Published in final edited form as:
Child Lang Teach Ther. 2011 November 1; 27(3): 354–370. doi:10.1177/0265659011412247.

Vocabulary Intervention for School-age Children with Language Impairment: A Review of Evidence and Good Practice

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Abstract

The purpose of this paper is to provide evidence to support direct vocabulary intervention practices for primary school-age children with language impairment (LI). A rationale for providing direct vocabulary intervention for children with LI is outlined by reviewing typical and atypical vocabulary acquisition, evidence of instructional strategies from research in mainstream and special education is summarised, and suggestions for vocabulary intervention activities that facilitate deep word knowledge are provided. Suggestions for choosing appropriate vocabulary, using strategies during direct intervention, and conducting activities that increase depth of vocabulary knowledge are included.

Keywords

vocabulary intervention; language impairment; school-age children

Within the topic of vocabulary acquisition, the bulk of research on children with language impairment (LI) has focused on describing the nature of early word learning problems (e.g., Rice et al., 1990) and the underlying processes affecting word learning (e.g., Gathercole and Baddley, 1990). This research has important implications for educators working with children with LI. However, regarding specific intervention practices to improve vocabulary acquisition, research is much more limited (Cirrin and Gillam, 2008). Basic questions about service delivery models and appropriate instructional strategies are difficult to satisfactorily answer because of the lack of vocabulary intervention studies that have been conducted with primary school-age children who have LI (Cirrin and Gillam, 2008; Cirrin et al., 2010). In an effort to help inform decision making for direct vocabulary intervention for children with LI, this paper will first build the case for the need for direct intervention through a brief summary of typical and atypical vocabulary acquisition. Principles of vocabulary intervention from available research will then be reviewed, and instructional activities and supports to improve depth of word knowledge will be provided. Although a comprehensive approach to vocabulary instruction (e.g., Stahl and Nagy, 2006; Lubliner and Smetana, 2005) is likely to hold the most promise for children with LI; this paper will focus on direct

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intervention, in an effort to create a manageable scope (for descriptions of comprehensive vocabulary programs in mainstream education, see Lubliner and Smetana, 2005; Baumann et al., 2007).

Typical and Atypical Vocabulary Acquisition

Word learning in spoken contexts

Incidental word learning during conversation, including conversation in the classroom, is a primary way for children to build vocabulary. Much of the research on incidental spoken word learning has been conducted with preschool children (Rice et al., 1990; Rice et al., 1994) and young school-age children (Nash and Donaldson, 2005; Oetting et al., 1995; Riches et al., 2005). These studies have shown that young typical language learners are able to capture some aspects of word meanings in natural, incidental situations, including play, conversation and television viewing.

Children with LI also learn words incidentally, though they are not always as proficient as their same- age peers with typical language (Kan and Windsor, 2010; Nash and Donaldson, 2005; Rice et al., 1990; Windfuhr et al., 2002; Riches et al., 2005). Specifically, children with LI have difficulty comprehending and producing new words after limited exposures in quick incidental learning conditions (Rice, et al., 1990). They also show more difficulty learning and using verbs compared to nouns (Kan and Windsor, 2010; Oetting et al., 1995; Windfuhr et al., 2002; Riches et al., 2005). When exposed to target words more frequently, word learning of children with LI improves (Nash and Donaldson, 2005; Rice et al., 1994; Riches et al., 2005); however, the performance gap between children with LI and same-age peers also increases (Kan and Windsor, 2010). Children with LI need many exposures to achieve complete word learning, and they also require continued follow-through to maintain their vocabulary gains (Riches et al., 2005; Rice et al., 1994). Thus, in the school setting, a vocabulary rich oral language environment with repeated exposures to new words are an important source of incidental word learning for children with LI.

In addition to more frequent exposures to words, children with LI also respond positively in structured learning situations that more closely resemble what children would encounter in direct intervention (Kiernan and Gray, 1998; Nash and Donaldson, 2005). Kiernan and Gray found that supported learning contexts, which included modeling, imitation prompts, comprehension probes, production probes and corrective feedback, improved word learning performance for preschool children with LI. Relatedly, Nash and Donaldson (2005) showed that all children, including those with LI, gained more in-depth knowledge about words' meanings when explicitly taught through definitions, compared to incidental exposure during a story context. They also gained more knowledge when the words appeared more frequently. Riches and colleagues (2005) also reported positive effects for more frequent exposures. However, they showed that children with LI benefitted from these exposures being spaced across several days, rather than being massed on one single day.

Additional research has focused on which aspects of word learning are especially difficult for children with LI. Findings have shown that children with LI have deficits in phonological (Gathercole and Baddley, 1990), semantic (Alt et al., 2004) and syntactic (Rice

et al., 2000) components of word learning. Learning the phonological sequence of new words is often problematic for children with LI, primarily due to limited phonological memory (Gathercole and Baddley, 1990). Four- to six- year old children with LI have been shown as less successful identifying the correct label for words that were recently been learned (Alt et al., 2004). Also, school-age children with LI have consistently been found to perform more poorly on nonword repetition tasks (Gathercole and Baddley, 1990; Dollaghan and Campbell, 1998; Ellis Weismer et al., 2000; Graf Estes et al., 2007), a measure of phonological short-term memory. These results are relevant to word learning because impairments in phonological short-term memory are at least partially responsible for the long-term word learning difficulties of children with LI (Archibald and Gathercole, 2007).

The semantic component of word learning is also problematic for children with LI, who often have problems storing and remembering the content of word meaning (McGregor et al., 2002; Alt et al., 2004). Using an interactive computer program to teach semantic features of novel words to 4- to 6-year old children with and without LI, Alt et al. (2004) found that children with LI learned fewer semantic features than their typically developing peers. McGregor and colleagues asked 16 school-age children with LI and 16 typically developing control children to provide definitions and to draw stimulus words. Their results showed that the LI group made more labeling errors than the control group. By comparing the errors, definitions and drawings, McGregor and colleagues concluded that the errors in labeling arose from sparse or missing semantic representations. Thus, the problems for children with LI went beyond merely learning the phonological labels for words; they also had an impaired ability to acquire the details of word meanings.

Finally, although children with typical language skills use syntactic cues in sentences to figure out the meanings of novel words, young children with LI may not be as sensitive to these cues (Rice et al., 2000). Rice and colleagues showed video sequences that included novel words and novel items to 5-year-old children with LI, age-matched peers, and younger children matched for mean length of utterance. A cued condition gave syntactic cues (e.g. ‘some’ or ‘a’), and a neutral condition replaced these cues with neutral articles (e.g., ‘the’ or ‘my’.) The age-matched group comprehended significantly more words in the cued condition, whereas the LI and younger groups performed similarly in both conditions. The authors concluded that children with typical language skills use syntactic cues to help match the word referent with the word label, and that children with LI, at least by 5-years-old, are not sensitive to these cues.

Word learning in written contexts

In the school years, reading becomes an increasingly important source for vocabulary acquisition through shared book reading (Brett et al., 1996) and independent reading (Nagy et al., 1987). Shared book reading is often used with preschool children but can also be effective for teaching vocabulary to school-age children (Elley, 1989; Brett et al., 1996). Shared book reading allows adults natural opportunities to provide definitions and explanations of new words in meaningful contexts. Elley (1989) compared word learning of 8-year-old children from six classrooms during oral story book reading. Children who heard

words with an explanation (e.g., providing a synonym, role playing or pointing to a picture) made greater receptive gains than children who did not receive an explanation. Children made the greatest gains on words that occurred more frequently, were illustrated by the pictures and had a supportive context with helpful clues to the meanings of new words. Similar positive results were found with US grade 4 students (age was not reported, but typically children are 9- to 10- years old in grade 4). Compared to students who heard a story without explanations, children who were given definitions of target words during shared reading made greater vocabulary gains, which were maintained at a delayed post-test six weeks later (Brett et al., 1996).

Incidental word learning during independent reading is also important for school-age children. Nagy et al. (1987) calculated that a typical 10- to 11- year old child could learn approximately 800 to 1,200 words per year from independent reading, though the potential number of words learned depended on the child's amount of independent reading behavior. Reading allows children to encounter words multiple times in various contexts. Repeated exposures help children refine their mental representations by adding correct details and eliminating incorrect details (Fukkink et al., 2001). Schwanenflugel, Stahl, and McFalls (1997) found several word factors that were related to vocabulary growth; specifically, words that were concrete, had high imageability or were nouns were more easily learned in written contexts.

In addition to reading behavior, the ability to learn new words incidentally during reading depends on the child's reading comprehension skills and oral language ability. Children with deficits in either of these areas have more difficulty with incidental word learning during reading (Cain et al., 2003; Cain et al., 2004; Steele and Watkins, 2010; Steele, 2010). Steele and Watkins (2010) tested 9-to 10- year old children with and without LI on their ability to infer new word meanings from contexts. Target words appeared either two or five times, and were either directly adjacent to or separated from informative context, which gave clues to the words' meanings. They found that children with LI incidentally learned fewer words than their peers with typical language, regardless of frequency and position of informative context. A subsequent analysis of errors made during the assessment indicated that children with LI made fewer gains in partial, as well as complete, word knowledge compared to typical peers (Steele, 2010). Cain, Oakhill, and Lemmon (2004) reported that Year 5 children with weak vocabulary and poor reading comprehension also struggled during a direct instruction task, in which they were directly told the meaning of some of the target words that appeared in the reading passages. Thus, primary school-age children with LI are not as skilled as their same-age typically developing peers at incidental word learning during reading, which is likely to negatively impact their independent vocabulary growth.

Implications for Practice

In summary, research on typical and atypical vocabulary acquisition has several relevant implications for professionals who work with children with LI. First, the incidental nature of typical vocabulary acquisition and the word learning difficulties of children with LI highlight the importance of developing rich language environments, in which students receive repeated exposures to new words. Research findings point to the need for creating

classrooms that support and encourage sophisticated word use through a rich oral language environment, including class discussion and conversation, and a rich written language environment, including independent and shared book reading. Research findings also suggest that the strategies of providing multiple exposures, modeling and prompting, are appropriate for encouraging word learning within educational settings. An instructional program, in which educators provide repeated exposures to vocabulary across several days is also supported by the research literature from children with LI. (For more information on creating rich oral language environments, see Stahl and Nagy, 2006).

Even in supported settings, school-age children with LI are not as skilled as their typically developing peers at incidentally learning new word meanings. These results support the need for directly teaching certain word meanings, rather than reliance on incidental word learning as an adequate means for vocabulary acquisition for children with LI. Thus, those responsible for supporting vocabulary acquisition within the school setting may need to consider providing direct intervention and collaborating to identify effective teaching strategies (Wilson et al., 2010). This collaboration may involve discussions of why vocabulary needs to be taught explicitly, what are the components of effective vocabulary programs are, how to embed activities into content lessons, and how accommodations can be made for children who are struggling (Wilson et al., 2010).

Vocabulary Intervention

Service delivery options

In a recent systematic review of evidence based practice for service delivery models, Cirrin and colleagues concluded that the current level of evidence does not support any certain service delivery model for primary school-age children with communication needs (Cirrin et al., 2010) . Regarding vocabulary specifically, Cirrin et al. reported on two relevant studies dealing specifically with children with LI. One of those studies used a randomized control study of 152 children to compare direct to indirect and group to individual service delivery models (Boyle et al., 2007). Vocabulary was targeted along with other language skills including grammar, narratives, and comprehension monitoring. Results indicated no significant differences between direct and indirect or between individual or group on a standardized vocabulary measure; however, speech and language therapists (SLT) and assistants reported positive influence of direct therapy on child's well being, distress and frustration. Similarly, parents reported direct therapy resulted in greater improvements in literacy and behavior.

Throneburg et al. (2000) compared curricular vocabulary outcomes of collaborative, classroom-based and traditional pull-out therapy models. Twelve classrooms, kindergarten through US grade 3, participated in 12 weeks of vocabulary intervention. The collaborative approach used team teaching among the classroom teachers, the SLT, and graduate students, whereas the classroom-based approach had the SLT and graduate assistants conducting the same intervention in the classroom, but without the teacher present. Children in both groups also received at least 15 minutes per week of ‘pull-out’ services (students pulled from the mainstream classroom to receive small group intervention conducted by the SLT in a separate resource room). The traditional approach was completely pull-out. Results showed

that the collaborative approach led to better gains in curricular vocabulary than traditional or classroom-based approaches. Throneburg and colleagues stated that although it led to the best results, the collaborative approach also was the most costly, in terms of SLT time spent in planning. Additionally, grant money was used to pay for a substitute teacher so the classroom teacher could attend collaborative meetings during the school day, a strategy not available to most practicing SLTs. Thus, this study suggested that the collaborative approach may have the best results for learning curricular vocabulary; however, until more data becomes available, Cirrin et al. (2010) concluded that clinicians must use reason-based practice and their own data to make clinical decisions about service delivery.

Direct intervention

Regardless of the service delivery model used, a shared understanding of vocabulary goals may be beneficial for guiding the educational teams' intervention efforts. There are different stages of knowing words, as children (and adults) gain more information about word meanings through repeated exposures. A word knowledge scale, such as one proposed by Dale (1965) may be useful for identifying a general goal for vocabulary intervention. Dale (1965, p. 898) proposed the following stages of word learning from incomplete to complete knowledge: 1) 'I never saw the word before'; 2) 'I know there is such a word, but I don't know what it means'; 3) I have 'a vague contextual placement of the word'; and 4) I have the meaning of the word 'pinned down'. Through successive encounters with words, children add correct details and eliminate incorrect details (Fukkink, Blok, & de Glopper, 2001) until they gain full, productive control of the words (Stahl and Nagy, 2006). Successful intervention is intended to help children 'pin down' word meaning, so they are able to understand the words when they encounter them in reading or in conversation, and so they are able to use the words productively in their own speaking and writing. A word learning scale may be used to assess children's word knowledge. Or, children may be taught to use the scale, so they are able to assess their own understanding of target words (Lubliner and Smetana, 2005; Baumann et al., 2003).

Choosing target words—For vocabulary intervention to be functional, target words should be tied to a meaningful context (American Speech-Language-Hearing Association, 2004). In the mainstream school environment, this context would most likely be the classroom. An interdisciplinary team, including students, parents, SLTs and educators may collaborate to choose appropriate target vocabulary which are aligned with the curriculum and which will have the most meaningful and functional impact on children. Words may also come from reading sources, such as classroom textbooks or literature, or from subject topics discussed in the classroom. Words may also come from sources important to the child, such as song lyrics (Hines, 2010). Importantly, vocabulary intervention should be individualized to the needs of the students, so children with LI are likely to have more basic or different vocabulary needs than their typical peers (McGregor et al., 2002). It follows that individualization of vocabulary will lead to different target words than those highlighted in textbooks.

One way to identify target vocabulary from reading sources is offered by Beck, McKeown, and Kucan (2002) from the literature on mainstream education. They propose three tiers of

word types. Tier I words are high frequency, general words whose meanings should not be targeted directly in instruction because students are most likely to learn them incidentally. Tier II words are those for which children have an understanding of the underlying concepts, are useful across a variety of settings, and can be used instructionally in a variety of ways. According to Beck and colleagues, these words should be the primary focus of vocabulary instruction, as they would make the most significant impact on a child's spoken and written expressive capabilities. Finally, Tier III words are rare and highly specific to a particular domain. Beck et al. suggest providing brief explanations of these word meanings, but not focusing directly on them during vocabulary instruction, since they will have less of a functional impact on children's expressive vocabulary. In addition to actual words found in the text, concepts may be chosen as target vocabulary (Beck et al., 2002). For example, *The Quiltmaker's Gift* (Brumbeau, 2000) is a story of a greedy king who learns to be generous and finds true happiness. The words *benevolent* and *banish* are not written in the story itself, but the concepts are present and may be appropriate choices for intervention. See Table 1 for more examples of possible word choices from this book.

Considering instructional strategies—Once target vocabulary is chosen, appropriate instructional strategies can be considered. At present, the research on vocabulary intervention strategies for school-age children with LI is extremely limited (Cirrin and Gillam, 2008); however there are a few studies which may inform intervention practices. For example, Weismer and Hesketh (1993) manipulated the manner in which novel words were presented to kindergarten children with and without LI in a quick incidental learning task. They found positive effects of a slow rate of presentation on word comprehension and production, of emphatic stress on word production and of gesture on word comprehension.

Zens, Gillon, and Moran (2009) examined whether intervention conducted with 6- to 8-year old children with and without LI could positively impact word learning. Children received six weeks of phonological awareness intervention and six weeks of semantic intervention. Half of the children received the phonological awareness intervention first, and the other half received semantic intervention first. Pre-test, mid-test and post-test assessments of fast mapping and word learning skills were made. Regardless of the order of intervention, both groups made gains in production, but not comprehension, of novel words on the fast mapping task. Intervention did not impact comprehension of novel words in the word learning task, though production improved for children who received the phonological intervention first. These results suggested that phonological awareness intervention may be important for improving semantic skills. It is important to note that this study investigated whether intervention could affect the underlying process of word learning, rather than learning of particular words.

Finally, Parsons, Law, and Gascoigne (2005) employed a single subject design to investigate the effects of curricular vocabulary instruction in math concepts for two boys with LI in Year 4 who were attending a mainstream primary school. The children attended 18 sessions of intervention, 3 sessions per week, 25-35 minutes in length. Eighteen words were targeted in total, with one word taught per session. Intervention followed a structured format of ‘10 Steps to Becoming a Word Wizard’, which included activities such as orthographic and phonological presentations of the target words, activation of background knowledge,

explanation of meaning and activities and games to further practise and support the phonological and semantic aspects of the target words. Results showed that the two children learned most of the target words and had carryover to control words, but not to a standardised test of vocabulary.

To further inform intervention, findings from mainstream and special education may be helpful in identifying instructional strategies that hold promise for clinical use. The rationale for using evidence from children with typical language and with specific learning difficulties is: 1) children with LI appear to have a quantitative rather than qualitative difference in word learning (e.g., Riches et al., 2005: ; Rice et al., 1994); and 2) children with LI often have concomitant specific learning difficulties (e.g., Catts et al., 2006). Furthermore, Nelson and van Meter (Nelson and Van Meter, 2006) suggested that intervention and instruction are often identical, or at least very similar. What distinguishes intervention from instruction is that intervention is individualised to the student's needs, provides supports and scaffolds for student success, and is often conducted in one-to-one sessions or small groups.

In a meta-analysis of vocabulary instructional strategies for typically developing children, Stahl and Fairbanks (1986) found three key characteristics of effective vocabulary programmes for mainstream education, which remain the gold standard for effective instruction: 1) they provide definitional and contextual information; 2) they teach in-depth meaning of words; and 3) they provide multiple repetitions or exposures to new words. Graves (2006) expressed these strategies slightly differently: 1) ‘review, rehearse, and remind students about the word in various contexts over time’ (p. 70); 2) discuss word meanings to actively involve students; and 3) spend time teaching, discussing, and learning about each word. Graves also gave advice about what should *not* be done during vocabulary instruction, including the following: 1) giving words out of context and asking student to look up meanings in a dictionary; 2) doing speeded trials with individual words; 3) completing word mazes; 4) teaching words as an alternative label when they represent new and challenging concepts; 5) teaching spelling rather than vocabulary; 6) assuming that contextual clues are enough to yield precise word meanings.

Similar to typically developing children, children with specific learning difficulties learn more through direct instruction than incidental learning through context (Jitendra et al., 2004). In their review of the research on instructional strategies for children with specific learning difficulties, Jitendra and colleagues concluded that the guidelines for vocabulary instruction with typical children were also appropriate for children with specific learning difficulties. Specifically, they supported the instructional strategies of providing explicit instruction in definition and contextual information, and encouraging children to use vocabulary expressively.

Introducing word meanings: Included in this section are suggestions for activities that might be used during direct intervention to encourage deep processing of new words. For teaching new words for known concepts (e.g. Tier II words), instruction typically begins by providing a student-friendly definition for the word (Beck et al., 2002). Student-friendly definitions differ from dictionary definitions, which have not been shown to be an effective way for children to learn word meanings (McKeown, 1993). In fact, when given a dictionary

definition, typically developing children are most likely to incorrectly interpret the meaning (McKeown, 1993). A student-friendly definition is written by an adult (SLT, teacher, assistant) and is not constrained by space limitations, as a dictionary definition is. Beck and colleagues provide two guidelines for writing a definition: pinpoint the word's typical use and explain its meaning in everyday language. For example, the dictionary definition for *benevolent* (http://dictionary.reference.com/browse/benevolent) is ‘characterized by or expressing goodwill or kindly feelings; desiring to help others; charitable; intended for benefits rather than profit’. The word's typical use is to describe a person who helps others. One way to explain its meaning in everyday language would be describes a person who is happy and kind, and does nice things to help other people feel happy too. See table 2 for examples of dictionary and student-friendly definitions.

Increasing depth of word meaning: Additional activities that may be used to provide definition information include teaching synonyms and antonyms, generating examples and nonexamples and discussing the similarities and differences between the new words and known words (Stahl and Nagy, 2006). Word association activities may also be useful. By avoiding teaching words as synonyms, the words’ new and challenging concepts may be explored (Graves, 2006). For example, possible Tier II words from *The Quiltmaker's Gift* were greedy, seize, stashed, grateful, generous, practical, banish. Possible synonyms are: greedy-selfish, seize-steal, stashed-hidden, grateful-pleased, generous-kind, practical-useful, banish-remove. Compared to matching of synonyms through drill activities, an in-depth discussion of word meanings would include how these synonyms are similar and different and in what contexts each word may be used. For example, *steal* implies secretly taking something that is not yours, whereas *seize* means taking something that is not yours by using force. Generating examples and nonexamples may help children understand word meanings more deeply. Continuing with the example words, examples of a *practical* gift from the book would be a coat or shoes. Nonexamples would be waltzing blue Siamese cats or a merry-go-round. In a word association activity, a new word is paired with a known word through questions (Beck, et al., 2002). For example, ‘What word goes with punish?’ (*banish)*. Note that the response requires the student to provide the target word. Another way to ask word associations would be, ‘How do *banish* and *punish* go together?’ Students then explain their answer, to encourage deep processing of word meanings.

Expanding words to new contexts: After the meaning of the word is presented and discussed, a rich and informative context for the word (which may be one sentence or an entire paragraph) might be given, and other contexts in which the word could be discussed (Graves, 2006). Students may generate sentences using the target word. Alternatively, Beck and colleagues suggest a variation on this activity, in which students are given a sentence stem which includes the target word, and students complete the stem a meaningful way. For example, ‘The *benevolent* father saw the injured cat and...’ The purpose of the sentence stem activity is to prevent generic sentences, such as ‘She is benevolent’. Stahl and Nagy (2006) suggest going one step beyond a simple sentence and having students generate an entire narrative based around target words. Other activities to generate multiple contexts may include personal experience activities and question and discussion (Beck, et al., 2002). During a personal experience activity, students are asked questions including target words,

such as ‘Have you ever known someone who was *benevolent*?’ ‘Describe a time when you were *benevolent*.’ These questions may be extended beyond personal experience by asking questions such as, ‘When is a time that you *would* act benevolently?’ Contexts that are examples and nonexamples might also be given, after which students are asked to make choices. For example, ‘Would you *stash* a favorite toy or dirty socks?’ Relatedly, questions about new words, and additional examples and explanations might be requested, such as, ‘You would stash something that is valuable. What is something you would stash? Why would you stash it?’ The purpose of these activities is to build depth of vocabulary knowledge.

The strategies suggested above have yet to be tested with children with LI; however, research on children with typical language supports their use. For example, Beck, Perfetti, and McKeown (1982) provided evidence of the effectiveness of rich, daily vocabulary intervention that focused on learning in-depth word meanings. The children in their study were typically developing students in US grade 4 who participated in five months of daily, 30 minute, whole class vocabulary sessions led by the classroom teacher. Instructional strategies included generating contexts or situations for target words, developing speed through matching definitions and words and motivating children to listen for target words outside of class through a ‘Word Wizard’ activity. Compared to a control group of children, who were matched to the experimental group on pre-test standardized vocabulary and reading comprehension scores and who received traditional text-book curricular instruction, participants who received rich vocabulary instruction made gains in targeted word knowledge and recall of details in stories. Participants also scored significantly higher on standardized tests of vocabulary and reading comprehension.

Beck and McKeown (2007) provided rich vocabulary instruction to US kindergarten and grade 1 children from low-socioeconomic backgrounds. Classroom teachers provided rich instruction in target words taken from stories which were read aloud. The intervention included providing contexts from a story, explaining word meanings, providing examples of contexts outside of the story, answering questions about words, constructing examples and repeating words. Compared to a control group which received no instruction, children who received the rich vocabulary instruction learned target vocabulary. As shown in their second study, more instruction resulted in stronger word gains, with children who received six days of instruction making more word learning gains than children who received three days of instruction. The effect of rich vocabulary instruction has yet to be empirically tested on children with LI, and future research is needed to provide higher level of evidence. The results provided by Beck and colleagues suggest that these strategies may also be helpful for children with LI, inasmuch as children with LI are quantitatively, but not qualitatively different than typical children.

Providing prompts and supports—Nelson and Van Meter (2006) suggest that intervention with children with LI differs from instruction in several ways, including that SLTs provide scaffolding for individual children's needs, which allows them to be successful. Scaffolding comes from the Vygotskian theory of child development (Vygotsky, 1978; Vygotsky, 1987), in which children are believed to develop cognitively and linguistically in the context of social interaction. Adults structure these interactions so that

children operate within their zone of proximal development, or the zone in which they are able to optimally learn. Schneider and Watkins (1996) illustrated how SLTs vary their level of scaffolding according to the child's needs, providing high, medium, or low level cues to ensure success with a given task. In the context of vocabulary intervention, verbal support, such as modeling, fill-in-the blank, expanding or recasting may be useful (Nelson and Van Meter, 2006). Also visual support, such as pictures, photographs, pictorial mnemonic strategies or visual organizers might be included. Some types of visual support will be further described in the following sections.

Keyword Strategy: Evidence for children with specific learning difficulties supports use of pictorial mnemonic (i.e. keyword) strategies in recalling meaning of taught words for school-age children (Bryant et al., 2003). The keyword strategy involves presenting on an index card the target word, a phonologically similar keyword, a definition and a pictorial mnemonic. The pictorial mnemonic is a picture of the keyword interacting with the definition of the target word. For example, for the target word *banish*, the keyword may be *band*, and the pictorial mnemonic could illustrate a musical band alone on a deserted island (Mastropieri et al., 1990). The pictorial mnemonic strategy is intended to facilitate recall of word meaning by helping students associate the target word with a phonologically similar keyword, relate the keyword to the target word's definition and retrieve the appropriate meaning. The keyword method has been shown to be superior to drill with definitions (Mastropieri et al., 1990) and rehearsal with picture support (Condus et al., 1986). A downside to use of a pictorial mnemonic is that it can be time consuming, difficult to brainstorm an appropriate key word and difficult to visually represent meanings, especially for abstract words.

Visual organizers: Visual organisers may also be useful during vocabulary instruction, particularly for teaching complex concepts (Graves, 2006). Jitendra and colleagues (2004) reported that visual organisers used during discussion of concepts was superior to traditional dictionary instruction for children with specific learning difficulties. Visual organizers can be created in pairs, small groups or with the whole classroom, but are intended for use during discussion of word meanings (rather than an independent activity). Thus, they may be used to support definition and context activities, which were previously described. Use of visual organizers specifically has not been directly researched with children with LI; however, visual support in general is a cornerstone of language intervention strategies. Additionally, visual organizers are frequently used in mainstream education. Visual organizers include semantic maps, semantic feature analysis and Venn diagrams; each will be described here.

A semantic map has the target word in the center. Students brainstorm categories, relationships, features and examples related to the concept. The features are then grouped together and listed on the semantic map (see figure 1). An alternative approach (Stahl & Nagy, 2006) is for the adult to create questions or subcategories on the word map, which the students complete. Stahl and Nagy presented a ‘four square’ method of semantic mapping, in which children fold a piece of paper into four sections and write the target word in the upper left section. Examples and nonexamples are generated during discussion. Examples

are then listed in the upper right corner and nonexamples in the lower right corner. Following discussion, a student generated definition is written in the lower left corner (see figure 2).

Nash and Snowling (2006) compared the effects of teaching dictionary definitions to teaching contextual clues using semantic maps and discussion of target words from a written passage for 7- to 8-year old children with poor spoken vocabulary knowledge. Intervention occurred twice a week for 30 minutes for six weeks. Both groups of children made immediate gains in taught words; however the children who received intervention of contextual clues using semantic maps scored higher on maintenance tests of expressive knowledge 3 months after intervention. The purpose of their investigation was to determine whether teaching contextual clues was of greater benefit than teaching dictionary definitions. However, only the group who received contextual clues also used semantic maps. Thus, the results may indirectly support use of semantic maps for children with limited spoken vocabulary knowledge, when used in conjunction with contextual cues and written passages.

Semantic feature analysis involves creating a matrix, in which related words are listed vertically along the left margin. Across the top is a list of possible features. In pairs, small groups, or whole class, students complete the matrix using a + − system to indicate whether each feature applies to each word (see figure 3). Semantic feature analysis is an appropriate activity for distinguishing between related concepts that are partially known to students, though it would not be useful for a set of completely unknown words (Stahl & Nagy, 2006). Bos and Anders (1990) found that adolescents with specific learning difficulties (who had a mean age of 13.8 years) who received instruction in semantic feature analysis and semantic mapping had greater gains in vocabulary knowledge and recall of written passages compared to adolescents who received instruction in definitions of target words only.

Venn diagrams can be used to show similarities and differences between two related concepts. Two overlapping circles are drawn and one word is written inside each circle. Common characteristics of the word are placed in the overlapping portion, and different characteristics are placed in the non-overlapping portion (see figure 4). Venn diagrams are commonly used in mainstream education; however, no specific research describing the benefits of their use could be found.

In summary, there are many types of instructional activities that may be useful to increase depth of vocabulary knowledge for school-age children with LI, including definition and context activities. Visual support, such as semantic mapping, semantic feature analysis and Venn diagrams, may also be helpful, though the specific benefits of these techniques have not been directly tested for children with LI. The activities should be matched to specific vocabulary goals (for more information about writing goals aligned with curriculum, see Nelson et al., 2004). For example, for a vocabulary goal of learning curricular vocabulary for science, instruction might begin by presenting words with student-friendly definitions. Following the initial presentation, a possible sequence of activities may be to read a passage containing target words or contexts, discuss informative contexts in the passage, and generate different contexts for target words. The students could then complete word

association activities and create a Venn diagram to visually display similarities and differences among words. These example activities may also be modified to match receptive vocabulary goals by asking children to identify, rather than express, contexts and relationships between words. In small groups of children with many different vocabulary goals, a variety of activities will likely be most appropriate.

Conclusion

This paper provided a rationale for providing direct vocabulary intervention for children with LI, described principles of vocabulary intervention from special and mainstream education and provided suggestions for meaningful vocabulary intervention activities. The strategies and activities presented here would be appropriate for use within various models of service delivery, including direct intervention and collaboration in classroom settings. Collaboration may involve sharing of effective vocabulary strategies, of appropriate activities to increase depth of word knowledge, and of supports and prompts to use with children who have LI (Wilson et al., 2010). Collaboration will allow for multiple exposures to words across different environments (classroom and therapy room) and in different context, which are elements of effective vocabulary programs for children who are typically developing (Stahl & Fairbanks, 1986) and for children with specific learning difficulties (Jitendra, et al., 2004). During direct intervention, instruction can be individualized to the ability level of each student, and in-depth instruction of new word meanings may be more feasible. Small group, rather than individual intervention, is best suited for most of these activities, as learning occurs during discussion. The majority of the guidelines presented in this paper were not tested specifically with children with LI. Thus, future research is needed to empirically test the effectiveness of these strategies with this group of children.

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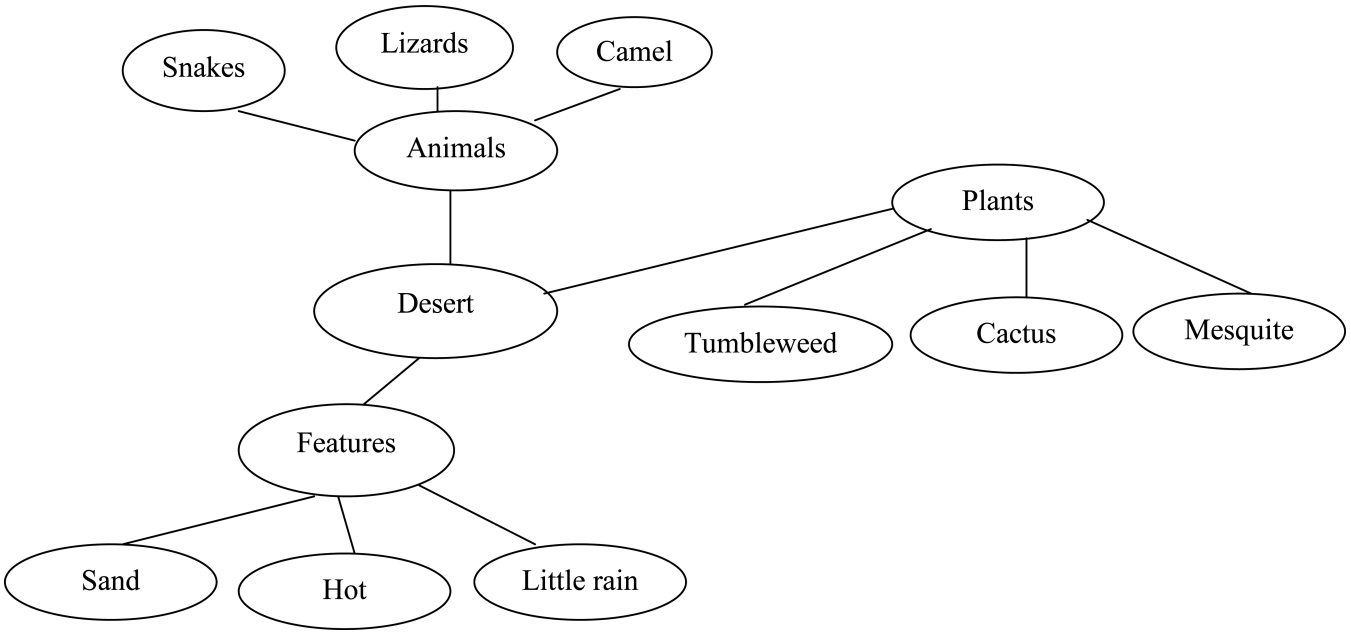

Figure 1.
Semantic Map

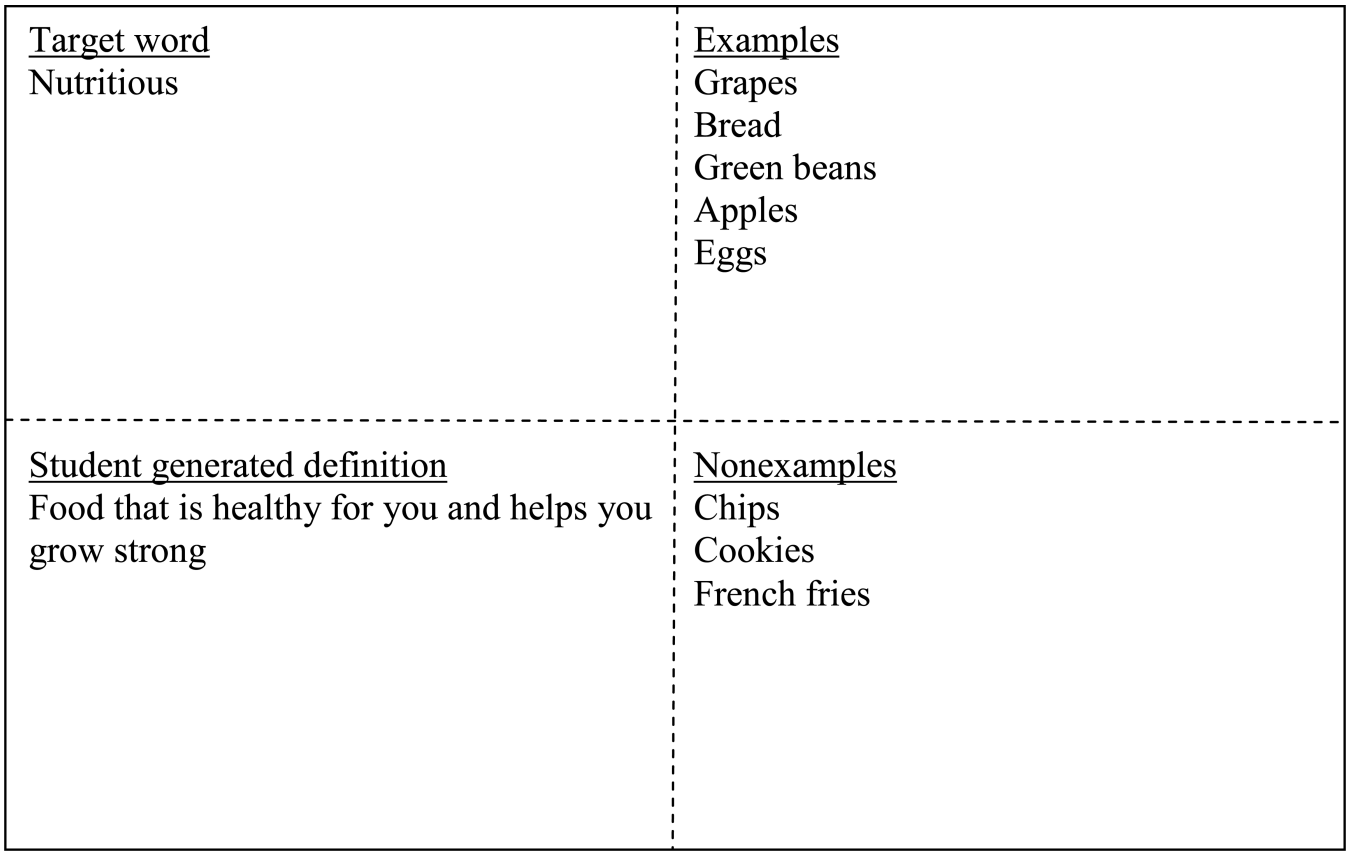

Figure 2.
Four Square

	Lives in Trees	Lives on Ground	Make nests	Use tools	Live in Groups
Gibbons	+				
Chimpanzee	+	+	+	+	+
Gorilla		+	+	+	+
Orangutan	+		+	+	

Figure 3.
Semantic Feature Analysis

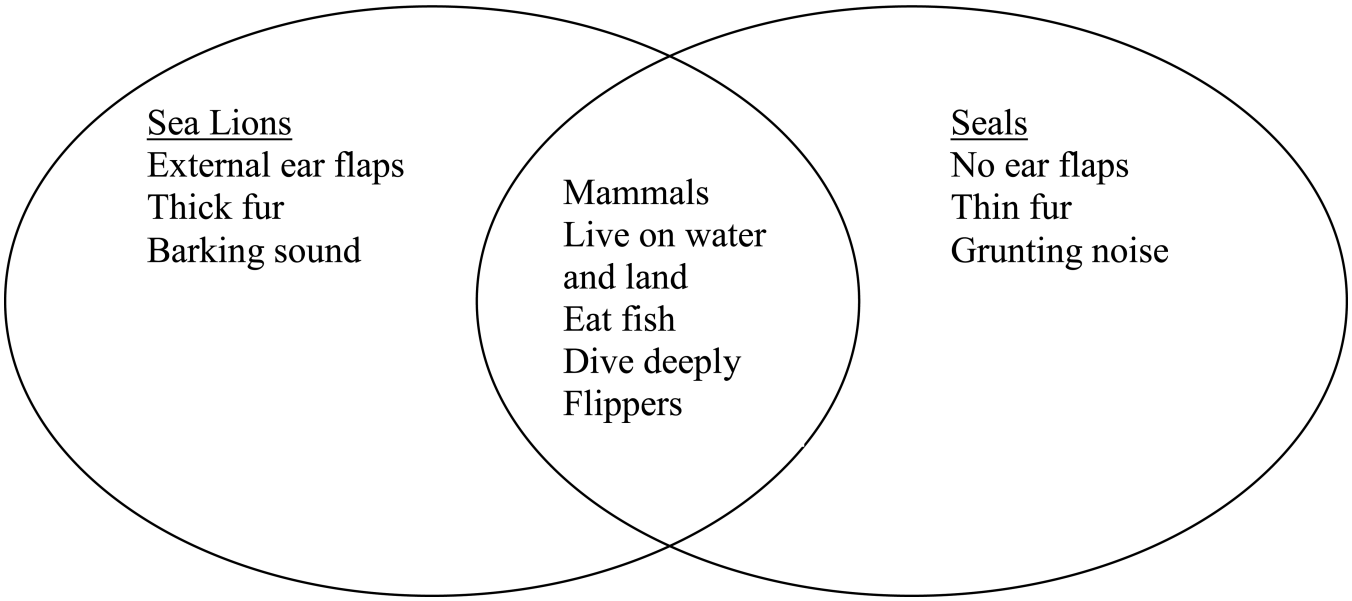

Figure 4.
Venn Diagram

Table 1

Vocabulary Categorized by Tier

Tier I	Tier II	Tier III
Poor	Greedy	Cobblestone
Rich	Seize	Iron maker
Treasure	Stashed	
Piece	Grateful	
Pleased	Generous	
Sparrow	Practical	
Quilt	Banish	

Table 2

Examples of Dictionary vs. Student-friendly Definitions

Word	Dictionary definition*	Student-friendly definition
introduce	to present (a person, product, etc.) to a particular group of individuals or to the general public for or as if for the first time by a formal act, announcement, series of recommendations or events, etc.	to tell about something or someone for the very first time
suggestion	the act of suggesting	what you tell someone that you think they should do, but in a nice way
formal	being in accordance with the usual requirements, customs, etc.; conventional	following special rules, which are usually old-fashioned, so that you act the right way
collection	something that is collected; a group of objects or an amount of material accumulated in one location, especially for some purpose or as a result of some process	a group of similar things, usually things that you like or need, that you put together and save
sympathy	harmony of or agreement in feeling, as between persons or on the part of one person with respect to another	understanding what another person is feeling because you have felt the same way before

* retrieved from www.dictionary.com