Vocabulary Instruction for Secondary Students With Reading Disabilities: An Updated Research Review

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Abstract
This article presents an update and extension of the research on instructional methods for vocabulary learning by secondary-age students with learning disabilities. Seven studies that have been published since the last comprehensive review of the research were located. Four instructional methods were found to be the most effective: mnemonic instruction, learning strategies that utilized morphemic analysis, direct instruction, and multimedia instruction. In addition, peer-mediated instruction was found to be a successful approach for supporting vocabulary learning, although it was not possible to separate the effects of peer mediation from the instructional methods used. Implications for classroom practice and for future research are discussed.

Keywords
vocabulary, learning disabilities, secondary

More than a decade ago, Bryant, Goodwin, Bryant, and Higgins (2003) began their review of the research literature on teaching vocabulary to secondary-level students with learning disabilities (LD) by noting the increased requirements for reading at the secondary level. Since their review appeared, those requirements have continued to increase. Rigorous state and federal standards, high-stakes testing, and legislation that require that most students with disabilities be educated and evaluated on the general education curriculum make it imperative to identify evidence-based practices that can enable secondary-age students with disabilities to develop the reading skills they need to be successful both in school and after graduation.

Many secondary-age students with (and without) disabilities struggle with reading skills. In their review of the research on adolescent literacy, Biancarosa and Snow (2006) reported results that showed that as many as 70% of students struggle with reading in some manner and require differentiated instruction. On average, students with disabilities scored 40 points below their peers on the 12th-grade assessment of reading on the National Assessment of Educational Progress (U.S. Department of Education, 2013). As a result of reading and writing difficulties, adolescents with disabilities are less prepared for postsecondary education and/or the world of work and are more likely to drop out of school (National Joint Committee on Learning Disabilities, 2008).

A review of evidence-based interventions for adolescents with reading difficulties by Scammacca et al. (2007) identified five types of interventions that have been found to improve reading outcomes: comprehension strategies, word study, fluency, vocabulary, and multicomponent methods. Of all of these approaches, vocabulary interventions yielded the largest effect size (1.62). In particular, instruction in vocabulary has been found to improve reading comprehension outcomes, especially for students with reading difficulties (Elleman, Lindo, Morphy, & Compton, 2009). As an example of this research, Bos and Anders (1990) reported that the use of interactive vocabulary strategies such as semantic mapping and semantic/syntactic feature analysis resulted in significant improvements in both short- and long-term recall of information from science texts.

All of these factors—rising expectations for secondary-age students with disabilities, the documented literacy difficulties of this population, the effectiveness of evidence-based vocabulary instruction, and the association between vocabulary instruction and improvements in reading comprehension—suggest that it is important to determine the most effective methods for teaching vocabulary to secondary-age students with LD.

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Despite the importance of vocabulary instruction for the reading success of adolescents with reading difficulties, there has been only one review that specifically targeted vocabulary instruction for this population (Bryant et al., 2003). At that time, Bryant and her colleagues were able to identify only six research articles that conducted eight studies on vocabulary instruction with middle- and/or high school-aged students with LD. Despite the limited research base, the authors reported that vocabulary instruction, such as computer-assisted instruction, fluency-building vocabulary practice activities, mnemonic strategy instruction, and conceptual enhancement instruction (e.g., semantic feature analysis and semantic mapping) could improve the learning of word meanings as well as reading comprehension, especially when students were interactively engaged through the use of methods such as mnemonics, semantic feature analysis, and semantic mapping.

Jitendra et al. (2004) reviewed the research on vocabulary instruction for students with LD from 1978–2002. This review was not focused exclusively on older students with LD but included students from Grades 4 to 12. Of the 19 studies they found, 12 included participants from Grades 7 to 12, including five of the six reviewed by Bryant et al. (2003). Unlike the Bryant et al. review, Jitendra et al. (2004) calculated effect sizes for the interventions they reviewed, finding that cognitive strategy methods and mnemonic interventions were the most effective methods. The results for computer-aided instruction were mixed. Although Jitendra et al. reported positive results for activity-based instruction, the only study that utilized this method with secondary-age students (Scruggs, Mastropieri, Bakken, & Brigham, 1993) actually reported no improvement on measures of vocabulary. Like Bryant et al., Jitendra et al. also found that the most effective interventions were those that could be implemented efficiently in the classroom.

The results of both the Bryant et al. (2003) and the Jitendra et al. (2004) reviews indicate that specialized vocabulary instruction can improve the vocabulary acquisition of secondary students with LD and do so with relatively limited amounts of instructional time. Yet, as both groups of researchers note, these conclusions are based on a relatively small sample of research. Additionally, at the time that these reviews were conducted, the use of computer-aided instruction was just emerging and was often designed simply to take traditional forms of vocabulary study and place them on a computer screen.

The overall purpose of the present review was to update the literature on vocabulary instruction for secondary students with LD. Such an update is necessary to identify new methods for teaching vocabulary to secondary-age students with LD and to identify those methods that are most effective for this population.

Method

Literature Search Procedures and Selection Criteria

Computer searches of the PsychINFO, ERIC, and Education Full Text databases from 2003 to 2016 were conducted. Descriptors for the computer search included “vocabulary,” “disabilities,” “learning disabilities,” “adolescent,” and “secondary.” In addition, references from the studies that were identified as focusing on vocabulary for secondary students with LD were also examined. Finally, the databases for the following journals were examined to locate relevant literature: Journal of Learning Disabilities, Learning Disability Quarterly, Journal of Special Education, Reading and Writing Quarterly, Remedial and Special Education.

Articles were selected for further review based on five criteria. First, only studies published in peer-reviewed journals were included. Presentations, unpublished doctoral dissertations, and non-peer reviewed articles were not included. Second, only experimental, quasi-experimental, and single-subject designs were included. Third, at least 50% of the participants in the study were identified as children with LD. In some cases, other students with disabilities (e.g., “other health impairment”) were included but the primary population was students with LD. Studies that included students with LD who were also English language learners (ELLs) were not included because the vocabulary acquisition difficulties of these students may be different from that of native English speakers with LD. Fourth, the studies had to include middle school or high school students with LD in Grades 6 to 12. Fifth, studies included in this review had to primarily measure vocabulary outcomes. Studies that examined multiple components of reading one of which was vocabulary learning were not included. Using these criteria, a total of seven studies were located.

Data Analysis

Coding procedures. A coding sheet based on one developed by Solis et al. (2012) was used to organize the following information: (a) participants, (b) methodology, (c) intervention and comparison information, (d) clarity of causal inference, (e) measures, and (f) findings.

Effect size calculation. For those studies that did not include them, effect sizes were calculated for studies using Cohen’s d ($d = (M_2 - M_1) / SD$ pooled) ($M_2 =$ posttest score of the experimental group) − $M$ (posttest score of the control group) / pooled standard deviation). For single-subject studies, the percentage of nonoverlapping data (PND) was calculated. PND is defined as the percentage of Phase B data that are more extreme (in an improvement direction) than the single most extreme Phase A data point (Scruggs & Mastropieri, 2001).
Results

Study Features

The seven studies identified by the literature search included three experimental studies that utilized group designs (Harris, Schumaker, & Deshler, 2011; Kennedy, Deshler, & Lloyd, 2015; Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014), two quasi-experimental design studies (Seifert & Espin, 2012; Shook, Hazelkorn, & Lozano, 2011), and two single-subject design studies (Hughes & Fredrick, 2006; Terrill, Scruggs, & Mastropieri, 2004).

The students with disabilities who participated in the studies ranged in grade level from sixth to 10th grade. Four of the seven studies included the age of the participants, which ranged from 11 to 17 years of age. All of the studies reported the gender of the participants (94 [58%] male; 68 [42%] female). Most of the students were receiving special educational services under the category of LDs (114 [88%]). The remainder included students with behavior disorders (five), intellectual disabilities (four), other health impairments (five), and students with autism (one). None of the studies reported results for subgroups of students by disability types.

Six of the seven studies were conducted in general education classrooms that included students with disabilities. The remaining study (Terrill et al., 2004) was implemented in a self-contained special education classroom. The duration of interventions ranged widely across the studies from 3 days (Kennedy et al., 2015) to 8 weeks. Five of the studies utilized vocabulary from classroom and/or district textbooks for the items that were taught to students. One study (Terrill et al., 2004) used words from a vocabulary workbook designed to prepare students for the SAT test. Another study (Harris et al., 2011) used words chosen by the researchers that contained at least one high-frequency Greek or Latin root and a prefix and/or a suffix. Researchers delivered the intervention in two of the studies; teachers delivered the instruction in the other five studies. Five of the seven studies reported the use of treatment fidelity procedures (Harris et al., 2011; Hughes & Fredrick, 2006; Kennedy et al., 2015; Kennedy et al., 2014; Seifert & Espin, 2012; see Table 1).

Summaries of the types of interventions used in the studies, the study measures, and the outcomes can be found in Table 2. Several types of interventions were used in the studies, including mnemonic methods (Terrill et al., 2004), learning strategies (Harris et al., 2011), peer-mediated methods (Shook et al., 2011), direct instruction (Seifert & Espin, 2012), repeated reading (Seifert & Espin, 2012), and a multimedia approach using podcasts (Kennedy et al., 2015; Kennedy et al., 2014). In addition, one study (Hughes & Fredrick, 2006) used an instructional approach that combined a peer-mediated method (classwide peer tutoring) with an applied behavior analysis method (constant time delay). All of the studies used researcher-developed measures rather than standardized assessments to evaluate the outcomes of the vocabulary interventions.

Outcomes by Type of Intervention

In their review, Bryant et al. (2003) identified five types of interventions: computer-aided instruction, fluency-building activities, mnemonic strategy instruction (keyword), and concept enhancement (semantic feature analysis). Jitendra et al. (2004) identified six types of interventions, but only four were used for students in middle or high school (mnemonic strategies [keyword]), computer-aided instruction, cognitive strategies (semantic feature analysis), and activity-based methods (in which vocabulary is taught within the context of other classroom activities). One of the features of the recent studies that have examined vocabulary instruction is the use of peer-based approaches, including peer tutoring and collaborative strategic reading (CSR). In addition, whereas some previous studies of vocabulary instruction have utilized technology such as computers, they were generally used as an alternative means to deliver drill and practice discussion. The current studies have utilized emerging technologies that provide students with multiple channels for learning.

Mnemonic instruction. A number of studies conducted with secondary-age students with disabilities (Mastropieri, Scruggs, Levin, Gaffney, & McLoone, 1985) have established that the use of mnemonic instruction, especially the keyword strategy, can improve vocabulary knowledge. Mnemonic instructional methods use a technique such as a rhyme or a picture to help the individual recall information. The keyword method utilizes a three-step process to aid the learner in vocabulary:

Step 1: The target word (e.g., forte) is recoded into a word that the student already knows that is acoustically similar word to the target (e.g., keyword = fort).
Step 2: An interactive picture is created that contains an action related to the keyword to illustrate the meaning of the target word (e.g., there could be a picture of a fort with guns firing with the sentence, “The guns of the fort were loud.”).
Step 3: The student is prompted to state the meaning of the target word (forte means loud) using the keyword (fort), the action depicted, and the description.

Terrill et al. (2004) reported the results of a study of vocabulary learning conducted with eight 10th-grade students with LD. Students were taught new vocabulary words in their English class using either the keyword method or a nonmnemonic method that utilized traditional drill and
<table>
<thead>
<tr>
<th>Study</th>
<th>Study design</th>
<th>Participants</th>
<th>Grade/class type</th>
<th>Duration</th>
<th>Material</th>
<th>Person implementing</th>
<th>Treatment fidelity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris, Schumaker, and Deshler (2011)</td>
<td>Pretest, posttest, comparison group</td>
<td>230, 24 with disabilities, 16 LD, 2 ED, 1 ID, 4 OHI, 1 AU</td>
<td>Ninth-grade inclusive English classes</td>
<td>10 lessons of 45 min for 7.5 total hours</td>
<td>20 target words that contained at least one high-frequency Greek or Latin root and a prefix and/or suffix</td>
<td>Researchers</td>
<td>Fidelity checklist used by observers with video backup</td>
</tr>
<tr>
<td>Hughes and Fredrick (2006)</td>
<td>Multiple probes across behavior replicated across students</td>
<td>Three students with LD; 16 students w/o LD</td>
<td>Sixth-grade inclusive language arts</td>
<td>Ranged from 6–7 sessions</td>
<td>Three sets of five words from a novel used in the classroom</td>
<td>Teachers following training by researchers</td>
<td>Treatment integrity assessments conducted four times per week.</td>
</tr>
<tr>
<td>Kennedy, Thomas, Meyer, Alves, and Lloyd (2014)</td>
<td>Between-groups pretest, posttest nested</td>
<td>32 students with disabilities; 27 LD, 3 ED, 3 ID</td>
<td>10th-grade inclusive world history</td>
<td>8 weeks</td>
<td>Content acquisition podcasts (CAPS) based on social studies unit vocabulary</td>
<td>Teachers</td>
<td>Treatment fidelity checklist</td>
</tr>
<tr>
<td>Kennedy, Deshler, and Lloyd (2015)</td>
<td>Four-groups pretest, posttest</td>
<td>30 students with LD and reading disabilities</td>
<td>Ninth- to 12th-grade inclusive world history class</td>
<td>10 podcasts per day for 3 days</td>
<td>30 vocabulary terms on World War I taken from textbook and district curriculum</td>
<td>Teachers</td>
<td>Treatment fidelity checklist</td>
</tr>
<tr>
<td>Seifert and Espin (2012)</td>
<td>Within subjects, four conditions</td>
<td>20 students with LD enrolled in Gen ed. biology</td>
<td>10th grade</td>
<td>Four sessions of 45 min over 2 weeks</td>
<td>Four 500 word selections from a biology textbook</td>
<td>Researchers</td>
<td>Checklist of essential instructional steps Audio recording of sessions checked by lead author and graduate student</td>
</tr>
<tr>
<td>Shook, Hazelkorn, and Lozano (2011)</td>
<td>Two groups, pretest, posttest</td>
<td>26 students, 7 with disabilities: 6 LD, 1 OHI</td>
<td>Ninth-grade inclusive biology</td>
<td>30 min for 8 weeks</td>
<td>20 vocabulary words from biology units</td>
<td>Teachers</td>
<td>None reported</td>
</tr>
<tr>
<td>Terrill, Scruggs, and Mastropieri (2004)</td>
<td>Repeated measures</td>
<td>Eight students with LD</td>
<td>10th-grade self-contained special ed. class</td>
<td>6 weeks of alternating treatments</td>
<td>10 vocabulary words per week selected from vocabulary workbook</td>
<td>Teacher</td>
<td>None reported</td>
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Note. LD = learning disability; ED = emotional disturbance; ID = intellectual disability; OHI = other health impairment; AU = autism.
### Table 2. Summary of Measures and Outcomes.

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Measures</th>
<th>Results</th>
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<tbody>
<tr>
<td>Harris, Schumaker, and Deshler (2011)</td>
<td>Strategy instruction: Morphological analysis (WM) vs. mnemonic (VL)</td>
<td>Researcher developed tests including: Strategy use word knowledge morphological analysis Satisfaction survey</td>
<td>Both students with disabilities and those without were able to learn to use the strategies. Students with disabilities group made significant gains in word knowledge in both the WM, t(9) = −6.280, p &lt; .001, d = 4.264, and VL conditions, t(5) = −5.391, p = .003, d = 4.226. On the morphological test, students with disabilities in the WM condition outperformed students in either the VL or TO conditions, t(9) = −3.45, p &lt; .01, d = 6.942.</td>
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<tr>
<td>Hughes and Fredrick (2006)</td>
<td>Peer mediated and direct instruction: Classwide peer tutoring and constant time delay</td>
<td>Researcher developed daily probes following instruction Mastery probes at 1, 4, and 7 weeks after instruction</td>
<td>Two of the three students with LD demonstrated mastery of the three word sets and maintained mastery over a 7-week period. The third student demonstrated mastery of two word sets, but failed to maintain mastery of either set. PND = 98%</td>
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<tr>
<td>Kennedy, Thomas, Meyer, Alves, and Lloyd (2014)</td>
<td>Multimedia: CAPs vs. BAU</td>
<td>Assessments of social studies units developed by teachers from the school district</td>
<td>SWD taught using CAPs had significantly higher average CBM scores (n = 15, M = 7.6, SD = 1.1) than students in the BAU condition (n = 17, M = 5.4, SD = 1.3), F(1, 31) = 20.0, p &lt; .001; d = 1.83, ES = 1.82</td>
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<tr>
<td>Kennedy, Deshler, and Lloyd (2015)</td>
<td>Multimedia: CAPs containing EI; CAPs with the KMS; CAPs containing both EI + KMS; instructional videos with audio and generic slides (NM)</td>
<td>30-item multiple-choice instrument developed by researchers to assess knowledge of target vocabulary</td>
<td>Participants with LD who used the CAPS containing both EI + KMS had higher scores than those who used the CAPS with audio and generic slides (NM) (M = −2.8, SD = 2.3, d = 1.97). KI + KMS group outscored both the students in the EI only condition (M = −.92, SD = 1.5, d = 1.09) and those in the KMS only condition (M = −1.6, SD = 1.6, d = 1.40</td>
</tr>
<tr>
<td>Seifert and Espin (2012)</td>
<td>Direct instruction (vocabulary learning) and repeated reading (text only)</td>
<td>Researcher developed measures for reading fluency vocabulary knowledge comprehension</td>
<td>Participants read more words in the text only, t(19) = 4.36, p = .000, ES = 0.97, and combined, t(19) = 4.67, p = .000, ES = 1.04, conditions Participants made significantly more correct vocabulary matches in the vocabulary learning, t(19) = 5.00, p = .000, ES = 1.12, and combined, t(19) = 4.97, p = .000, ES = 1.11, conditions</td>
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<td>Shook, Hazelkorn, and Lozano (2011)</td>
<td>Peer mediated: CSR</td>
<td>20-item teacher-designed weekly vocabulary quiz</td>
<td>Mean baseline quiz score for the whole class was 75 points. After implementing CSR, the average score for the whole class was 93.85 (93.57 for students with disabilities); students with disabilities increased their scores by 34 points (ES = .83)</td>
</tr>
<tr>
<td>Terrill, Scruggs, and Mastropieri (2004)</td>
<td>Mnemonic: Keyword strategy vs. “traditional” (drill and practice) instruction</td>
<td>Researcher developed 10-item quiz each week, administered by teacher</td>
<td>Vocabulary recall was much greater in the mnemonic condition than in the nonmnemonic condition. In the former, the students correctly recalled a mean of 27.5 out of 30 vocabulary words. In the nonmnemonic condition, students correctly recalled a mean of 14.6 words (ES = 2.743)</td>
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**Note.** WM = word mapping; VL = vocabulary LINCing; TO = test only; LD = learning disabilities; PND = percentage of nonoverlapping data; CAP = content acquisition podcasts; BAU = business as usual; SWD = students with disabilities; CBM = curriculum based measurement; ES = effect size; EI = explicit instruction; KMS = keyword mnemonic strategy; CSR = collaborative strategic reading; NM = non-Mayer design strategies.
practice methods. In the nonmnemonic condition, the teacher provided the students with worksheets that included activities such as fill-in-the-blank definitions, sentence-completion tasks, and synonyms. The two instructional methods were used in an alternating order, so that one week the students used the keyword method and the next week they used the nonmnemonic method. Instruction took place over 6 weeks following this alternating sequence. Terrill et al., (2004) found that students’ vocabulary recall was much better when they used the keyword method than when the nonmnemonic methods were used. In the mnemonic (keyword) condition, students recalled nearly 92% of the vocabulary words whereas in the nonmnemonic condition they recalled only less than 50% (48.8 %). The large effect size ($d = 2.743$) supports the findings of previous studies that the use of a mnemonic technique such as the keyword method can be highly effective for improving the vocabulary acquisition of secondary-age students with LDs. Additionally, the students reported that they enjoyed using the keyword method, which could lead to their continued use of this approach.

**Learning strategies.** Harris et al. (2011) compared a generative approach to learning vocabulary that used a morphological analysis approach (Word Mapping Strategy [WMS]) to a nongenerative strategy that utilized several steps to help students memorize the meaning of words (Vocabulary LINCS; Ellis, 1992). The authors described nongenerative approaches as those that are designed to teach specific targeted words but cannot be applied to learning several new words. Generative strategies, in contrast, are designed to help students learn the meaning not only of a target word but also other related words. For example, Harris et al. claimed that teaching the meaning of a word such as *dictate* by learning both the word and the meaning of its root (dict- “to say or talk”) could help students learn the meaning of other words that use that root, such as *diction* and *dictation*.

In the Harris et al. (2011) study, 230 students in ninth-grade English classes, 24 of whom had been previously identified as LD, were assigned to one of two groups: a WMS or a Vocabulary Strategy (LINCS) group.

The WMS group received instruction designed to help students use morphemic analysis to predict the meaning of words. The strategy utilized four steps:

1. Step 1: Breaking words into their morphemic parts (prefix, suffix, root)
2. Step 2: Attaching meaning to each word part
3. Step 3: Making a prediction about the meaning of the unknown word based on the meaning of the parts
4. Step 4: Checking the dictionary for the definition

Participants in the WMS group were taught to use a graphic organizer that prompted them through the steps of the strategy.

Participants in the Vocabulary Strategy (LINCS) group were taught to use a series of steps designed to help them in memorizing and recalling the meaning of vocabulary words. This approach included the use of a keyword strategy, visual imagery, a story strategy to link known words to new vocabulary words, and a self-testing method to aid recall. As with the WMS strategy, students used a graphic organizer that prompted them through each of the steps of the LINCS strategy. Students in both of the treatment groups received instruction for 10 lessons of 45 min each that were delivered by one of the study authors.

Posttesting indicated that most of the students in both treatment groups were able to learn and utilize the strategy they were taught. In addition, both students with disabilities and those without disabilities in both treatment groups made statistically significant gains in their ability to define the target vocabulary words. However, students in the morphological strategy (WMS) group outperformed their peers who utilized the alternative vocabulary (LINCS) strategy as well as those in the control group on a test of morphological analysis skills. Although students with disabilities in both of the intervention groups made significant gains on both the tests of word knowledge and morphological analysis, students without disabilities outperformed them on both measures.

The results of the Harris et al. (2011) indicated that both the generative (morphological analysis) strategy as well as the nongenerative (mnemonic) vocabulary learning strategy can help high school students with LD as well as students without disabilities improve their vocabulary knowledge. However, the morphological analysis strategy was more effective for helping students learn how to use a morphological approach to learning new words. This finding should come as no surprise because the instructional method was designed to do just that—help students learn new words by applying their knowledge of morphology. But, as Harris et al. noted, the results indicate that students with disabilities are able to utilize a strategy that goes beyond simple memorization of word meanings.

**Peer-based approaches.** Peer-based methods, including peer tutoring (Okilwa & Shelby, 2010) and cooperative learning (Jenkins, Antil, Wayne, & Vadasy, 2003), have been found to be effective methods for enhancing the learning of students with LD. These methods have been applied to vocabulary learning of secondary-age students with LD in two studies.

Shook et al. (2011) reported the results of the use of CSR, a type of collaborative learning strategy, to teach scientific vocabulary to 26 ninth-grade students, including six with LD and one identified as other health impaired. The CSR model (Vaughn, Klingner, & Bryant, 2001) utilizes four strategies to enhance reading skills:

- Previewing: (activating background knowledge and making predictions)
Click and Clunk: Monitoring reading and enhancing vocabulary development during reading
Get the Gist: Identifying main ideas during reading
Wrap-Up and Review: Summarizing key ideas following reading

In the Shook et al. (2011) study, CSR was used as a way for students to review vocabulary from their science textbook following teacher-led classroom instruction. After previewing the text to get an idea of the content, they read the text to identify vocabulary they understood (“clicks”) and those terms that were unfamiliar to them (“clunks”). Using a preassessment, the classroom teacher identified the “clunks” and used those as the basis for study groups that reviewed the reading, including the vocabulary items. Following training in the CSR method, students worked in their groups for 8 weeks, 2 days a week, for 90 min per session. Prior to and following implementation of this procedure, all students in the class took a 20-item vocabulary test worth 100 points. The researchers found that students without disabilities improved by an average of 13 points but the students with disabilities improved by an average of 34 points (from a preintervention mean of 60 to a postintervention mean of 94).

Hughes and Fredrick (2006) combined a peer-mediated method (classwide peer tutoring) with constant time delay to teach vocabulary to 18 students (three with LD) enrolled in an inclusive sixth grade language arts class. The subjects were provided with the correct answer immediately following the task request (0-s delay trials) for 10 trials. During subsequent trials, the subject was given the opportunity to respond with the correct answer within 5 s. Classwide peer tutoring is an instructional approach that is designed to engage students through reciprocal peer tutoring opportunities using components such as partner pairing, teams, immediate error correction, and contingent point earning and posting of team performance. In the Hughes and Fredrick study, teachers rank ordered the students on the basis of their score on a vocabulary pretest then paired the highest performing students with those who performed the lowest. Then all students were trained in the tutoring process, including how to use constant time delay and how to give feedback to their partner. Following the training, the student pairs worked together each school day for approximately 16 min a day, switching tutor and tutee roles after 8 min. The students continued to work together until they had mastered three target sets of vocabulary words.

Hughes and Fredrick (2006) found that all three of the students with LD were able to master two of the word sets and that two of the three students mastered all three sets. Additionally, the students with LD learned the vocabulary words at a rate that was similar to their peers without disabilities. A generalization probe performed 1 week after conclusion of the peer tutoring found that each of the students with LD were able to recall all of the vocabulary words they had been taught.

These two studies suggest that peer-mediated methods can be useful methods for improving the vocabulary acquisition of secondary-age students with LD. However, neither of these studies included a comparison group so it cannot be determined whether the methods were actually superior to other approaches. In addition, both of the studies had a small number of participants and only one (Hughes & Fredrick, 2006) reported the use of a measure to ensure treatment fidelity.

Repeated reading and direct instruction. Seifert and Espin (2012) found that the students learned more vocabulary words in the vocabulary learning (direct instruction) and the combined conditions than in the text reading (repeated reading) condition. However, students read significantly more words in the text reading and combined conditions than in the vocabulary learning condition. Neither the text reading nor vocabulary learning conditions resulted in improved reading comprehension.

The results of the Seifert and Espin (2012) study confirm that, for students with LD, simply reading more does not translate into improved vocabulary knowledge or improved comprehension. Instead, instruction that focuses on vocabulary knowledge is needed. The authors concluded that an instructional approach that combines both direct instruction in vocabulary knowledge with repeated reading to enhance fluency might be the most effective and efficient means of enhancing the reading of adolescents with disabilities. However, they acknowledged that even the combined
approach did not result in improvements in reading comprehension.

**Multimedia instruction.** Contemporary classrooms use a variety of technologies to support and enhance instruction. The use of appropriate technology applications has been found to enhance the learning of students with disabilities (Israel, Marino, Delisio, & Serianni, 2014).

Two studies by Kennedy and his colleagues (Kennedy et al., 2015; Kennedy et al., 2014) examined the use of podcasts to deliver vocabulary instruction in social studies content areas to high school students with disabilities. The content acquisition podcasts (CAPs) developed for these studies utilized a multimedia format based on universal design of learning (UDL) principles.

Kennedy et al. (2014) developed 81 CAPs for vocabulary instruction in five sections of 10th-grade social studies classes taught by one teacher. These sections included 27 students with LD. Students were taught using either “standard” instructional methods (e.g., presentation of text-based definitions via an overhead projector that students copied into a notebook) or with CAPs. The researchers found that when the students with disabilities were taught using the CAPs, they had significant higher scores on vocabulary probes and learned the words faster than when they were taught using the standard approach.

In a second study, Kennedy et al. (2015) compared the effectiveness of two types of CAPs that utilized either explicit instruction on vocabulary, a mnemonic (keyword) method, or a combination of both approaches for enhancing the vocabulary knowledge of 279 high school students, 30 of whom had been previously identified as having LD. The students were randomly assigned to one of four conditions: explicit instruction, mnemonic instruction, a combination of explicit and mnemonic, or a text-only presentation (without the images used in the other presentations). Following 3 weeks of instruction, the students with LD who used CAPs that included both explicit instruction and a mnemonic strategy had significantly higher posttest scores on a 30-item test developed by the researchers. The results for the students without disabilities were similar.

**Discussion**

The purpose of this updated review was to identify and analyze recent studies that have examined vocabulary instruction for secondary-age students with LD. Many of these students struggle with reading, making it difficult for them to be successful in an educational environment that is holding all students to higher standards. Although improvements in vocabulary are not the only solution to the literacy difficulties faced by older students with LD, they have been found to be a significant factor in reading success (Ebbers & Denton, 2008).

Like the previous reviews of vocabulary instruction for secondary-age students with LD by Bryant et al. (2003) and Jitendra et al. (2004), the current review found that vocabulary instruction for secondary-age students with LD could lead to improvements in word knowledge. Given high-quality instruction using evidence-based practices, these students can continue to expand their word knowledge at the secondary level. Moreover, as Bryant et al. (2003) noted, this instruction does not have to consume large amounts of instructional time, an especially important consideration in secondary classrooms.

The previous reviews by Bryant et al. (2003) and Jitendra et al. (2004) identified several approaches that showed promise for addressing the vocabulary learning difficulties of older students with disabilities. In the Jitendra et al. study, large effect sizes were found for studies that utilized mnemonic strategy instruction, cognitive strategy instruction, direct instruction, and constant time delay. Small to moderate effect sizes were found for computer-aided instruction and activity-based methods. Similar to Jitendra et al., the current review, which covered research since 2003, found that mnemonic instruction, learning strategies that utilized morphemic analysis, and direct instruction had large effect sizes. The one study that utilized the constant time delay method (Hughes & Fredrick, 2006) also included only three participants and combined constant time delay with peer tutoring, making it impossible to differentiate the effects of each of these instructional approaches.

In addition to mnemonic instruction, morphemic analysis, and direct instruction, the current review found that multimedia instruction delivered through podcasts resulted in large effect sizes. Previous reviews have reached different conclusions in regard to computer-aided instruction. Bryant et al. (2003) reviewed one study that reported positive effects for the use of computer-aided instruction, concluding that this was an effective approach to improving vocabulary knowledge. Jitendra et al. (2004) reported a small effect size for computer-aided instruction. The type of technology-based instruction utilized by Kennedy and his colleagues (2014; Kennedy et al., 2015) may be more effective because it goes beyond the simple drill and practice computer activities often used in the past. The use of emerging technologies that incorporate multimedia features into instruction are worthy of additional investigation.

**Limitations**

A significant limitation of the current review is the number of studies (seven) that are included. Despite the widely acknowledged importance of reading for the academic success of secondary-age students with LD, there is still a paucity of research on this topic. In regard to vocabulary instruction, although there have now been a number of studies (over 25 since 1979), the design of many of these studies...
is weak. Of the seven studies included in the current review, only four included a comparison group. All of the studies used researcher-developed measures of intervention outcomes. Although this has the advantage of evaluating vocabulary that is actually found in participants’ classrooms, it raises the question of whether the skills that the students are learning will generalize to new vocabulary items and to the variety of classroom environments that are characteristic of secondary education.

**Implications for Future Research**

This review as well as previous reviews highlights the need for more well-designed research that includes larger sample sizes, appropriate comparison groups, and the consistent use of measures to ensure implementation fidelity. Additionally, the use of both standardized and researcher-developed outcomes measures would be useful for determining the extent to which intervention methods lead to generalization of learning to new vocabulary items.

Although the research on peer-mediated instruction suggests that this can be a useful way for supporting instruction for secondary-age students with LD, there is a need for research that examines the differential effects of peer-based support from specific instructional methods. This could be accomplished by comparing the use of an instructional method with two groups of participants, one of whom receives peer support while the other does not.

In addition, future research should examine effective instructional methods for ELLs with LDs. This population of students is expanding, and research (e.g., Lesaux, Kieffer, Faller, & Kelley, 2010) has found that many of these students lack adequate vocabulary skills.

**Implications for Practice**

Despite the limitations noted above, it is possible to identify some implications for teaching vocabulary to secondary-age students with LD. First, it is clear that systematic instruction on vocabulary can improve vocabulary learning. Although this conclusion may seem obvious, it is important because it may be assumed that secondary-age students with LD may either be incapable of learning vocabulary or may be unmotivated to learn. The studies reviewed here as well as those in previous reviews indicate that secondary-age students with LD can learn new vocabulary when given appropriate instruction.

A second implication from the current review is that vocabulary instruction works best when it is frequently and systematically implemented using evidence-based practices such as mnemonic instruction, morphemic analysis, direct instruction, and multimedia instruction.

Finally, findings from the current review suggest that the use of peers, including peers with disabilities, to support instruction can be a useful method to help teachers deliver instruction in the classroom. Although it is still important to use the evidence-based vocabulary practices described in this review, the use of peer-mediated methods can help teachers better use their time in the classroom.

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