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Effects of Peer Tutoring With Audio Prompting on Vocabulary Acquisition for Struggling Readers

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Abstract

Reciprocal peer tutoring can be an effective supplement to teacher-led instruction, but students need to have the tutoring skills necessary to teach their peers successfully. Previous studies have addressed the challenge of providing essential information to a naïve tutor, allowing for correct modeling and feedback. The present study compared incidental learning of vocabulary words through classroom reading instruction to a combination of incidental learning supplemented with peer tutoring. Eight fourth-grade students were trained to tutor each other using a digital recording and playback device that provides audio prompts to naïve tutors. Results indicated that students made modest gains from incidental learning and much stronger gains from peer tutoring with audio prompting. Implications for practice and future research are discussed.

Keywords

peer tutoring; vocabulary instruction; audio prompting

In the United States, more than 17% of children (about 10 million) experience reading difficulties during their early school-age years (National Reading Panel, 2000). In fact, on the most recent National Assessment of Educational Progress, the National Center for Education Statistics (2006) reports that the percentage of the nation's fourth graders scoring at or above the proficient level in reading is 32%. Vocabulary acquisition is important for school success, especially in the area of reading comprehension (Anderson & Nagy, 1992), so students who have limited vocabularies often struggle in the area of reading (Bryant, Ugel, Thompson, & Hamff, 1999).

According to the National Reading Panel (2000), vocabulary should be taught both indirectly (i.e., through opportunities for multiple exposures of the word in passages across contexts) and directly through explicit teaching of the meaning of words that will be encountered in reading (pp. 4–24). Although both approaches are important to increase the learner's comprehension of text, an extra emphasis on direct instruction of vocabulary may be necessary for learners with low vocabulary or with disabilities.

Robbins and Ehri (1994) investigated the effects of listening to a story read twice on kindergarteners' vocabulary acquisition. The Peabody Picture Vocabulary Test–Revised was administered to students to assess their vocabulary knowledge prior to intervention. Based on the standard scores obtained on the Peabody Picture Vocabulary Test–Revised, students were divided into three groups: low (standard scores = 85 to 99), middle (standard scores = 100 to 114), and high (standard scores = 115 to 130). Then each student listened to a story with 11 target vocabulary words. The stories were read twice to each student (2–4 days apart). Results indicated that students can expand their recognition vocabulary when stories are read to them at least twice. The authors further concluded that students with weaker vocabulary skills (those in the low group) were less likely to learn new words incidentally than their peers within the high group. The investigators discussed the possibility that teachers may need to provide explicit vocabulary instruction for students demonstrating weak vocabulary because they are less likely to acquire new vocabulary incidentally.

Coyne, Simmons, Kame'enui, and Stoolmiller (2004) also investigated the effect of storybook reading on kindergarteners' vocabulary knowledge. However, their intervention used explicit vocabulary instruction within storybook reading. Results indicated that students with smaller vocabularies outperformed students in the control

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group on a measure of vocabulary acquisition. In addition, students with lower receptive vocabulary skills who received the intervention demonstrated greater gains in vocabulary acquisition than students with higher receptive vocabulary knowledge.

Additional research has been conducted examining the differences between vocabulary acquisition when students are taught using various treatment approaches. Coyne, McCoach, and Kapp (2007) investigated the use of "extended" vocabulary instruction during small-group storybook reading with kindergarteners. These researchers compared the effects of three conditions including extended vocabulary, embedded instruction, and incidental exposure on vocabulary acquisition. The extended vocabulary intervention included explicit instruction, multiple exposures to target words, and activities leading to deep processing of target word definitions. The embedded instruction condition included providing participants with simple definitions of target words when those words appeared in the story. A sentence was then read a second time, and the target word was replaced with the definition. In the incidental exposure condition, neither target words nor their definitions were taught directly, but they were simply read when they appeared in the story. Results indicated that the extended instructional condition demonstrated greater target word learning than the other two conditions.

The advantage of direct vocabulary instruction was also seen for students with disabilities. Jitendra, Edwards, Sacks, and Jacobson (2004) conducted a review of intervention studies that focused on vocabulary acquisition for students with learning disabilities. Based on their review, the authors suggested that when the purpose of vocabulary instruction is to introduce novel words and their definitions, practitioners should use instructional strategies that directly teach vocabulary. Some of the direct methods of instruction included use of mnemonic devices, direct instruction, activity-based methods, and computer-assisted instruction. Designing effective direct instruction of target vocabulary means ensuring the inclusion of instructional design principles, such as conspicuous strategies. Use of conspicuous strategies to teach vocabulary includes direct presentation of word definitions, modeling, and use of full and clear explanations of target vocabulary words (Coyne, Kame'enui, & Carnine, 2007).

Although direct teaching of vocabulary to students is important, it may be very challenging for the general education teacher to target this instruction and efficiently provide instruction across students with very different levels of vocabulary. One way to supplement incidental learning with targeted direct teaching and practice is through peer tutoring. Peer tutoring provides increased practice opportunities and immediate feedback to tutees. Rohrbeck, Ginsburg-Block, Fantuzzo, and Miller (2003) conducted a meta-analysis review of group comparison studies investigating the effects peer-assisted learning interventions within elementary school settings. Results indicated an effect size of .59 across 81 studies. Overall, based on the findings of the meta-analysis, the authors concluded that strong evidence exists for the effectiveness of peer-assisted learning interventions, especially with vulnerable students (e.g., minority students attending urban schools).

There are few studies investigating the effects of peer tutoring on vocabulary gains. One study by Hughes and Fredrick (2006) used a multiple probes across behaviors design to investigate the effects of classwide reciprocal peer tutoring procedures combined with constant time delay on the vocabulary acquisition of sixth-grade students with learning disabilities. The researchers also examined the vocabulary acquisition of 16 students without learning disabilities who also participated in the intervention. Even though the peer tutoring was reciprocal, dyads had to be carefully planned so that a student with stronger academic skills was always paired with a student with weaker skills. The stronger student always assumed the role of tutor first during each session. All of the students with learning disabilities demonstrated mastery on two sets of vocabulary words (5 words per set). Two of the 3 students demonstrated mastery on a third set of words, and these students were able to maintain mastery for all 15 target words for at least 7 weeks following intervention. For the students without learning disabilities, high rates of mastery were demonstrated and maintained for at least 7 weeks.

Reciprocal peer tutoring has several advantages (e.g., the items address the needs of both students, there is no stratification of roles) but may be difficult to arrange in such a way that students provide sufficient support to each other to learn the content. In the majority of studies conducted using peer tutoring as an intervention, students had to be carefully paired because the tutor needed to be able to provide correct modeling and appropriate feedback to the tutee. A few studies have been conducted to address the challenge of providing the essential information to a naïve tutor, allowing for correct modeling and feedback (Butler, 1999; Heward, Heron, & Cooke, 1982; Van Norman & Wood, 2008). Heward et al. (1982) used a tutor preparation component, "tutor huddle," to ensure that tutors were prepared with correct responses in advance of working with their partners. Butler (1999) also used "tutor huddles" within a classwide peer tutoring model that was used to teach sight words to fourth- and fifth-grade students receiving special education services in a self-contained setting. Van Norman and Wood (2008) used audio prompting to increase the accuracy of tutor feedback. They taught kindergarteners to tutor each other on sight words by providing the tutors with word cards that held an embedded

voice-output device. Following a tutee's response, the tutor activated the device to hear a model of the correct response. Results showed improved accuracy of feedback for all participants when the voice-output device was used.

The use of audio prompting holds promise for a variety of tutoring purposes (Wood, Mackiewicz, Van Norman, & Cooke, 2007) including providing naïve tutors with audio models of vocabulary words to assist in peer tutoring. The current study extends prior research by investigating the effectiveness of an intervention designed to target vocabulary acquisition and further examining the use of audio prompting as a support to naïve tutors within a reciprocal peer tutoring model. In a reciprocal peer tutoring model, each student functions as both the tutor and the tutee (Mastropieri et al., 2001). Specifically, we investigated (a) the additive effect of peer tutoring with audio prompting to multiple exposures of target words in passages on the number of vocabulary words correctly placed in context and (b) student opinions regarding treatment acceptability of the intervention.

Method

Participants

Participants were eight students who had been identified by the classroom teacher as struggling in reading and demonstrated below-average performance on classroom assessments. Students included four girls and four boys, ages 9 to 11 years old. Of the eight students, one was identified as having a specific learning disability in reading only; two were identified as having specific learning disabilities in reading and writing; one was identified as having specific learning disabilities in reading, writing, and math; and one was identified as having a mild intellectual disability. The remaining three students were identified by the classroom teacher as needing support in the area of reading. All students received core, general education reading instruction in the same fourth-grade inclusion classroom cotaught by a general education teacher and a special education teacher (fourth author).

Students were teamed together in tutoring pairs based on academic and behavioral characteristics. For example, a student with attention difficulties was paired with a student who could keep the tutoring pair focused on the task and redirect the other student as needed. Student pairs were determined prior to student training and remained static throughout the study.

Setting

Training, peer tutoring, and data collection took place in an elementary school within a public, urban school system in the southeastern United States that had a population of approximately 925 students. Demographic information related to the school population at the time of the study indicated that approximately 48% of students were eligible to receive free or reduced-price lunch with eligibility based on financial need. The population was diverse, with 50.6% African American, 37.5% Caucasian, 4.3% Hispanic, 4.1% multiracial, 2.3% Asian, and 1.1% American Indian students. Students with disabilities represented 9.8% of the school population.

Training, pretests, posttests, and completion of social validity questionnaires took place in a private office within the school. Core reading instruction took place within a fourth-grade general education classroom. Peer tutoring was conducted outside the classroom in the hallway for two pairs, and two pairs worked in a separate classroom used by teachers providing supplemental instruction. These settings were chosen because, as is true in many overpopulated schools, small-group instruction often takes place in areas outside of the classroom.

Peer tutoring took place prior to the beginning of the academic school day. While the students participating in the study completed the intervention procedures, the other students in the classroom completed nonacademic morning activities to prepare for the day (e.g., unpacking book bags, sharpening pencils, recording homework assignments).

Researchers

The first and fourth authors implemented the study procedures at the school. At the time of the study, they were doctoral students in special education at a university in the southeastern United States. The first author was employed as a school psychologist, working full-time at the school where the study was conducted. The fourth author was employed as the special education teacher in the fourth-grade inclusion classroom in which the incidental condition occurred. She cotaught with the general education teacher during several classes throughout each day, including reading.

Materials

Pretests. Pretests were created to determine which 12 vocabulary words to use as target words for each Open Court (Bereiter et al., 2000) lesson. A total of 10 pretests were created for use over the course of the study. Pretests were printed on paper and consisted of a word bank at the top of the page containing 20 story words plus 4 distracter, nonstory words and 20 fill-in-the-blank sentences. An example of a fill-in-the-blank sentence from the pretest is, "She always kept her desk _____ so that she could find everything she needed during class." The correct answer,

"tidy," would be in the word bank. The 20 story words were selected from each Open Court lesson that would be taught during the next week. To avoid introducing a confounding variable, the 20 story words did not include any that were identified for explicit vocabulary instruction in Open Court materials. Twelve target words were selected from the story words missed on the pretests. These 12 words were identified as target words, with 6 randomly assigned to the incidental learning condition and 6 words assigned to the peer tutoring condition.

Posttests. Posttests followed the same format as the pretests (i.e., word bank plus distracters, fill-in-the-blank sentences). Posttests included 12 target words in the word bank along with 3 distractors and 12 fill-in-the-blank sentences.

VoicePods. VoicePods (Attainment Company Inc., 2006) were used to facilitate peer tutoring and were purchased for approximately $60.00 each. The VoicePod is a portable digital recording and playback system that includes multiple, reusable cards. Each card is covered with a clear plastic sleeve that can be lifted to insert a paper square displaying text. In addition, each card has an identification/activation strip across the bottom, and when that strip is inserted into the pod, it accesses a recording of up to 10 s that can be coordinated with the visual prompt on the card. The recordings are activated by the push of a button. The VoicePod was selected because it was transportable, easily adapted, and cost efficient.

Eight VoicePod cards were used for each target word. The text for each card was printed from a computer and then put into each sleeve. The text for the eight cards included the following information for each vocabulary word (a) the vocabulary word, (b) the definition or synonym of the vocabulary word, (c) a sentence using the vocabulary word, (d) an identical sentence using the definition or synonym in place of the vocabulary word, (e) a different sentence using the vocabulary word, (f) an identical sentence using the definition or synonym in place of the vocabulary word, (g) two sentences (labeled "a" and "b") containing blanks for one word, and (h) the correct sentence (a or b) from the previous card containing the vocabulary word.

Measures

Dependent variable. The dependent variable was the number of target vocabulary words correctly selected for sentences on the posttests. The number of words correctly selected from the incidental condition was compared to the number of words correctly selected from the incidental plus peer tutoring condition. Scores were entered into a database that was used to construct a graphical representation of the data.

Interscorer reliability. A second observer scored 40% of the posttests administered to each child. An agreement was counted if both the experimenter and the second observer marked the same item as correct or the same item as incorrect. A disagreement was counted if the second observer's markings differed from those of the experimenter. Interscorer reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Reliability of scoring across student pairs was 100%.

Experimental Design

A simultaneous treatments design (Tawney & Gast, 1984) was used to compare the effects of incidental learning of vocabulary words through classroom reading instruction to a combination of incidental learning supplemented with peer tutoring. In a simultaneous treatments design, the two conditions are presented concurrently; however, the tasks for each condition are discrete (e.g., different vocabulary words). If there is a clear separation in the data paths from the probes in each condition, confidence increases that one condition had a greater effect than the other. In the present study, vocabulary learned through incidental learning from classroom reading activities was graphed and compared to incidental learning of vocabulary plus peer tutoring with audio prompting.

Procedures

Pretesting and posttesting. A pretest was administered prior to each new instructional reading lesson, and posttests were administered at the conclusion of lessons related to each story, or approximately every 5 days. Pretests and posttests were administered in the same way. Students were given the test, and the experimenter read aloud each word in the word bank. The experimenter then read aloud each fill-in-the-blank sentence. Words and sentences were repeated at the students' request. As each sentence was read, the students wrote the numeral corresponding to the word in the word bank they thought best completed the sentence. Tests were read aloud to standardize administration procedures and to ensure that deficits in decoding were not preventing the accurate measurement of vocabulary knowledge.

Incidental learning. The incidental learning condition included student exposure to target words during core reading instruction from Open Court Reading (Bereiter et al., 2000). Each Open Court lesson (Bereiter et al., 2000) was presented during five 40-minute whole-group sessions. The general and special education teachers conducted the sessions. Students were given repeated opportunities to come in contact with target words (i.e., read aloud, read independently) ranging from 2 to 14 times ($M = 7.8$) across the five sessions (i.e., per lesson). For example, *timber* was a target word from Pretest 6, and students had eight opportunities to come in contact with *timber* during the five sessions either

Table 1. Number of Times Students Came Into Contact With Target Words Throughout Each Lesson

Lesson	Range	*M*
1	2–8	5.00
2	2–6	3.66
3	2–9	3.88
4	2–14	2.84
5	2–8	3.50
6	2–8	4.00
7	2–4	3.16
8	2–6	3.33
9	2–8	4.66
10	2–12	5.00

through whole-group read-aloud or independent reading. Table 1 provides information about the number of times students came into contact with target words during the incidental learning condition. The Open Court sessions were conducted as follows: (a) Session 1: Story background and vocabulary were presented by the teacher (i.e., vocabulary were not target words); (b) Session 2: Teacher read the first half of the story aloud, and students independently answered literal, inferential, and vocabulary questions about the first half of the story; (c) Session 3: The teacher read the second half of the story aloud, and students independently answered literal, inferential, and vocabulary questions about the second half of the story; (d) Session 4: The class participated in an open-ended whole group discussion of the story, and students were assigned to reread the story independently and complete a study guide for homework; and (e) Session 5: Teacher reviewed the study guide with the class, and students took an open-book assessment of comprehension and vocabulary questions.

Training. Students were trained in tutoring pairs on the steps of reciprocal peer tutoring during a 1-hour session conducted by both researchers. Tutoring pairs remained constant throughout the study. Specifically, students were taught appropriate tutoring behaviors as well as how to give feedback to each other. All students received step-by-step instructions for both roles (tutor and tutee) because each student spent an equal amount of time in each role. Students first watched a demonstration of the procedures conducted by the researchers and then were given an opportunity to practice the tutoring procedure with a researcher. The tutoring pairs then continued to practice the tutoring procedures until they could independently complete all steps within the roles of both tutor and tutee. Practice continued until mastery (i.e., 100% on treatment fidelity checklist) was reached. During the first four tutoring sessions, the experimenters observed the students and gave feedback and correction when needed. A booster training session was provided to one tutoring pair that consistently left out one of the tutoring steps.

Peer tutoring. Peer tutoring included all of the steps of the incidental learning condition with the addition of reciprocal peer tutoring. VoicePods (Attainment Company Inc., 2006) were used to facilitate peer tutoring. Each pair of students was provided one VoicePod and six sets of eight cards as described earlier in the Materials section. Tutors used a model-lead-test, feedback strategy (i.e., demonstration, pair practice, independent tutee practice, feedback) to present the words and definitions to the tutees. At any time, if the tutee's response was correct, the tutor provided praise (e.g., "fantastic," "great job"). If the tutee was incorrect, the tutor said, "listen again," and the steps were repeated. Tutoring pairs participated in four tutoring sessions per week during which they practiced all six sets of vocabulary words. When procedural fidelity data were collected, tutoring sessions were timed. Sessions typically lasted 14 to 17 minutes and were not directly monitored unless researchers were collecting procedural fidelity data. Table 2 shows the specific steps used to present each vocabulary word.

Treatment fidelity. Treatment fidelity was measured for peer tutoring. The first and fourth authors observed 25.8% of the sessions distributed evenly across tutoring pairs. A 210-item checklist was used to measure the integrity of delivering peer tutoring using audio prompting. Results indicated that tutoring sessions were implemented with a mean accuracy of 93.4% (ranging from 75.7% to 99.5%).

Results

Posttest

Table 3 depicts the mean number of words correctly selected by each participant in both conditions. Figures 1 and 2 show the number of vocabulary words correct on lesson probes for each participant.

For Thomas, Trey, Isabel, and Ginny, there was a clear separation between all data paths when comparing the two conditions. Three of the participants, Rachel, Oliver, and Uriah, had one probe each wherein scores were the same for the two conditions. The other nine probes for these students showed a clear separation between data paths. Nyla, on one probe, performed better on the incidental learning than on the peer tutoring words. For the remaining nine probes, there was clear separation between data paths. Two of the participants (Thomas and Oliver) participated in peer tutoring only once during the fourth week of the study due to Oliver's absence from school. The fourth probe was not administered to these students.

Social Validity

A questionnaire was used to investigate the students' opinions regarding treatment acceptability of the intervention

Table 2. Tutoring Steps

Step	Tutor Response	Tutee Response	Tutor Response
1	Showed the printed vocabulary word to the tutee and activated the recording device so the word could be heard	Repeated the vocabulary word	Activated the recording device so the word was heard again and provided feedback based on a match of the tutee's answer to the recording
2	Presented the definition of the word and activated the recording device	Repeated the definition	Activated the recording device and provided feedback based on a match of the tutee's answer with the recording
3	Presented an example sentence and activated the recording device	Repeated the sentence	Activated the recording device and provided feedback based on a match of the tutee's answer with the recording
4	Presented the same example sentence using the definition in place of the vocabulary word and activated the recording device	Repeated the sentence	Activated the recording device and provided feedback based on a match of the tutee's answer with the recording
5	Repeated Steps 3 and 4 using another example sentence		
6	Presented two sentences (labeled "a" and "b"), activated the recording device, and asked, "Which one?"	Identified the sentence that used the vocabulary word in the correct way (a or b)	Presented the sentence with the correct answer, activated the recording device, and provided feedback on a match of the tutee's answer with the recording
7	Repeated Steps 1 through 6 using two more vocabulary words		
8	Switched roles with tutee, repeated Steps 1 through 6 using three more vocabulary words		

Table 3. Mean Number of Words Correctly Selected by Students, by Condition

Student	Incidental Learning	Incidental Learning + Peer Tutoring With Audio Prompting
Thomas	0.5	4.3
Oliver	1.0	3.0
Uriah	2.0	4.4
Nyla	1.4	4.0
Trey	1.2	4.5
Rachel	1.2	4.2
Ginny	1.8	4.8
Isabel	1.1	3.7

procedures and its effect on learning new vocabulary. The first six items were rated on a 4-point Likert-type scale from 1 (*strongly disagree*) to 4 (*strongly agree*). After each item was read aloud, the students indicated which rating they wanted to assign. The questionnaire also included two open-ended questions.

All of the students indicated that they agreed or strongly agreed with the statement, "I learned new words using the VoicePod." Seven of eight students agreed or strongly agreed with the statement, "Learning new words from tutoring with the VoicePod helped me when our class read or discussed a story." For the statements, "The VoicePod was easy to use" and "I would like to use the VoicePod again," seven of eight students reported that they agreed or strongly agreed. When students were asked about the statement, "I used words I learned from tutoring with the VoicePod when I had writing assignments," six agreed or strongly agreed.

The students also had an opportunity to indicate what they liked best about using the VoicePod with their partners. For this question, some students indicated that the intervention was "fun" and that they liked "learning new words, especially big words." Three students indicated that they enjoyed taking the posttests because "it asked about all of the new words they had learned and they knew the answers." One

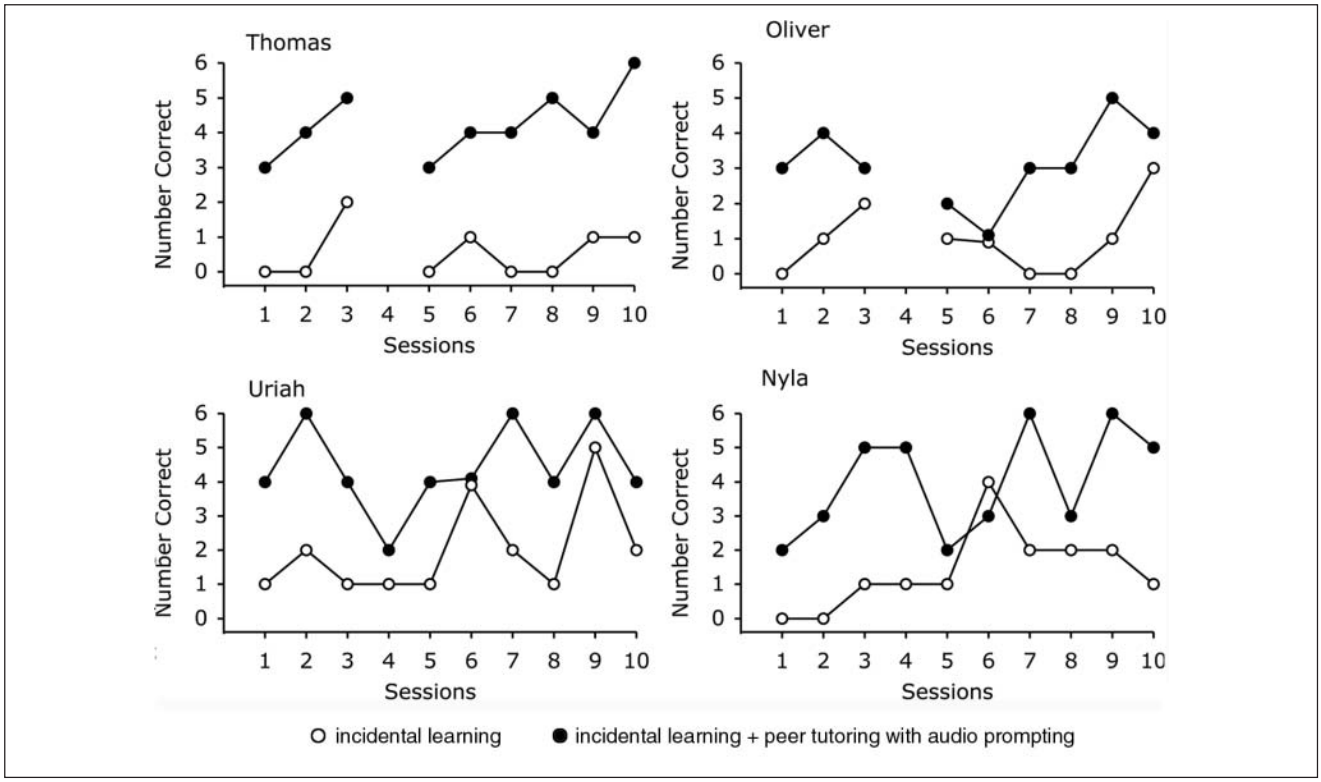

Figure 1. Number of vocabulary words correct on lesson probes for Thomas, Oliver, Uriah, and Nyla
○ = incidental learning; ● = incidental learning + peer tutoring with audio prompting.

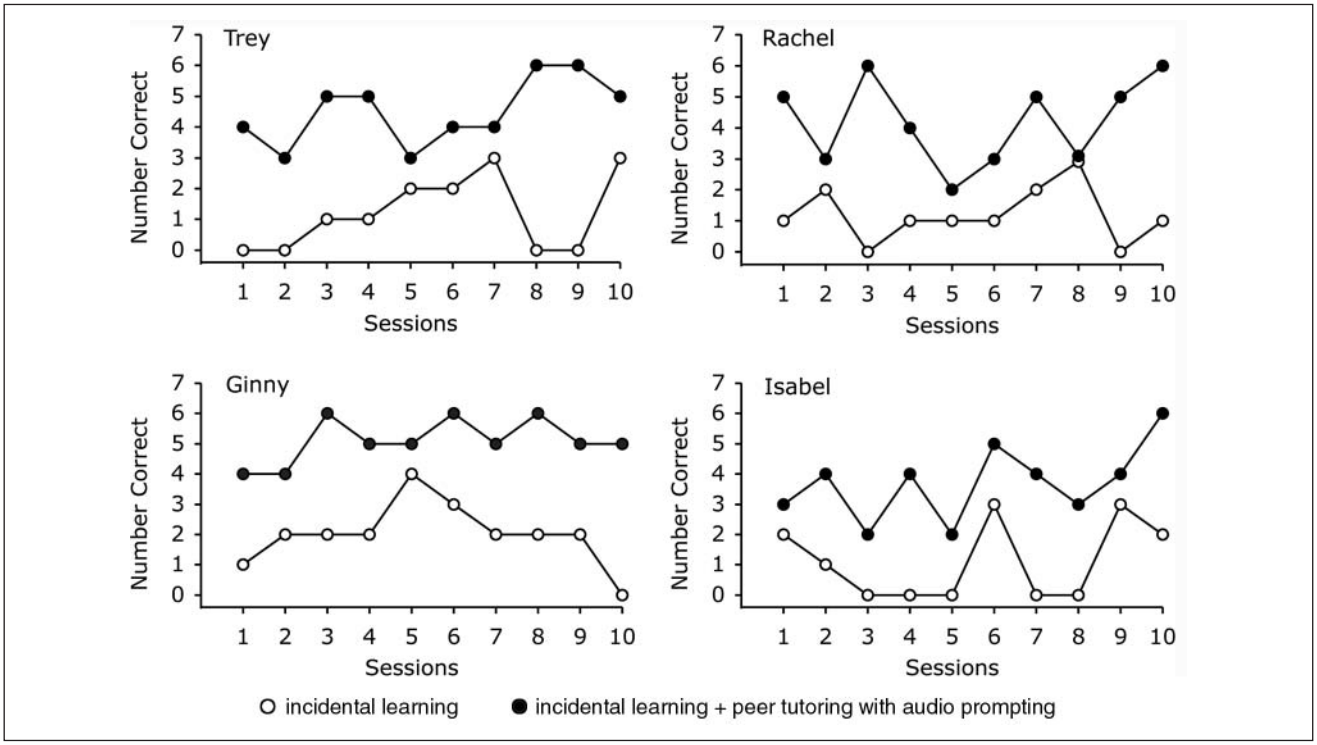

Figure 2. Number of vocabulary words correct on lesson probes for Trey, Rachel, Ginny, and Isabel
○ = incidental learning; ● = incidental learning + peer tutoring with audio prompting.

student indicated that learning the new words helped her to pass the end-of-year high-stakes reading assessment.

Discussion

The purpose of this study was to compare the effects of incidental learning of vocabulary words compared to incidental learning plus peer tutoring with audio prompting. The mean performance for all participants was greater for peer tutoring with audio prompting ($M = 4.1$ correct selections of 6 total) compared to incidental learning ($M = 1.2$ correct selections of 6 total). The data indicate that students made limited gains from incidental learning alone and stronger gains when peer tutoring with audio prompting was added. The measure used in this study was a conservative measure in that the sentences on the pretests and posttests were not the same as the sentences used for instruction. When correct, the students were able to gain sufficient facility with the target words that they were able to place them in novel contexts. In addition, the word bank consisted of 15 choices in contrast to studies that use maze procedures with only 3 choices, diminishing the likelihood that guessing accounted for correct selections.

The tutoring procedures used in this study were explicit (i.e., students were given the definition) and included multiple opportunities to hear and practice saying the definition as well as apply the word to context, a level of practice difficult to provide during whole-group class instruction. The results of this study support findings from previous research that demonstrates the effectiveness of direct, explicit vocabulary instruction (Coyne et al., 2007; Jitendra et al., 2004), especially for at-risk students who are less likely to learn new word meanings through incidental exposure (Coyne et al., 2004; Robbins & Ehri, 1994).

The results of this study support previous research on the effectiveness of peer tutoring (Rohrbeck et al., 2003) and the use of peer tutoring to teach word meanings (Hughes & Fredrick, 2006). Teachers are challenged to find ways of reaching the diverse needs of students in ways that are efficient and feasible with available resources. The gains made with the procedures used in the study are meaningful considering the tutoring sessions were a short, supplemental activity that did not require teacher monitoring. This study demonstrated a tutoring strategy that worked within the typical constraints placed on classroom teachers (e.g., no additional personnel, minimal budget). By using a peer tutoring procedure, teachers are able to extend targeted instruction to more students. In addition, academic gains were realized for both partners, adding to literature on reciprocal peer tutoring (e.g., Hughes & Fredrick, 2006; Mastropieri et al., 2001; Van Norman & Wood, 2008).

In addition, research has demonstrated the effectiveness of peer or parent tutoring with low-tech audio prompting to support a naïve tutor and improve limited-English-proficient preschoolers' English vocabulary (Cooke, Mackiewicz, Wood, & Helf, 2009) and kindergartners' acquisition of sight words (Van Norman & Wood, 2008). The present study extended the use of technology support in tutoring to another device, the VoicePod.

Limitations and Future Research

One limitation of this study related to participant absenteeism. Several times throughout the intervention, a participant was absent. However, this posed a problem for only one tutoring pair on one set of words because they were not able to participate in a minimum of three tutoring sessions necessary to practice all of the words on the posttest representing the tutoring condition.

A second limitation is that the posttests required students to make a selection-type response (i.e., matching the vocabulary word to an appropriate sentence) rather than a recall-type response (writing the vocabulary word in the blank space of an appropriate sentence). If the goal of vocabulary instruction is to increase expressive use of the target word, a different measure would be important. A more conservative measure would be to eliminate the word bank and use a cloze procedure in which students supply the target word to fill in a blank within a context-rich sentence. Although this measure has many scoring challenges (e.g., interpreting student spelling, more lengthy testing, variability induced by student recall), it might demonstrate a greater difference between explicit instruction through peer tutoring and incidental exposure.

In the present study, one of the classroom teachers noted that some of the participants began using learned vocabulary words from tutoring in expressive writing assignments. A measure that could capture students' expressive use of vocabulary would also strengthen future research.

Future studies could examine various easy-to-use technology supports (e.g., computer slideshow software; Wood et al., 2007) to improve the efficiency and effectiveness of peer tutoring. Moving to computer-based support has the advantage of easy development, easy storage, detailed graphics, and very clear audio prompts. Studies that demonstrate the effectiveness of peer tutoring using various technologies is advantageous because the constraints of classroom settings vary. For example, the VoicePod is highly transportable, so in classrooms where there is limited access to computers or if tutoring pairs need to work outside the classroom, this technology would be beneficial. As new technologies emerge, researchers should continue to explore these as support mechanisms for tutors.

This study included fourth graders identified as struggling readers or having high-incidence disabilities. More research across a range of student ages, abilities, and content

areas (e.g., phonemic awareness, writing skills, math problem solving) is needed. Butler (1999) found that peer tutoring was an effective strategy for teaching sight words to students with mild to moderate disabilities, and Kamps, Barbetta, Leonard, and Delquadri (1994) found peer tutoring to be an effective strategy for students with autism. Peer tutoring-related research has also been conducted with students with moderate to severe intellectual disabilities. Peer tutors varied from students placed in advanced classes (Collins, Branson, & Hall, 1995) to students with mild intellectual disabilities (Agran, Fodor-Davis, Moore, & Martella, 1992). Future research can investigate the benefits of peer tutoring with audio prompting for students with moderate intellectual disabilities and determine if this method provides the needed support for tutoring pairs to successfully teach each other without needing a tutor who already knows the material.

Implications for Practice

Peer tutoring with audio prompting has advantages for use in educational settings. First, peer tutoring can supplement teacher-led instruction and provide students with repeated practice on new content. A teacher could set up peer tutoring stations, and students could work at the stations while not participating in whole-class or small-group instruction. During tutoring, students can make several active, curriculum-related responses in a short amount of time (Heward, 1994), thus receiving the practice needed to master new skills. Second, an audio prompting device allows tutors to give immediate and accurate feedback to tutees even if the tutors are naïve to the material (Van Norman & Wood, 2008; Wood et al., 2007). Even though prerecorded audio prompts and feedback are embedded into the materials, the tutor's presence is still necessary. The tutor's presence and feedback can ensure that the tutee will respond to each task, unlike an independent activity in which the student might passively look at or skip through the materials.

Peer tutoring has enhanced academic achievement for struggling students (Rohrbeck et al., 2003). This study supports and extends previous studies that combined technology and peer tutoring (Cooke et al., 2009; Van Norman & Wood, 2008) and shows that peer tutoring with audio prompting can be a valuable supplement to incidental exposure to vocabulary through reading.

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