

A Root Awakening: Vocabulary Instruction for Older Students with Reading Difficulties

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There is reliable evidence that new vocabulary is primarily acquired through wide independent reading. However, struggling readers tend to avoid reading, resulting in limited word encounters and inadequate vocabulary growth, and they often have difficulties inferring the meanings of new words from context. While there are no clear solutions to the problem of vocabulary acquisition for older students with reading difficulties, there are instructional approaches that have some evidence of effectiveness for this population. We describe the research base and promising practices related to three aspects of vocabulary instruction: (1) creating a verbal learning environment that fosters word consciousness, (2) selecting and teaching specific words, and (3) teaching an independent word learning strategy through a combination of contextual and morphemic analysis. These instructional approaches are grounded in overarching principles recognized by researchers as being characteristic of effective instruction for students with learning difficulties, including explicit instruction, promoting cognitive and collaborative engagement, and providing many opportunities for practice, including distributed practice, with teacher feedback. Finally, we discuss the possibilities inherent in a cross-content schoolwide approach to vocabulary instruction at the secondary level. We conclude with a call for additional research examining the effectiveness of instructional approaches to vocabulary development for secondary school students with reading difficulties, including a schoolwide collaborative model.

For many students in the upper grades, reading does not come easily. Upon reviewing the available research for disadvantaged learners, Becker (1977) found insufficient vocabulary to be strongly associated with academic failure for students in grades 3 through 12. Three decades later, the English language, with its mongrel mix of Latin, Greek, French, and German, continues to confound diverse learners. According to Coyne, Kame'enui, and Carnine (2007), "The learning characteristics that have the strongest causal connection to academic failure are rooted in the area of language" (p. 38). While language includes many constructs, we will focus on vocabulary development for adolescents with reading difficulties.

In their review of research-supported vocabulary instruction for students with learning disabilities (LD), Jitendra et al. (2004) have noted that "the development of proficient reading skills is documented as the most effective independent word learning strategy" (p. 299). In other words, teaching students to read at more proficient levels (i.e., to identify words, read fluently, and comprehend what they are reading) is an important way to support their vocabulary

development. There is reliable evidence that typically developing readers acquire vocabulary primarily through wide independent reading (Nagy & Anderson, 1984; Nagy, Herman & Anderson, 1985). However, it generally takes several encounters with a new word to learn it (Nagy & Scott, 2000; Stahl & Fairbanks, 1986), and students who experience reading difficulties may need considerably more repetitions (McKeown, Beck, Omanson, & Pople, 1985). Unfortunately, struggling readers tend to avoid reading, resulting in limited word encounters and inadequate vocabulary growth (Baker, Simmons & Kame'enui, 1998; Stanovich, 1986). In addition, students with reading difficulties and disabilities often experience difficulty inferring the meanings of new words from context (Bryant, Goodwin, Bryant, & Higgins, 2003; Carver, 1994; McKeown, 1985; Pany, Jenkins, & Schreck, 1982). These limitations result in what has been termed the "Matthew Effect" wherein the word-rich get richer, and the poor remain at a linguistic disadvantage (Stanovich, 1986). While this pernicious cycle is of great concern to parents, policy makers, educators, and researchers alike, a simple or failsafe solution to the vocabulary gap has not yet been found. It is doubtful that one exists. Rather, the best solution will likely require a consistent and persistent long-term investment in vocabulary development through a variety of approaches.

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It may be logical to begin with the premise that teaching vocabulary is educationally profitable or time well spent. Stahl and Fairbanks (1986) examined vocabulary studies involving students at various reading levels and found that, as time allocated to vocabulary lessons increased in minutes, the effect size for reading comprehension also increased, with a fairly strong correlation ($r = .65, p < .001$). Stahl and Fairbanks noted that this correlation was not only statistically significant, but also “educationally significant” (p. 99). Vocabulary instruction, and the time allocated for it, is certainly of educational significance for those who are at a linguistic disadvantage. This does not imply that vocabulary instruction should replace literature discussions or subject-matter inquiry. It simply affirms teachers across the curriculum in scheduling vocabulary instruction into their lessons.

It is clear that teaching vocabulary is time well spent, but how to best use that time is not as easily defined. While there is no single solution to the vocabulary challenge, there are specific instructional methods found to be effective for older students with reading difficulties. In addition, there are approaches to vocabulary instruction that have not yet been thoroughly validated for the striving reader, but that are grounded in overarching principles characteristic of effective instruction for students with reading disabilities and difficulties, including (a) explicit instruction (e.g., Fletcher, Lyon, Fuchs, & Barnes, 2007; Mastropieri, Scruggs, & Graetz, 2003; Scammacca et al., 2007; Swanson, 1999; Swanson & Hoskyn, 2001; Torgesen et al., 2007; Vaughn, Gersten, & Chard, 2000), (b) teaching students to apply cognitive and metacognitive strategies (e.g., Gersten, Fuchs, Williams, & Baker, 2001; Swanson, 1999; Torgesen et al., 2007; Vaughn et al., 2000; Wong, Harris, Graham, & Butler, 2003), (c) using questioning approaches (including self-questioning) to promote active cognitive interaction with text (e.g., Mastropieri et al., 2003; Vaughn et al., 2000) and completing cognitively demanding tasks in collaborative groups (Bos, Anders, Filip, & Jaffe, 1989), (d) promoting collaborative engagement in learning with opportunities for verbal interactions (e.g., Gersten et al., 2001; Jenkins & O’Connor, 2003; Mastropieri et al., 2003; Torgesen et al., 2007; Vaughn et al., 2000), and (e) providing many opportunities for practice (including distributed practice) with teacher feedback (e.g., Swanson, 1999; Swanson & Hoskyn, 2001; Vaughn et al., 2000).

These instructional principles facilitate vocabulary acquisition for students with LD and effective instructional practices include them. Primarily, researchers have focused on two kinds of vocabulary learning tasks: learning the meanings of specific words and learning strategies for inferring the meanings of new words encountered while reading, or *word-learning strategies* (Blachowicz & Fisher, 2000), including the strategic analysis of context clues and morpheme clues (i.e., prefixes, roots, suffixes). In addition, researchers have recently begun to investigate the importance of promoting *word consciousness*, a term that refers to students’ interest in and awareness of words (Graves, Juel, & Graves, 1998; Scott & Nagy, 2004).

CREATING A VERBAL LEARNING ENVIRONMENT THAT FOSTERS WORD CONSCIOUSNESS

Word consciousness requires metalinguistic awareness (Nagy, 2007; Nagy & Scott, 2000). Students with high levels of metalinguistic awareness are responsive to all aspects of language, including words. For example, they notice the similarities between words related morphologically, through a common root, such as *beware*, *aware*, and *wary*, and they notice when words rhyme or involve onomatopoeia. Metalinguistic awareness is an emergent field of study, so the effectiveness of promoting word consciousness to support vocabulary acquisition has not yet been thoroughly investigated for typically developing students or for struggling readers. However, the literature does indicate a correlational relationship between vocabulary knowledge and word consciousness, especially awareness of word formation through roots and affixes (e.g., Carlisle, 2000; Ku & Anderson, 2003; Nagy, 2007; Nagy, Berninger, & Abbott, 2006). According to Blachowicz and Fisher (2000), the importance of a word-rich environment that fosters word consciousness has been demonstrated through qualitative studies, but the nature and extent of its efficacy is still uncertain. In a sense, developing metalinguistic awareness might be akin to priming the pump for vocabulary development. At this stage of research, we would classify promoting word consciousness as a promising practice for older students with reading difficulties, one that merits future study.

Word consciousness—and thus vocabulary development—might best be fostered in a verbal learning environment. Children learn their first words through oral language in the home. Students start school already knowing thousands of words, learned at home through verbal interactions. Children who are provided with the most verbally supportive atmosphere at home (e.g., word explanations, discussions, storybook reading, etc.) learn far more words than those whose families engage in fewer of these verbal behaviors (Hart & Risley, 1995). Teachers can emulate such an atmosphere by providing opportunities for discussion. Nagy (2007) has suggested that an accessible learning model includes discussions about word meanings, enabling students to translate complex text-based or dictionary-based definitions into more accessible language.

In their overview of research-based principles for promoting academic literacy in adolescents, Torgesen and his colleagues (2007), have recommended providing instruction that includes discussion of text and concepts. Oral discussion of content and content vocabulary is a common component of many successful reading interventions (Nagy, 2007). For example, in providing instruction in collaborative strategies for comprehending a social studies unit in a heterogeneous inclusion classroom, Klingner, Vaughn, and Schumm (1998) found that 65 percent of the student discourse was related directly to the content, including content vocabulary. The instructional model they evaluated, emphasizing the application of comprehension strategies in collaborative groups, resulted in significant group gains in reading comprehension, although differences were not significant for students with LD

as a separate group. This particular intervention also included explicit vocabulary instruction and comprehension strategy instruction. It is important to note that oral discussion was only one component of this effective intervention.

Similarly, in a study comparing a traditional definitional approach to three different discussion-oriented approaches, Bos and Anders (1990) found that junior high students with LD participating in collaborative semantic mapping activities outperformed students learning in the definitional model on measures of vocabulary as well as reading comprehension. The researchers conjectured that a portion of the positive results might be attributed to the discussion that occurred as students shared prior knowledge with one another, asked questions, made predictions, and confirmed or justified predictions through the text, stating that “[s]uch systematic discussion utilizing student background knowledge and text information may be particularly fruitful in terms of generating long-term learning” (p. 40).

As an instructional tool, oral language is not to be underestimated, as verbal interchanges may well be the primary vocabulary-learning venue for students who have not yet mastered printed English. While some students may struggle to decode or encode complex words like *bioenvironmental*, they can be exposed to such sophisticated words in oral vocabulary. Students need to both hear and speak the targeted vocabulary. Studies in memory have suggested that spoken language such as discussion groups, verbal interaction, and even simple articulation promotes retention more effectively than listening passively (see Sousa, 2001). Through oral language, teachers can begin to make students more comfortable with academic vocabulary by simply dropping it into classroom conversations occasionally. Beck, McKeown, and Kucan (2002) have advised educators to naturally integrate sophisticated, mature oral vocabulary into normal school dialogue. In everyday classroom situations, teachers can use scholarly synonyms for known words (*surplus* vs. *spare*, *obtain* vs. *get*, *proceed* vs. *go*) and eventually students may begin to use, or at least understand, academic words more readily. As long as vocabulary remains trapped within the narrow boundaries of the printed page, word learning is restricted for students with limited decoding skills. Conversely, when scholarly vocabulary becomes conversational or pragmatic (e.g., “Yes, Lucas, you may *obtain* a *surplus* pencil from the box.”) it has the potential to become personally meaningful.

In essence, students who are word conscious seek to make connections among words and tend to actively build semantic relationships, asking questions and expressing interest as they search for associations. To promote word consciousness, teachers might help students understand the differences in the ways words are used in normal conversation, in classroom discourse, and in the language of the text, pointing out that using formal language is akin to wearing formal clothing (Scott & Nagy, 2004). In addition, teachers might model their own love of words and affirm students for using words effectively, particularly when they use words in clever, precise, or novel ways (Graves et al., 1998). Teachers can surround students with literature that promotes word awareness and involve students with discussion of the language used in these selections. Finally, with teacher guidance, students can engage in word games, invent new words, select and display

favorite words, share word wit and poetry, and explore the origins and meanings of surnames and/or local place names.

Stephanie Higgins is a Title 1 reading teacher in Oregon who has been promoting word consciousness in her students. She understands the value of this kind of inquiry. Consider the impact of her fifth-grade lesson, as described in an e-mail:

I have been drawing students’ attention to roots throughout the year. . . . The students are always very eager to suggest related words. Yesterday our word was *urgent*, which led to *urgency*, and then a suggestion of *emergency*. I thought that was a clever connection, and wondered if you knew if *urgency* and *emergency* are, in fact, relatives. . . . (personal communication, May 23, 2006).

In fact, *urgency* and *emergency* do not share the same immediate root, but that is irrelevant. The question is excellent, and the association between the two words is clear. This type of detective work engages the learner and fosters word awareness. The primary goal is not to become linguists, but to become curious, to root around, so that networks may be unearthed and associations formed. By promoting linguistic curiosity and facilitating discussions of this nature, Stephanie is helping her students reach that goal. She is creating an environment that fosters metalinguistic awareness, and as a byproduct, correlational research indicates that she may also be promoting vocabulary development (Carlisle, 2000; Graves et al., 1998; Ku & Anderson, 2003; Nagy, 2007; Nagy et al., 2006; Scott & Nagy, 2004).

SELECTING WORDS TO TEACH AND TEACHING SPECIFIC WORD MEANINGS

This section outlines several research-based principles and instructional practices for teaching specific words to older students with reading difficulties. No single method is effective for teaching every type of word, in part because words and phrases vary greatly in characteristics and complexities (Nagy & Scott, 2000), as do learners. In reviewing vocabulary acquisition for diverse learners, Baker et al. (1998) have suggested that using a variety of techniques might prove optimal.

A Word about Word Selection

Which words are most worth teaching? Not all words are equal. Some are high frequency; others are rare. Some are content specific; others cross domains. Some are sophisticated and complex; others are easily conveyed through a simple synonym. With more than 400,000 words in a comprehensive dictionary, teachers must make some decisions. Beck et al. (2002) and Hiebert (2005) provide logical rationales for deciding which words to teach in school. Where possible, in addition to teaching words necessary for understanding the text, teachers are advised to select academic words that appear across the curriculum and that belong to morphological families. Morphological families include words that share the same root or base, such as *logic*, *logical*, *logically*, *illogically*, and so on. Carlisle and Katz (2006) studied 152 upper

elementary students from general education classrooms, more than half of whom received free or reduced-price lunch, and about 21 percent of whom were poor readers, finding that, generally speaking, the students read individual words more quickly and accurately if the word belonged to a large morphological family and that this was even more likely to be true if the words were clearly related, as in *govern* and *governmental*. Thus, in general, the most useful words to support academic growth are unknown words that students are likely to encounter again and again in various morphological forms and in various textbooks and that, if they were understood, could advance reading, writing, and classroom discussion.

For example, *relationship* is an academic word that might appear in narrative as well as informational text. It has a higher frequency and content area dispersion index than *transverse*, which is also an academic word (Zeno, Ivens, Millard, & Duvvuri, 1995), and it belongs to a fairly large morphological family (*relate, related, relatedness, relational, relative, relativity*). Because it belongs to a large morphological family it may be more rapidly processed and retrieved (Bertram, Baayen, & Schreuder, 2000; Carlisle & Katz, 2006; Nagy, Anderson, Schommer, Scott, & Stallman, 1989). As it appears fairly frequently across varied content areas, it is more likely to be revisited, reviewed, and thus remembered.

In selecting which words to teach, content-specific vocabulary must not be overlooked. In general, students with reading disabilities should be directly taught words that represent key concepts or big ideas. For example, all chemistry students must comprehend key concepts such as *solution* and *evaporation*, and civics students must understand terms such as *federal* and *civil rights*. In addition, it can be especially important to teach multiple-meaning words to all students with a limited lexicon, including English language learners (ELLs), as these words may be particularly confusing for them (Snow & Kim, 2007; Stahl, 1999). For example, *wave* can indicate a sine wave, an ocean wave, and a greeting.

Explicit Instruction and Active Engagement

Older students with reading difficulties benefit from explicit and direct instruction in word meanings (e.g., Scammacca et al., 2007). This includes modeling, guided practice, checking for understanding, and multiple opportunities for practice with explicit and timely feedback (e.g., Jitendra et al., 2004; Swanson & Hoskyn, 2001). The pronunciations, spellings, and meanings of new vocabulary words are made clear through a systematic presentation. Pany et al. (1982) have shown that direct instruction methods (i.e., teaching the meaning of the word in advance) are superior to simple reliance on context clues, with no instruction, for students with LD in grades 4 and 5. In general, they found that performance improved apace with the intensity of the instruction. Researchers have identified key components of explicit lessons that make instruction more effective for struggling readers (Mastropieri & Scruggs, 2002; Swanson & Deshler, 2003). Explicit instruction typically includes: (a) a statement of the objective or purpose of the lesson, including a rationale for learning; (b) modeling of skills and strategies, including clear explanation of concepts with examples and nonexamples; (c) guided practice with teacher scaffolding; (d) specific posi-

tive feedback to confirm correct responses or clear corrective feedback to clarify misconceptions; (e) independent practice with teacher monitoring (returning to guided practice if the student is not successful); (f) teaching students how they can generalize the learning or use it in different situations; (g) monitoring student learning to assure that critical concepts and skills are mastered; and (h) periodic cumulative review with multiple opportunities for practice.

Providing a Rationale for Learning

A key component of explicit instruction, particularly for older readers, is beginning with a rationale for learning (see Mastropieri & Scruggs, 2002) and an advance organizer, providing an overview of the new content and explaining the learning objectives. Swanson and Hoskyn (2001) found the provision of advance organizers to be an essential instructional component for adolescents with LD in any content area. For example, teachers can demonstrate the potential benefits of vocabulary instruction that emphasizes morphemes (i.e., prefixes, roots, and suffixes) with complex polymorphemic words extracted from authentic classroom texts, such as *microbiologist*. Teachers may demonstrate how to find meaning within morphemes and explain how morphology (i.e., the analysis of these meaningful word parts) can support reading and spelling as well as provide keys to unlock word meanings. To honor the status of secondary school students, it is recommended that teachers teach and use advanced terminology to describe the study of words (i.e., *linguistics, etymology, morphology, root, prefix*). Using advanced terminology in oral vocabulary acknowledges the inherent intelligence of each student.

Modeling and Teaching

For many students, simply hearing or seeing a new vocabulary word, prefix, or root is not enough for long-term retention, but if the students say the word or morpheme aloud, clearly, deliberately, and repeatedly, they may be more likely to remember it (cf. Sousa, 2001). It is helpful if teachers clearly model correct pronunciation, including syllable stress in multisyllabic words, and link sound to spelling, dividing the word into morphemes or syllables. The teacher provides a simple definition and anchors the word to the meaning through multiple exposures in various contexts (Juel & Deffes, 2004). When directly teaching a word, teachers might follow a routine like the one described below, adapted from Archer, Gleason, and Vachon (2005) and Beck et al. (2002):

The teacher writes the new word on the chalkboard or whiteboard in large, clear print. The teacher says the word syllable-by-syllable (or morpheme by morpheme), making a scooping motion with one finger under each syllable or morpheme while pronouncing it. Students pronounce the word in the same way along with the teacher, then without the teacher. Then the teacher says the whole word, enunciating it clearly and stressing the accented syllable. Students listen for the word and repeat it, echoing the teacher. Students may copy the word and use a contrasting color for the targeted morpheme and/or underscore it. Then the teacher provides a “student-friendly” understandable definition for the word

(and, if appropriate, morphemes within the word), and provides (or solicits from students when appropriate) examples and nonexamples related to the word.

Guided Practice with Explicit and Timely Feedback

Swanson and Hoskyn (2001) concluded that repeated practice opportunities with explicit feedback are an essential ingredient in effective instruction for students with LD. With feedback that is explicit, teachers provide pointed validation and confirmation, but they also clarify misconceptions as they arise. For example, they do not allow a mispronunciation to go unchecked if the goal is for the students to assimilate the word into their oral vocabularies. Denton and Hocker (2006) have observed that failing to provide students with corrective feedback is, in essence, allowing students to practice their mistakes and that what is practiced is likely to become habitualized and difficult to change.

Active Student Engagement

For older students with reading difficulties, it may be important to link explicit instruction with active engagement, for deeper processing of semantic relationships (see Bryant et al., 2003; Jitendra et al., 2004). Despite the fact that instruction is explicitly delivered by the teacher, the student is not a passive learner, but actively participates with his or her peers, constructing new knowledge in response to deliberate prompts, questions, and feedback. In reviewing the research on vocabulary instruction for students with LD, Bryant et al. (2003) concluded that, “interventions that engage students interactively with memory devices [mnemonics] and graphic depictions [e.g., semantic maps, grids] and that are paired with direct instruction seem most promising in promoting word-meaning knowledge and reading comprehension of passages” (p. 127).

Promoting Cognitive Engagement with Words

Teachers and researchers alike have long realized that some students—including many students with LD—do not spontaneously engage in the cognitive processing essential to learning and retention; they are often not active participants in their own learning (Torgeson, 1977). For some time, researchers questioned whether such students lacked the necessary cognitive abilities to do so. However, in a study involving students with LD in grades 2 and 6, Wong (1980) began to dispel that notion; through the use of interactive questions and prompts, passive learners became cognitively engaged, and readers significantly increased comprehension and retention of implied information.

Semantic Sorting

It is important that students interact actively with words in context, as merely memorizing a list of definitions from the dictionary is generally ineffective (Bos & Anders, 1990; Bos et al., 1989; McKeown et al., 1985; Nagy & Scott, 2000). Teachers can help students become cognitively engaged in

processing the meanings of words by creating networks of semantically related words. This has been found to be effective for students with reading difficulties and disabilities (Bos & Anders, 1990; Bos et al., 1989; Bryant et al., 2003; Jitendra et al., 2004). Words might be semantically related if they are synonymous (e.g., *contemplate*, *think*) or antonymous (e.g., *remember*, *forget*) or if they share the same root (e.g., *battle*, *battalion*, *combative*), concept (e.g., *environment*, *pollution*, *sky*, *earth*, etc.), or any other trait. Students can engage in a variety of lexical processing tasks, including semantic mapping, semantic feature analysis, and word sorting (Pearson & Johnson, 1978). Semantic networking activities often include a graphic organizer and can be effectively implemented in small-group settings, with relevant verbal interactions, with large effects.

For example, Bos et al. (1989) found that students who engaged in semantic feature analysis (i.e., categorizing words in a graphic organizer according to aspects of the words' meanings) in collaborative groups performed better than comparison students, who engaged in a more typical dictionary-based activity (i.e., looking up words and using them in sentences) to learn the same set of words. The semantic analysis group had statistically better outcomes on measures of vocabulary and concept knowledge, and these differences were still apparent 6 months after the intervention period. Effect sizes favoring the semantic analysis group were large. Similarly, Bos and Anders (1990) demonstrated that students who followed the traditional approach of looking up words in a dictionary did not learn or remember as many words as students who used a semantic mapping approach that included cognitive engagement and deep processing through text-based discussions. Bryant et al. (2003) have questioned the benefit of assigning long lists of vocabulary words, explaining that many students with LD are unlikely to be able to learn and remember the typical 20–25 words per week, especially through a definitional approach. This does not mean that students should never use a dictionary. It is, of course, important that students learn to use reference materials such as dictionaries and thesauruses (both paper and online versions). However, asking students to memorize a list of dictionary or glossary definitions is not optimal for meaningful learning of new words.

Strategic Questioning

Another way to promote active cognitive engagement with words is through strategic questioning, leading to deeper processing. For example, teachers may ask questions that encourage students to reason through the new word or ask students to use new words to answer questions or solve problems in different contexts. (e.g., If you could work in any *industry*, which would you choose? Why? Tell a partner. What playground big toy best shows how *natural resources* and *industry* affect each other: (a) two swings, (b) monkey bars, (c) a teeter-totter, and why?) Finally, Beck et al. (2002) suggest that teachers ask questions that juxtapose or integrate two different vocabulary words (e.g., Why might it be important to *reassess* our use of *natural resources*? If people are *complacent* about our *balance of trade* with China, what might happen in the future?).

Mnemonic Devices

Cognitive engagement may also be fostered by the use of personalized or individualized memory-boosting aides, called mnemonics. The strategic use of mnemonic strategies to learn and remember new word meanings—as well as other facts—has strong research support for students with LD (Bryant et al., 2003; Jitendra et al., 2004). One of the most effective mnemonic methods involves the combined use of images and similar sounding word parts, known as the keyword method (Pressley, Levin, & Delaney, 1982). For example, a student might better remember the academic word *purchase* if he or she is shown an image of a *purse*, often associated with shopping. Context might be provided, too: The woman opens her *purse* to *purchase* the groceries. The student associates the word *purchase* with the picture and pronunciation of the word *purse*. If needed, the student can later recall the meaning of the word *purchase* through an individually generated image of the known concept *purse*. This process promotes recall, or memory. It may be especially powerful to teach students to generate their own mnemonic devices that are meaningful to them.

Multiple Exposures to Words in a Variety of Contexts

There are different degrees of knowing a word. Dale (1965) provided a framework to conceptualize degrees of word knowledge, suggesting that there are words that we (a) have never seen before, (b) have heard of but are unsure of their meanings, (c) recognize and know a little about, and (d) know well and can explain to others. If the goal is for students to learn words on more than a surface level, it is essential to provide ongoing exposures to words, both in print and in speech (Blachowicz & Fisher, 2000). In general, students benefit from simply worded definitions and multiple exposures of the target word in differing contexts, including student-generated contexts (Stahl & Fairbanks, 1986). Ongoing distributed practice promotes retention of information and ideas (Willingham, 2002). Providing students with recursive contextualized exposures to words across weeks and even months, in both speech and print, offers them numerous opportunities to renew word meanings and integrate words into their own speaking, listening, reading, and writing vocabularies. In addition, through exposure in varied contexts, students develop an understanding that words can convey shades of meaning, even multiple meanings (Stahl & Fairbanks, 1986). This is essential for students with LD, who may have difficulty in making the transition from the most primary meaning (e.g., a *book* is an object) to a secondary meaning (e.g., to *book* a passage on a cruise).

TEACHING A WORD-LEARNING STRATEGY WITH CONTEXTUAL AND MORPHEMIC ANALYSIS

If a teacher's goal is to teach the meanings of a group of words, research suggests that it is best to teach the meanings directly,

as described above. However, it is clearly impossible to directly teach all the words that students need to learn. Thus, students must learn how to figure out what an unknown word might mean when reading independently. Students can apply the strategic analysis of context clues and morpheme clues or, preferably, a combination of the two (Baumann, Edwards, Boland, Olejnik, & Kame'enui, 2003; Baumann et al., 2002; Tomesen & Aarnoutse, 1998; Wysocki & Jenkins, 1987). For example, students might apply morphemic analysis in context to resolve the meaning of the word *belfry* as they read *Paul Revere's Ride* (Longfellow, 1863). The teacher might ask students to first examine the context clues (the word *belfry* appears multiple times in varying contexts), then to look for a familiar word part in *belfry*, reminding the students that spellings of word parts can be different from the spelling in a whole word. Finally, once the students discover the hidden clue, the teacher might ask how *bel* (a form of *bell*) could be associated with the context of a church tower. With encouragement, students might make a leap of faith, an inference, through the integration of contextual and morphemic input.

Morphemic Analysis

Morphological awareness is a subset of metalinguistic awareness (Nagy, 2007) and includes awareness of meaningful word parts, called morphemes (i.e., prefixes, roots, and suffixes). Morphemic analysis refers to the process of parsing word parts to infer meanings of unknown words. A *morpheme* is the smallest unit of language that carries meaning. In the word *biographers*, there are four morphemes: *bio*, *graph*, *-er*, *-s*. Because about 60 percent of the word meanings in printed school English in grades 3–9 might be predicted through their morphemes (Nagy & Anderson, 1984), strategies in morphemic analysis have strong potential for enhancing the reading and vocabulary development for all readers, including those with reading difficulties. Because there are fewer roots than there are words, a morphology approach may make the task of learning and remembering new words more manageable. Words can be clustered in root families to promote association around a related concept. For example, the Greek combining form (or root) *chron* denotes the concept “time” as seen in the morphological family *chronological*, *synchronize*, *chronic*, *anachronism*, and *chronometer*. If students know that *chron* generally conveys a sense of time, they should be better able to understand the related words listed above. In fact, Nagy et al. (1989) have found that knowing just one word from a morphological family can help the adult reader infer the meaning of a related unknown word. Morphological association may enhance working memory and promote associative learning, which may benefit students with reading difficulties.

In a word-rich, metalinguistic environment, morphological relationships are illuminated through discussion. Both typically achieving ELLs and typically achieving native speakers of English in fifth grade have demonstrated enthusiasm for exploring such relationships (Carlo et al., 2004). To illustrate how to prompt a rich discussion in morphological awareness, Beck et al. (2002) have provided an interesting scenario:

Another entry point for adding words to the environment is morphological relationships. For example, challenge students to compare *tyrannosaurus* and *tyrant*; *pedestrian* and *pedal*; *duplicate* and *duplicity*. It can also be valuable to discuss when relationships seem to exist but do not, as in the case of *gargle* and *garden*. . . Including such ideas in discussions of words lets students see language as an open book rather than as mysterious and impenetrable with authority over them (p. 128).

A morphological approach like this makes sense; however, teaching vocabulary through morphology to students with LD has limited research support at this point and should be regarded as a promising practice. Much of the interest in morphology is relatively recent and primarily concerned with typically achieving learners. Only a few studies have directly investigated the effectiveness of teaching morphemic analysis to students with LD or reading impairments, with somewhat ambiguous results. In one such study, Abbott and Berninger (1999) provided intervention to two groups of striving readers in grades 4–7, 90 percent of whom had received special education services. Both groups received training in phoneme deletion (e.g., “Say *turn*. Now say it without the /t./”), spelling, and phonics, and both groups read text for meaning every day with support from their teacher and learned strategies for monitoring their own comprehension. One group, called the Structural Analysis Group, learned syllable division and morpheme division. The other group learned to sound out the words sound by sound rather than at the syllable or morpheme level. At the end of the intervention, both groups had made significant improvement in their reading, but there were no differences in growth between the two groups. However, more of the individual students in the Structural Analysis (morphemic analysis) group had a positive response to the intervention.

While the evidence supporting instruction in morphemic analysis is tenuous for students with LD at this time, there is evidence that readers of high and low proficiency use morphological cues to help them decode words (Abbott & Berninger, 1999; Carlisle & Stone, 2005; Singson, Mahony, & Mann, 2000), that morphological awareness is correlated with vocabulary and comprehension, and that a reliance on morphological awareness appears to strengthen over time (Carlisle, 2000; Kieffer & Lesaux, 2007; Ku & Anderson, 2003). For example, Nagy et al. (2006) found that morphological awareness was highly correlated with vocabulary knowledge ($r = .83$) for typical fourth- and fifth-grade readers, even when phonological processing/awareness was factored out of the equation. Based on these and other studies, some researchers have concluded that the ability to recognize and work with morphemes is an important metalinguistic skill, at least for students in grades four and beyond.

Instructional Sequence for Morphology Instruction

In general, learners are more successful at mastering new skills when there is a gradual progression from simple to complex. Controlling task difficulty is a critical component of instructional scaffolding (Vaughn et al., 2000). For that

reason, Stahl (1999) suggested that instruction in morphology might begin with the most common and most transparent affixes and roots.

Inflectional suffixes (e.g., *-s*, *-es*, *-ed*, *-ing*, *-er*, *-est*) are the least complex, so they might be learned first, if they are not already known. In alphabetic languages, these are quickly grasped by most children and are usually mastered during the early elementary grades (Anglin, 1993; Kuo & Anderson, 2006). If older readers (particularly ELLs) have not mastered the inflectional suffixes listed above (i.e., interpreting their meanings when reading and using them correctly when writing), they should be taught early in the instructional sequence.

Prefixes may also be taught early in the instructional sequence, because their meanings and spellings are fairly constant and they are easily located at the beginning of a word. In a frequently cited quasi-experimental study, students in third grade learned the nine most common prefixes and morphemic analysis strategies and outperformed a comparison group on several measures of word knowledge (White, Sowell, & Yanagihara, 1989). Graves (2004) reviewed research regarding prefix instruction for older readers and concluded that students can be effectively taught to use their knowledge of prefixes to infer the meanings of unknown words.

Derivational suffixes are far more complex than inflectional suffixes or common prefixes. These suffixes may alter both the function and the meaning of the root to which they are attached. Often, they denote particular parts of speech (e.g., many words ending with the derivational suffix *-ity* are nouns, as in *fertility*, *salinity*, and *sensitivity*). In morphologically complex words, a student may need to rapidly process two or three such suffixes at once, as in the words *characteristically*, *interchangeably*, or *instinctively*. While students may know what *instinct* means, they may be less clear about how to properly use the derivative *instinctively*. These types of words are linguistically complex and usually abstract, which is why understanding of derivational suffixes typically develops far more slowly than understanding of inflections and compounds or transparently prefixed words (Anglin, 1993; Singson et al., 2000). For some students, knowledge of derivational suffixes continues to develop through middle and high school and into the college years (Mahony, 1994; Nagy et al., 2006).

Having considered suffixes and prefixes, we now turn to roots. It is not necessary to teach all the Greek and Latin roots. The most common roots repeatedly appear in a wide array of words. Lists of the most common roots are found in Henry (2003), Moats (2000), and Stahl (1999). These resources also include lists of the most common prefixes and suffixes as well as instructional guidelines and/or sample lessons for morphology instruction.

Controlling task difficulty should also be considered when selecting and sequencing exemplars for each morpheme. In a carefully sequenced instructional plan, teachers provide explicit positive and negative examples of the given concept, where applicable, so students note what is really important, or salient (Carnine, 1980). In order to ensure initial understanding, students need to focus first on the most obvious examples. For instance, if teaching the meaning of “three” for the prefix *tri-*, teachers may start with straightforward exemplars such as *tricycle* and *triangle*. Contrasting that against

TABLE 1
Morpheme Meanings: Examples and Nonexamples

Morpheme Root or Prefix	Description			
	Meaning	Clearly in	Somewhat in	But not in
Port	To carry	Transport	Comport	Sport
Path	Pain, illness	Pathogen	Sympathy	Pathway
Pan-	All	Pantheism	Panic	Panda bear
Uni-	One	Unicycle	Unique	Immunity
Tri-	Three	Triangle	Trigonometry	Tricky

a nonexample, they might show students that the spelling pattern t-r-i appears in some words, but only as a series of letters, not the targeted morpheme (e.g., the words *trickle* and *trip* appear to contain the morpheme *tri-* but when we remove those three letters, there is no root left, and a prefix precedes a root or base). Then, the lesson might progress to words where the prefix *tri-* still means “three” even though it is pronounced slightly differently, as in *triplets* or *trinity*. As students become more confident, teachers might include slightly more complex derivatives in supportive context. For example, they might display the word *tripod* in the sentence, “She put her camera on a *tripod*.” With clear modeling, teachers can show students how to extract meaning from the prefix and the context clues, together. Eventually, students may progress to longer or more complex words found in texts at the secondary level (e.g., *triumvirate*, *trilobite*, *trilateral*). See Table 1 for a sample chart that illustrates this thinking process.

Providing nonexamples also helps students to be aware of the limitations of the morphemic analysis strategy; morpheme clues do not always provide clear keys to unlock word meaning. Consider the Latin root *port* meaning “to carry” as in *porter*. That connection is clear; it is easy to visualize a *porter* “carrying” bags into a hotel. It is also easy to see how the root concept relates to *portable*, *import*, *export*, *transport*, *deport*, and even *support* (*sup-* is a form of *sub-*). However, it is not so easy to link it to *important*; the connection is not immediately obvious. A root approach would probably not help the learner understand this word. In general, Latin roots are not as consistent in meaning as are Greek roots. For example, the Greek combining form *therm* consistently conveys an idea of *heat*, whether used in *thermos*, *thermometer*, *thermostat*, *exothermic reaction*, or *thermonuclear*. Students need to be shown examples where the meaning of the word is clearly revealed through the root and examples where it is not, and students need to learn to consider the context whenever they read.

Instruction in the Meanings of Morphemes

In teaching students the meanings of the most common morphemes, teachers might use the same guidelines and principles that are effective in teaching specific words, as described above. This means that the teacher provides a rationale for learning and a statement of the learning objective with a content summary, or advance organizer. Instruction is explicit and it includes examples and nonexamples. The teacher provides

modeling and guided practice, with explicit feedback that provides clarification and confirmation. Simple context in the form of phrases and sentences is provided early in the lesson. Students then practice applying the knowledge by using words with the new morpheme in oral discussions, reading, and writing. For example, once the students have learned the prefix *ex-* meaning “out,” they should read it in a few words (*exit*, *exhale*, *explode*, *extrovert*, *excavate*), in phrases and sentences, and finally in textbook context. Guided practice is followed with independent practice, and student knowledge and retention are monitored.

As students grow in competence and confidence with morphology, they may be motivated by the challenge of inferring the meanings of word parts by examining words with common roots. This kind of instruction is less explicit. A teacher can lead students to discover word meanings through a deductive process described by Henry (1997), as summarized below:

Begin by writing *rupt* on the board. Ask students to generate a number of words with *rupt* as the root (e.g., *rupture*, *abrupt*, *erupt*, *interrupt*, *disruptive*, *corrupt*, *bankrupt*, etc.). Write these words on the board. See if students can pick up the meaning of *rupt* from the words on the board (‘to break, to burst’). Have students identify the root in each word and note the placement of the root (the beginning if there is no prefix, the end if there is no suffix, the middle if there are prefixes and suffixes) (p. 188).

In addition, students might use semantic mapping and sorting activities similar to those described in the earlier section to organize and to process the meanings of polymorphemic words, and they may create word webs or root trees with words that share a common morpheme. Eventually, students may enjoy inventing their own words, using linguistic principles to create a logical new lexeme, such as *proliferative* or *polymorphographer*.

Independently Inferring Meaning from Context Clues and Morpheme Clues

Context Clues

Effective use of context clues requires metalinguistic awareness, as does effective use of morpheme clues (Nagy, 2007). Semantic clues can provide valuable information. Explicit instruction in how to seek semantic clues from context by ferreting out synonyms, antonyms, appositives, syntax, examples, and other devices from the sentences surrounding the unknown word can help students become more aware of context and more likely to utilize it, as shown in a meta-analysis conducted by Fukkink and de Glopper (1998).

Sometimes context is quite helpful for inferring the meanings of unknown words, but in general it is an inconsistent source of vocabulary information, especially for weak readers (Carver, 1994; McKeown, 1985). For instance, Nagy et al. (1985) found that unknown words could be solved through one exposure in natural context only 5–11 percent of the time, on average. Evidence of the effectiveness of this

approach is limited for diverse learners (Baker et al., 1998; Bryant et al., 2003), but the goal is to help all readers utilize available context to infer meaning, as some do fairly well (Wysocki & Jenkins, 1987). In general, struggling readers seem to focus mainly on context clues that are in proximity to the unknown word (e.g., in the same sentence) and that are synonymous with the unknown word (Carnine, Kame'enui, & Coyle, 1984). They need to be taught to look beyond the immediate sentence and beyond the obvious synonym.

Combining Morphemic Analysis with Contextual Analysis

The use of context to infer the meanings of unknown words is more reliable when readers analyze both the context surrounding the word and the morphemes within the word (Wysocki & Jenkins, 1987). Wysocki and Jenkins found that even middle school students who were able to use both morphemic clues and context clues as *separate* strategies did not necessarily *combine* the two when approaching an unknown word during reading. They needed to be taught how to do so.

Typically progressing students have been shown to profit from explicit instruction in strategically analyzing both types of clues in tandem (Baumann et al., 2002, 2003). Examining the effectiveness of contextualized morphemic analysis, Baumann and his colleagues (2002) conducted research with four groups of typically achieving fifth graders. One group received instruction in prefixes, another received instruction in context clues, a third group received instruction in combining both prefix clues and context clues, and the last group served as an instructed control group. In general, the students who received instruction in morphology, either combined with context or taught separately, outperformed the control group in vocabulary knowledge. In a similar follow-up study, Baumann et al. (2003) found that fifth-grade students could be taught to successfully use morphemic analysis with context clues in the context of their social studies text. In this study, one group of students was directly taught textbook vocabulary, while another was taught the meanings of common morphemes and how to apply the combined morphemic and context clue strategy. As might be expected, the directly instructed group performed better on a test of the taught words, while the morphemic analysis group demonstrated a greater ability to determine the meanings of untaught words that contained the morphemes they had learned. On a test given immediately after the intervention concluded, there were no differences between the groups in their abilities to infer the meanings of unknown words presented in text with useful context clues, but in a second test given 3 weeks later, the morphemic analysis group performed significantly better than the directly instructed group. Thus, both studies conducted by Baumann et al. point to potential value in teaching students to analyze morphemic and contextual clues, although results were somewhat mixed and neither found gains in passage comprehension.

Research of such a strategy with struggling readers is woefully slim, but combining morphemic and context clue analysis has had limited validation with this population. Tomesen and Aarnoutse (1998) investigated such an approach with

both average and low functioning fourth-grade readers in the Netherlands. Using an instructional plan including the principles of direct instruction and reciprocal teaching, these researchers found significant positive effects in the ability of the students to derive word meanings from morphemic clues in tandem with context clues. Most interesting, they found that the lower performing readers in their sample benefited the most from this intervention. Nevertheless, additional research pertaining to this word-learning strategy is clearly needed, particularly with older struggling readers. Thus, we would categorize this approach as a promising practice for this group.

The Outside-In Strategy

In the program of research described above, Baumann and his colleagues (2002, 2003) taught students to use a strategy called The Vocabulary Rule, which we have slightly revised and renamed. Based on Baumann's work, we describe a strategy called the Outside-In strategy:

1. First, look outside the word, at context clues in the neighboring words and sentences.
2. Then, look inside the word, at the word parts (prefix, root, suffix).
3. Next, reread the section, keeping the meaningful word parts in mind. Make an inference: What do you think the word might mean?

Modeling the strategy of using morphemic analysis to determine the meanings of unknown words in context may be done through a think-aloud. A think-aloud allows educators to reveal their reasoning, their internal logic, by speaking their thoughts aloud to the class as they problem solve. As Coyne et al. (2007) have explained, "[t]hink-aloud procedures make the cognitive processes used by proficient readers conspicuous and transparent to less proficient readers" (p. 89). We provide a sample think-aloud for the Outside-In strategy below.

[Display the following] *The director made a unilateral decision. He canceled the annual company picnic without discussing it with his managers, which made them angry.*

"I do not know this word *unilateral*, so first I will **look outside** the word for helpful clues. Let's see, it is describing some kind of a decision. The director, or boss, made the decision. That's not enough information, so I will look in another sentence. It says he did not discuss it or talk about it with his managers and it made them angry, or mad. Sounds bad."

"Next, I will **look inside** the word for parts I know. I see *uni-* [underline the prefix uni-] and I know some words with that prefix. I think that *uni-* means 'one,' like one horn on a unicorn and one wheel on a unicycle. So, maybe *unilateral* means 'one something.'"

"Now, I will **look outside** again, and reread the sentence, but I will keep thinking about 'one something' as I read: 'The director made a (one-something) decision. He canceled the annual company picnic without discussing it with his managers, which made them angry.'"

(Infer) “Hmm. A ‘one something’ decision could be a one-second decision or it could mean one-way, but it has to make people angry. It says he did not discuss it with his managers; he made the decision alone—his way. I think a one-way decision would make his managers mad because people like to be included in decisions, so both sides can be heard. Maybe *unilateral* means ‘one way’ or ‘one sided.’ A one-sided decision! I will reread the sentence and say ‘one-sided’ and see if it makes sense: ‘The director made a one-sided decision. He canceled the annual company picnic without discussing it with his managers, which made them angry.’ Yes, that does make sense. Unilateral might mean ‘one-sided.’” (The teacher could also remind students of a *lateral pass* in football, a sideways pass.)

This kind of think-aloud should be carried out the same general way numerous times, with various words in context, until it becomes routine or internalized. Teachers should teach the strategy thoroughly and review it periodically. They might post it on the wall and encourage students to keep it in their binders with a master list of morphemes and their meanings and reference it when needed. Eventually, with instruction that is initially highly supportive, and with a gradual removal of the scaffolds (i.e., morpheme list, word wall, strategy posters, teacher support) it is hoped that students will implement this practice routinely, until it becomes habitual. Of course, some students will need to keep the scaffolds in place, so differentiated instruction occurs.

A CROSS-CONTENT SCHOOLWIDE APPROACH

If individual teachers provide vocabulary instruction as described thus far, students are likely to benefit. They may gain a greater sense of metalinguistic awareness, and they may expand their vocabularies through specific word and morpheme instruction and strategy instruction, provided in a verbal word-rich environment. If teachers across each content area work collaboratively to create such a focus on vocabulary throughout the school, the results may be even stronger.

In a schoolwide model, all teachers might provide explicit vocabulary instruction and provide opportunities for students to actively interact with words in multiple contexts, encourage deep cognitive processing of words through the use of techniques such as questioning and semantic mapping, and encourage conversations about words through collaborative activities. It may be particularly powerful if secondary school content-area teachers reinforce morphology, including root meanings, as applicable to their content, pointing out morphological word families in the normal course of instruction. Connections may be made to related words across content, across domains of knowledge. Finally, all teachers may teach and encourage students to apply word-learning strategies such as the Outside-In strategy described above, providing opportunities for extended practice with feedback, essential for struggling learners.

In such an environment, content teachers would step outside the parameters of their own subject areas in order to create morphological links across the curriculum. For example, the math teacher, in teaching *percent* and *percentage*, might

connect the instruction not only to the related math term *cents* but also to the measurement term *centimeter*, pointing out that each word contains the same root idea (*cent* means “hundred”). Crossing domains of knowledge, the math teacher might make the linguistic link to the science term *centipede*, and the social studies terms *bicentennial* and *century*, briefly exploring how they all relate to one common overarching root concept. In addition, the math teacher might ask the class if they know a Spanish cognate for *percent*, or find *porciento* in a desk dictionary, taking the opportunity to link English and Spanish through the shared Latinate root. Likewise, the history teacher, when describing the *Roman centurion* commanding his force of 100, might link not only to *century* and *bicentennial*, but also to the science term *centipede* and to the math term *percent*. Even the art teacher, when explaining famous monuments, can point out the date inscribed in stone, and explain that the Roman Numeral C, which represents the number 100, stands for the Roman (Latin) *centum*, and link it to *century* and *centipede* and *percentage*. By linking the language across the curriculum, teachers provide opportunities for distributed practice through multiple exposures and ongoing review. With distributed practice across disciplines, students are more likely to remember what they have learned and to make important generalizations about words. Such a schoolwide approach could be termed a “root awakening.”

There are examples of secondary schools that have implemented a schoolwide focus on vocabulary similar to the model we have described. In these schools, each teacher draws students’ attention to word families through roots and prefixes and teaches students to use a strategy similar to the Outside-In strategy. In one school in particular, students are making important vocabulary connections across subject areas, as reported by an eighth-grade math teacher:

The most powerful piece was when students saw that they could make connections from math terms to other words from other subject areas. It was a big moment for them. I use a root approach a lot in geometry. Like the *x/y* axis—they can remember *intercept* from *inter-* means ‘crossing between’ like in *intersection* and *interception* (J. Sneddon, interview, June 14, 2006).

This type of instructional process can occur very naturally and spontaneously and is easily woven into the lesson plan. But teachers would certainly need a support system that includes professional development as they begin to implement this approach. In addition to professional development, provisions would need to be made for reference books, such as etymological dictionaries and possibly Spanish–English dictionaries. Every classroom should have at least one good dictionary that includes word roots. The Internet can also be a resource; there are a number of excellent etymology sites, among them the *Online Etymology Dictionary*.

Summary: Realizing a Root Awakening

By teaching secondary students specific word meanings through explicit direct instruction, along with techniques such as semantic feature analysis or the keyword method,

teachers encourage students to develop deep understandings of words, especially when the lesson is discussion oriented and the students are cognitively engaged. When students learn to apply the most common morphemes, they may be better able to read and understand complex words (Abbott & Berninger, 1999; Carlisle & Stone, 2005; Kieffer & Lesaux, 2007; Ku & Anderson, 2003; Nagy et al., 2006; White et al., 1989). By providing students with strategies such as the Outside-In strategy for attacking words in context, teachers may promote independence in reading (Baumann et al., 2002, 2003; Tomesen & Aarnoutse, 1998). By revealing morphological families of words teachers may help students process language more efficiently and develop metalinguistic awareness (Bertram et al., 2000; Carlisle & Katz, 2006; Nagy, 2007; Nagy et al., 1989). If teachers across subject areas apply these approaches, students may learn to generalize the learning and habitualize the use of effective strategies for learning and remembering words. Students may experience a root awakening as they begin to interact cognitively with words throughout the school day.

CONCLUSION

There is a great need for further research on vocabulary instruction for adolescents with reading difficulties and disabilities, especially for research in metalinguistic awareness and strategies for independent word learning, as well as school-wide implementation plans such as the one described here. However, we do know that in the absence of all vocabulary instruction, *any* vocabulary instruction, including simply teaching word meanings before reading, is of benefit (Beck et al., 2002) and that instructional minutes allocated for vocabulary correlate with gains in reading comprehension (Stahl & Fairbanks, 1986). In this article, we have presented strategies that have been validated by research as well as promising practices based on established tenets of effective instruction for struggling readers. With these tools, teachers might optimize vocabulary development for students who have little time left to gain ground on their typically developing peers. The vocabulary gap between proficient readers and those who struggle is large, and without intervention, it will only continue to widen as students progress through the grades.

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REFERENCES

- Abbott, S., & Berninger, V. (1999). It's never too late to remediate: A developmental approach to teaching word recognition. *Annals of Dyslexia*, 49, 223–250.
- Anglin, J. M. (1993). Vocabulary development: A morphological analysis. *Monographs of the Society for Research in Child Development*, 58 (10), v-165.
- Archer, A. L., Gleason, M. M., & Vachon, V. (2005). *Rewards: Multisyllabic word reading strategies*. Longmont, CO: Sopris West.
- Baker, S. K., Simmons, D. C., & Kame'enui, E. J. (1998). Vocabulary acquisition: Instruction and curricular basics and implications. In D. C. Simmons & E. J. Kame'enui (Eds.), *What reading research tells us about children with diverse learning needs: Bases and basics* (pp. 219–238). Mahwah, NJ: Erlbaum.
- Baumann, J. F., Edwards, E. C., Boland, E., Olejnik, S., & Kame'enui, E. J. (2003). Vocabulary tricks: Effects of instruction in morphology and context on fifth-grade students' ability to derive and infer word meaning. *American Educational Research Journal*, 40, 447–494.
- Baumann, J. F., Edwards, E. C., Font, G., Tereshinski, C. A., Kame'enui, E. J., & Olejnik, S. (2002). Teaching morphemic and contextual analysis to fifth-grade students. *Reading Research Quarterly*, 37, 150–176.
- Beck, I. L., McKeown, M. G., & Kucan, L. (2002). *Bringing words to life: Robust vocabulary instruction*. New York: Guilford.
- Becker, W. C. (1977). Teaching reading and language to the disadvantaged—What we have learned from field research. *Harvard Educational Review*, 47, 518–543.
- Bertram, R., Baayen, R. H., & Schreuder, R. (2000). Effects of family size for complex words. *Journal of Memory and Language*, 42, 390–405.
- Blachowicz, C. L. Z., & Fisher, P. (2000). Vocabulary instruction. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research: Vol. 3* (pp. 503–523). Mahwah, NJ: Erlbaum.
- Bos, C. S., & Anders, P. L. (1990). Effects of interactive vocabulary instruction on the vocabulary learning and reading comprehension of junior-high learning disabled students. *Learning Disability Quarterly*, 13, 31–42.
- Bos, C. S., Anders, P. L., Filip, D., & Jaffe, L. (1989). The effects of an interactive instructional strategy for enhancing reading comprehension and content area learning for students with learning disabilities. *Journal of Learning Disabilities*, 22, 384–390.
- Bryant, D. P., Goodwin, M., Bryant, B. R., & Higgins, K. (2003). Vocabulary instruction for students with learning disabilities: A review of the research. *Learning Disability Quarterly*, 26, 117–128.
- Carlisle, J. F. (2000). Awareness of the structure and meaning of morphologically complex words: Impact on reading. *Reading and Writing*, 12, 169–190.
- Carlisle, J. F., & Katz, L. (2006). Effects of word and morpheme familiarity on reading of derived words. *Reading and Writing*, 19, 669–693.
- Carlisle, J. F., & Stone, C. A. (2005). Exploring the role of morphemes in word reading. *Reading Research Quarterly*, 40, 428–449.
- Carlo, M. S., August, D., McLaughlin, B., Snow, C. E., Dressler, C., Lippman, D., et al. (2004). Closing the gap: Addressing the vocabulary needs of ELLs in bilingual and mainstream classrooms. *Reading Research Quarterly*, 39, 188–215.
- Carnine, D. (1980). Three procedures for presenting minimally different positive and negative instances. *Journal of Educational Psychology*, 72, 452–456.
- Carnine, D., Kame'enui, E. J., & Coyle, G. (1984). Utilization of contextual information in determining the meaning of unfamiliar words. *Reading Research Quarterly*, 19, 188–204.
- Carver, R. P. (1994). Percentage of unknown vocabulary words in text as a function of the relative difficulty of the text: Implications for instruction. *Journal of Reading Behavior*, 26, 413–437.
- Coyne, M. D., Kame'enui, E. J., & Carnine, D. W. (2007). *Effective teaching strategies for accommodating diverse learners* (3rd ed.). Upper Saddle River, NJ: Pearson.
- Dale, E. (1965). Vocabulary measurement: Technique and major findings. *Elementary English*, 42, 82–88.
- Denton, C. A., & Hocker, J. L. (2006). *Responsive reading instruction: Flexible intervention for struggling readers in the early grades*. Longmont, CO: Sopris West.
- Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2007). *Learning disabilities: From identification to intervention*. New York: Guilford.
- Fukkink, R. G., & de Glopper, K. (1998). Effects of instruction in deriving word meaning from context: A meta-analysis. *Review of Educational Research*, 68, 450–469.
- Gersten, R., Fuchs, L., Williams, J., & Baker, S. (2001). Teaching reading comprehension strategies to students with learning disabilities: A review of research. *Review of Educational Research*, 71, 279–320.
- Graves, M. F. (2004). Teaching prefixes: As good as it gets? In J. F. Baumann & E. J. Kame'enui (Eds.), *Vocabulary instruction: Research to practice* (pp. 81–99). New York: Guilford.

- Graves, M. F., Juel, C., & Graves, B. B. (1998). *Teaching reading in the 21st century*. Needham Heights, MA: Allyn and Bacon.
- Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Brookes.
- Henry, M. K. (1997). The decoding/spelling curriculum: Integrated decoding and spelling instruction from pre-school to early secondary school. *Dyslexia*, 3, 178–189.
- Henry, M. K. (2003). *Unlocking literacy: Effective decoding and spelling instruction*. Baltimore: Brookes Publishing.
- Hiebert, E. H. (2005). In pursuit of an effective, efficient vocabulary curriculum for elementary students. In E. H. Hiebert & M. L. Kamil (Eds.), *Teaching and learning vocabulary: Bringing research to practice* (pp. 243–263). Mahwah, NJ: Erlbaum.
- Jenkins, J. R., & O'Connor, R. E. (2003). Cooperative learning for students with learning disabilities: Evidence from experiments, observations, and interviews. In R. Harris & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 417–430). New York: Guilford.
- Jitendra, A. K., Edwards, L. L., Starosta, K., Sacks, G., Jacobson, L. A., & Choutka, C. M. (2004). What research says about vocabulary instruction for students with learning disabilities. *Exceptional Children*, 70, 299–322.
- Juel, C., & Deffes, R. (2004). Making words stick. *Educational Leadership*, 61, 30–34.
- Kieffer, M. J., & Lesaux, N. K. (2007). Breaking down words to build meaning: Morphology, vocabulary, and reading comprehension in the urban classroom. *The Reading Teacher*, 61, 134–144.
- Klingner, J. K., Vaughn, S., & Schumm, J. S. (1998). Collaborative strategic reading during social studies in heterogeneous fourth-grade classrooms. *Elementary School Journal*, 99, 3–22.
- Ku, Y., & Anderson, R. C. (2003). Development of morphological awareness in Chinese and English. *Reading and Writing: An Interdisciplinary Journal*, 16, 399–422.
- Kuo, L.-J., & Anderson, R. C. (2006). Morphological awareness and learning to read: A cross-language perspective. *Educational Psychologist*, 41, 161–180.
- Longfellow, H. W. (1863). *Tales of a wayside inn*. Boston: Ticknor & Fields.
- Mahony, D. (1994). Using sensitivity to word structure to explain variance in high school and college level reading ability. *Reading and Writing: An Interdisciplinary Journal*, 6, 19–44.
- Mastropieri, M. A., & Scruggs, T. E. (2002). *Effective instruction for special education*. Austin, TX: ProEd.
- Mastropieri, M., Scruggs, T., & Graetz, J. (2003). Reading comprehension instruction for secondary students: Challenges for struggling students and teachers. *Learning Disability Quarterly*, 26, 103–116.
- McKeown, M. G. (1985). The acquisition of word meaning from context by children of high and low ability. *Reading Research Quarterly*, 20, 482–496.
- McKeown, M. G., Beck, I. L., Omanson, R. C., & Pople, M. T. (1985). Some effects of the nature and frequency of vocabulary instruction on the knowledge and use of words. *Reading Research Quarterly*, 20, 522–535.
- Moats, L. C. (2000). *Speech to print: Language essentials for teachers*. Baltimore: Brookes.
- Nagy, W. E. (2007). Metalinguistic awareness and the vocabulary-comprehension connection. In R. K. Wagner, A. E. Muse, & K. R. Tannenbaum (Eds.), *Vocabulary acquisition: Implications for reading comprehension* (pp. 52–77). New York: Guilford.
- Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly*, 19, 303–330.
- Nagy, W. E., Anderson, R. C., Schommer, M., Scott, J. A., & Stallman, A. C. (1989). Morphological families in the internal lexicon. *Reading Research Quarterly*, 24, 262–282.
- Nagy, W., Berninger, V. W., & Abbott, R. D. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students. *Journal of Educational Psychology*, 98, 134–147.
- Nagy, W. E., Herman, P. A., & Anderson, R. C. (1985). Learning words from context. *Reading Research Quarterly*, 20, 233–253.
- Nagy, W. E., & Scott, J. A. (2000). Vocabulary processes. In M. L. Kamil, P. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 269–284). Mahwah, NJ: Erlbaum.
- Pany, D., Jenkins, J. R., & Schreck, J. (1982). Vocabulary instruction: Effects on word knowledge and reading comprehension. *Learning Disability Quarterly*, 5, 202–215.
- Pearson, P. D., & Johnson, D. (1978). *Teaching reading comprehension*. New York: Holt, Rinehart & Winston.
- Pressley, M. G., Levin, J. R., & Delaney, H. D. (1982). The mnemonic keyword method. *Review of Educational Research*, 52, 61–92.
- Scammacca, N., Roberts, G., Vaughn, S., Edmonds, M., Wexler, J., Reutebuch, C. K., & Torgesen, J. K. (2007). *Interventions for adolescent struggling readers: A meta-analysis with implications for practice*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Scott, J. A., & Nagy, W. E. (2004). Developing word consciousness. In J. F. Baumann & E. J. Kame'enui (Eds.), *Vocabulary instruction: Research to practice* (pp. 201–217). New York: Guilford.
- Singson, M., Mahony, D., & Mann, V. (2000). The relation between reading ability and morphological skills: Evidence from derivational suffixes. *Reading and Writing: An Interdisciplinary Journal*, 12, 219–252.
- Snow, C. E., & Kim, Y.-S. (2007). Large problem spaces: The challenge of vocabulary for English language learners. In R. K. Wagner, A. E. Muse, & K. R. Tannenbaum (Eds.), *Vocabulary acquisition: Implications for reading comprehension* (pp. 123–139). New York: Guilford.
- Sousa, D. A. (2001). *How the brain learns* (2nd ed.). Thousand Oaks, CA: Corwin.
- Stahl, S. A. (1999). *Vocabulary development*. Newton Upper Falls, MA: Brookline Books.
- Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research*, 56, 72–110.
- Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360–407.
- Swanson, H. L. (1999). Reading research for students with LD: A meta-analysis of intervention outcomes. *Journal of Learning Disabilities*, 32, 504–532.
- Swanson, H. L., & Deshler, D. (2003). Instructing adolescents with learning disabilities: Converting a meta-analysis to practice. *Journal of Learning Disabilities*, 36, 124–135.
- Swanson, H. L., & Hoskyn, M. (2001). Instructing adolescents with learning disabilities: A component and composite analysis. *Learning Disabilities Research & Practice*, 16, 109–119.
- Tomesen, M., & Aarnoutse, C. (1998). Effects of an instructional programme for deriving word meanings. *Educational Studies*, 24, 107–128.
- Torgesen, J. K. (1977). The role of nonspecific factors in the task performance of learning disabled children: A theoretical assessment. *Journal of Learning Disabilities*, 10, 27–34.
- Torgesen, J. K., Houston, D. D., Rissman, L. M., Decker, S. M., Roberts, G., Vaughn, S., et al. (2007). *Academic literacy instruction for adolescents: A guidance document from the Center on Instruction*. Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Vaughn, S., Gersten, R., & Chard, D. (2000). The underlying message in LD intervention research. *Exceptional Children*, 67, 99–114.
- White, T. G., Sowell, J., & Yanagihara, A. (1989). Teaching elementary students to use word part clues. *The Reading Teacher*, 42, 302–308.
- Willingham, D. T. (2002). Allocating student study time: Massed versus distributed practice. *American Educator*, 47, 37–39.
- Wong, B. Y. L. (1980). Activating the inactive learner: Use of questions/prompts to enhance comprehension and retention of implied information in learning disabled children. *Learning Disability Quarterly*, 3, 29–37.
- Wong, B. Y. L., Harris, K. R., Graham, S., & Butler, D. L. (2003). Cognitive strategies instruction research in learning disabilities. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 383–402). New York: Guilford.
- Wysocki, K., & Jenkins, J. R. (1987). Deriving word meanings through morphological generalization. *Reading Research Quarterly*, 22, 66–81.
- Zeno, S. M., Ivens, S. H., Millard, R. T., & Duvvuri, R. (1995). *The educator's word frequency guide*. New York: Touchstone Applied Science Associates.

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