conventions—such as learning that written words represent words in spoken language, that words are made up of letters, that they are processed from left to right (in English), that they are separated by white spaces, etc.—helps children get started in negotiating this speech-to-print typography. However, to synchomesh the mismatch of units between speech and print (e.g. words are more than one syllable; *once upon a time* is not one word), children must also learn to apply the alphabetic principle. When children can segment the beginning sound of a spoken word and match that sound to a letter, they can use that initial consonant to guide their finger-pointing in print. This is referred to as a *concept of word in text*, the ability to accurately point to individual words while reciting a memorized or familiar text. A concept of word in text is a “watershed event” in learning to read because, until children have a firm concept of word, they are not able to fully segment the phonemes within simple one-syllable words, and because of this, they are not able to fully decode text. Children must be able to hold steady in their mind's eye a word as an individual entity with a clear beginning and end in order to sound it out from left to right (Morris, 1993).

And the Word Was with Letters and Sounds

Researchers have also demonstrated that children who do not have a firm concept of word have difficulty remembering words out of context (Flanigan, 2007; Morris, Bloodgood, Lomax & Perney, 2003). Remembering words out of context is necessary to acquire *sight words*, or words whose pronunciation and meaning children immediately access from memory without having to sound them out (Ehri, 2005). Notably, Ehri's research suggests that words become sight words not through the holistic memorization of flash cards, but

from repeated opportunities to engage in the process of recoding letters into sounds, or graphophonic analysis (Metsala & Ehri, 2013). As children become more adept at graphophonic analysis, they become more capable readers, gradually depending less and less on recoding letter-sound correspondences to retrieve the pronunciations and meanings of printed words, and depending more and more on the spontaneous recognition of these words that are already stored in memory (i.e., sight words) (Ehri, 2014).

Acquiring a corpus of immediately known words is the first step toward becoming an independent, fluent reader. For beginners, sight words can serve as life rafts as they doggie paddle their way through text, strenuously decoding word-by-word, letter-by-letter. In reading, they see a letter then say a sound. In writing, the reverse is true—they say a sound then write a letter. Beginners' letter name-alphabetic approach to spelling as they write is slow and tedious and reflects their understanding of written words—their developmental word knowledge. If learners have only a tenuous grasp of the concept of word in text, their spelling will likely reflect only partial phonemic analysis—they may only represent the boundaries of words, B or BP for *bump*, for example. As they reconcile the conflicts that exist between spoken words and printed ones, their concept of a word in text will solidify, and as it does, their writing will reflect a fuller phonemic analysis in the beginning, middle and end positions. Their spelling of *bump*, for example may start to include a vowel and eventually, the nasal sound before the final consonant (e.g. BOP or BUP, then BUMP). The quality and completeness of the graphophonemic connections that are made will determine the smoothness and accuracy of the word's retrieval from memory, along with everything that is known about that word at that point in time. Perfetti (2007) refers to this as the "lexical quality hypothesis," a theory that explains the role word knowledge plays in the development of reading and writing fluency.

And the Word Begot Other Words

Once children figure out the basic one- and two- letter graphemes and their phonemic counterparts that constitute most single-syllable words, they begin to notice

certain letters that have no direct connection to a speech sound. These "silent" letters, such as the *e* in *lake* or the *i* in *train*, signal the phonemic value of a different vowel. To beginners acclimated to segmenting and blending letters in a serial fashion, this observation creates a conflict that pushes them to adopt a more efficient, hierarchical decoding strategy involving larger orthographic chunks. Since spelling patterns also distinguish word meanings even in words that are pronounced the same, this variance also exerts pressure to apply a more abstract level of analysis. Does *sail* or *sale* refer to the boat? As more words are learned, more connections are formed, and lexical restructuring continues.

Bear, Invernizzi, Templeton & Johnston (2016) refer to this insight as an awareness of within word patterns, where students first begin to recognize vowel and consonant patterns within syllables. Within word pattern learners are no longer tied solely to a serial alphabetic approach; now they can focus their attention on chunks of letter sequences. In spelling, students know they may need a letter *pattern* to represent a single vowel sound, and in reading, they look for patterns that relate to sounds and meaning. Ehri (1995) referred to this phenomenon as one of consolidation where students learn chunks of letter patterns and notice their reoccurrence across different words. Bear et al. (2016) refer to this phase as transitional because students are transitioning to more fluent reading and more flexible strategy use, including the chunking of recurring letter patterns and an increase in the use of analogies to other known words. Chunking is more efficient and results in faster word recognition, which, in turn, allows for silent reading (Invernizzi & Hayes, 2010).

Whereas beginners are preoccupied with decoding specific words, accumulated word knowledge and a growing store of sight words allow transitional students to generalize to other words that contain the same pattern. Transitional readers make a cognitive leap from the specific to the general. Some researchers refer to this phenomenon as a bootstrapping effect as students acquire a larger and larger sight vocabulary from which they extrapolate within-word features and apply that knowledge to new words as they are encountered

(Share, 1995). For example, if beginning readers know the words *drain*, *Spain*, and *rain*, they might be able to figure out the word *complain* even if they have never read it before. For the skilled reader, most words eventually do become automatically recognized as single units (Ehri, 2005). This effortless spontaneity allows readers to focus cognitive energy on the meaning of a text rather than on figuring out the pronunciation of individual words (LaBerge & Samuels, 1974). Bear (1992) described increases in the prosody and expression of oral reading, as well as increases in students' reading rates, once they have consolidated larger chunks of the orthography.

As students acquire an increasingly mature vocabulary, they begin to notice spelling-meaning connections among related words that indicate even more linguistic information about words, such as parts of speech, word origin, and nuances of meaning (*heal*, *health*, *healthy*). Fluent readers with more sophisticated word knowledge note the constancy and change of spelling and pronunciation across derivationally related words. For example, in the words *compose* and *composition*, the sound of the *o* changes in the noun form (*composition*) but retains the same spelling to signal its relationship in meaning to the verb (*compose*). Knowledge of prefixes and suffixes, and of other morphemes or meaning units such as Greek and Latin roots, enables students to generate meanings for thousands of words that share similar spellings or morphemes. For example, understanding the meaning of the word *recite*, and being cognizant of the fact that words related in spelling are often related in meaning, students can generate the meaning of *recital* or *recitation*, even if they hadn't known those words previously (Palmer & Invernizzi, 2015, p.26). These more advanced attributes of word knowledge continue to contribute to the development of silent reading fluency. Advanced word knowledge also contributes to fluency in writing. The nimbleness with which readers and writers understand the nuances of word meanings, follow and create more complex syntax at sentence and discourse levels, and interact intellectually with the logic, reasoning, or denouement of a plot or exposition, is a hallmark of what it means to be fluent in a language, spoken or written.

And the Words were with Form and Substance

Reading fluency has been defined variously as the accuracy and automaticity of word reading, the prosody and expression of oral reading, the demonstration of skilled reading (including silent reading), and the bridge to comprehension (Kuhn, Schwanenflugel & Meisinger, 2010). All these definitions characterize fluency as a connection between orthographic knowledge and comprehension; however, Perfetti's *lexical quality hypothesis* (2007) emphasizes that it is not just the automaticity of word recognition that influences prosodic reading and comprehension, but also the lexical quality of the word's representation in our lexicon, our dictionary in the head. *Lexical quality* refers to the mental representation of a word's multiple linguistic identities including attributes of pronunciation (phonology), meaning (semantics), and use (syntax). When all these attributes are absorbed and merged with the word's spelling in our mental dictionary, the mere sight of the word's spelling will activate all this linguistic information. According to Perfetti, these lexical attributes must be secure enough to be retrieved consistently each time the word is seen. They must be retrieved simultaneously and understood thoroughly and completely enough to support fluency and comprehension. Poor lexical quality can interfere with fluency and comprehension at the word level, if, for example, we don't realize a word's complete set of identities and can't identify the context-appropriate meaning and use of the word. Mistaking the word *stripped* for *striped*, or failing to recognize the connection of *invitation* to *invite*, for example, would limit our capacity to create meaning from text or to communicate in writing. The lexical quality hypothesis explains how developmental word knowledge is related to fluency and comprehension.

Developmental word knowledge entails an awareness of the linguistic attributes and semantic associations of spoken vocabulary, and these attributes must be linked to the orthography or spelling of words if we are to achieve fluency in literacy. Awareness of these linguistic attributes develops gradually over time. In early literacy development, phonological and orthographic awareness are reciprocally related and ultimately work together

to help children acquire and use general orthographic knowledge or sensitivity to the recurring letter patterns in English (e.g. *man, pan, fan*). These recurring letter patterns become increasingly abstract, moving from linear grapheme-phoneme correspondences to larger orthographic chunks involving silent letters (e.g. *skate, male, made; drain, mail, maid*) and inflections (e.g. *-ing; -ed; -s*). Eventually, these patterns appear in more sophisticated vocabulary where prefixes and suffixes, word roots, and other spelling-meaning connections generate even more nuanced word meanings and signal their parts of speech (e.g. *inspect, spectacle, spectacular*). In this way, phonological and orthographic processes are supplemented by another type of metalinguistic knowledge: syntactic awareness. Syntactic awareness entails sensitivity to grammatical form and facilitates the detection of reading errors and comprehension failures. Conjoint use of context-based strategies and phonological and morphophonemic decoding for word identification and comprehension during reading help us acquire and consolidate both alphabetic knowledge and the more general orthographic knowledge that ultimately leads to a nimbleness and facility with complex text forms. This nimbleness and efficiency continues to develop across text types and genres, for oral and silent reading, for reading and for writing, for speaking, and for listening.

How does one become fluent in a written language? The same language interactions that develop word meanings in oral language are necessary to develop word knowledge in written language, too. So, too, are the experiences and instruction that will hone those understandings. Practices that teach and exercise word knowledge include wide, voluminous, and repeated reading, daily writing, and word study instruction. But it is the latter that is necessary to teach children the alphabetic and morphological structures of English orthography. Insight into the form and substance of written words is necessary to integrate pronunciations with word meanings and patterns of use with innuendo. Knowledge of how written English words work to represent sound, pattern, and meaning helps integrate and apply these elements fluently within and across words, sentences, and texts. Developmental word knowledge fuels the development of fluency.

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