Effects of a Peer-Mediated Phonological Skill and Reading Comprehension Program on Reading Skill Acquisition for Middle School Students with Reading Disabilities

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Abstract

The purpose of this study was to examine the effect of a peer-mediated instructional approach on the teaching of phonological skills and reading comprehension for middle school (sixth- to eighth-grade) students with reading disabilities. All students \( (n = 38) \) were identified as having learning disabilities and reading at the third-grade level or below. One group was taught using a peer-mediated phonological skill program, Linguistics Skills Training (LST), and a peer-mediated reading comprehension program, Peer Assisted Learning Strategies (PALS). The contrast group was taught in the more traditional whole-class format using a widely implemented remedial reading program. The results showed significant differences between conditions, with students receiving the LST/PALS instruction outperforming the contrast group on Letter–Word Identification, Word Attack, and Passage Comprehension using the Woodcock-Johnson Test of Achievement–III. Furthermore, large effect sizes for growth were found on Letter–Word Identification, Word Attack, and Passage Comprehension for the LST/PALS treatment group. No differences were found between conditions for reading fluency. Findings are discussed in regard to instruction delivery format (peer tutoring vs. whole class) with respect to best practices for middle school students with reading disabilities.

Reading is a fundamental skill on which academic success, secure employment, and personal autonomy depend. Difficulty in reading undermines mastery of language, vocabulary growth, skill in writing, and knowledge of the world (Moats, 1999). In 1994, 59% of fourth graders read below the basic literacy level, which was a decline from the level in 1992 (Hall & Moats, 1999). An important longitudinal study following students from kindergarten through high school reported that 20% of its sample had serious reading difficulty (Shaywitz, 1996). The 2003 National Assessment of Educational Progress (NAEP) found that in the eighth grade, 31% of boys and 21% of girls could not read at the basic literacy level. This trend in reading underachievement demonstrates a serious problem for adolescents that appears to be increasing (McCray, 2001).

Research on remedial reading programs for older students with reading disabilities (RD) has indicated that although they accelerate reading growth, these programs do not significantly close the reading gap and normalize the reading skills of students with RD to the level of their nondisabled peers (Hanushek, Kain, & Rivkin, 1998; Kavale, 1988; Swanson, 1999; Torgesen, Alexander, Wagner, Rashotte, Voeller, & Conway, 2001; Zigmond, 1996). Without the effective implementation of remedial reading programs in special education classrooms, the number of older students with RD who fail in school and ultimately drop out will continue to rise (deBettencourt, Zigmond, & Thornton, 1989; Zigmond & Thornton, 1985). Special education, by definition, is supposed to provide “specific, direct, individualized, intense, remedial instruction” (Zigmond & Baker, 1995, p. 178). However, reading instruction with these characteristics is not typically made available to older students served in special education classes (Mastropieri et al., 2001; Moody, Vaughn, Hughes, & Fischer, 2000).

To help special education reading teachers identify key instructional practices associated with improving reading outcomes, a recent research synthesis was conducted. The results showed that (a) appropriate grouping prac-
tices, (b) strategy instruction, (c) extended practice opportunities with feedback, and (d) breaking down tasks into component parts were associated with significant improvement in reading skills (Vaughn, Gersten, & Chard, 2000). Concurrent with these findings, a meta-analysis of instructional strategy research found the following components to be important for teaching academic skills to students with learning disabilities: (a) using small, interactive group instruction, (b) using directed questioning and responses, (c) breaking down tasks into component parts and fading prompts and cues, and (d) using extended practice with feedback (Swanson & Hoskyn, 1998). The most important components of quality instruction and academic success when teaching complex materials and skills to adolescents appears to be extended practice with immediate feedback (Swanson, 2001) and group size (Maheady, 1997). Although research examining grouping practices for students with RD has not demonstrated conclusive support for one group size over another, the evidence does generally support the superiority of smaller groups for remedial instruction (Elbaum, Schumm, & Vaughn, 1997).

An instructional strategy that provides both an increase in practice opportunities with immediate feedback and delivery of instruction in small groups is classwide peer tutoring (CWPT). CWPT is a system in which all class members are organized in tutor–tutee pairs and work together rather than independently or in small groups (Greenwood & Delquadri, 1995). This strategy has been shown to be effective for teaching academic and social skills to adolescents (Calhoon & Fuchs, 2003; Delquadri, Greenwood, Whorton, Carta, & Hall, 1986; Maheady, Harper, Mallette, & Winstanley 1991; Topping & Ehly, 1998; Wehby, Falk, Barton-Arwood, Lane, & Cooley, 2003). The results from studies implementing CWPT have demonstrated that it keeps students actively engaged nearly 100% of the time, and practice time is doubled or tripled over that of teacher-led instruction (Greenwood, Delquadri, & Hall, 1989; Simmons, Fuchs, Fuchs, Mathes, & Hodge, 1995). Furthermore, research supporting CWPT has suggested that students persist longer on a task when they are actively engaged and take an active role in their own learning (D. Fuchs, Mathes, & Simmons, 1997). Moreover, during CWPT, practice is guided and provides immediate feedback, in direct contrast to typical, teacher-led instruction. Usually, teacher-led instruction engages students in active participation only about 30% of the time, resulting in fewer practice opportunities (Simmons et al., 1995).

Peer Assisted Learning Strategies (PALS; D. Fuchs & Fuchs, 2001), a reading comprehension strategy program, is based on a CWPT model (Delquadri et al., 1986) and is typically used as a supplement to existing reading programs. During PALS, students participate in three essential reading comprehension activities while reading aloud from narrative text: Partner Reading, Paragraph Shrinking, and Prediction Relay. All three activities are designed to provide students with explicit, systematic practice in reviewing and sequencing, summarizing and stating main ideas, and predicting story outcome (D. Fuchs, et al. 1997). The PALS program is usually implemented two to three times per week, providing intensive practice on comprehension strategies.

Research on PALS in Grades K–5 found increases in reading fluency and comprehension in students with disabilities as well as in low-, average-, and high-achieving students (Allor, Fuchs, & Mathes, 2001; D. Fuchs, Fuchs, & Burish, 2000; D. Fuchs et al., 1997; D. Fuchs, Fuchs, Thompson, et al., 2000; D. Fuchs et al., 2002; Mathes, Grek, Howard, Babyak, & Allen, 1999; Mathes, Howard, Allen, & Fuchs, 1998; Simmons, Fuchs, Fuchs, Mathes, & Tate, 1990). At the high school level, PALS significantly increased the reading comprehension skills of students with RD in comparison to a contrast group of students with RD (L. S. Fuchs, Fuchs, & Kazdan, 1999). Similar results were found for a PALS intervention lasting only 5 weeks, where gains in reading comprehension were seen in seventh-grade students with RD when compared to a nontreatment group (Mastropieri et al., 2001).

Overall, the combined results of the PALS studies demonstrate a positive trend for improvements in reading comprehension skills in kindergarten to 12th-grade students with RD. However, unlike the studies conducted in kindergarten to fifth grade, PALS did not produce significant improvements in reading fluency for secondary students (L. S. Fuchs, et al., 1999). Research has demonstrated that a necessary prerequisite skill for reading fluency is proficient and automatic phonological skill knowledge (Adams, 1990; Howell & Nolet, 2000). Both L. S. Fuchs et al. (1999) and Mastropieri et al. (2001) expressed concern about the lack of phonological skill knowledge in older students with RD and the difficulties that such deficits posed for teaching, practicing, and learning of the PALS comprehension strategies. The results from the PALS study led L. S. Fuchs et al. (1999) to suggest that older students with RD would benefit from an age-appropriate peer-mediated strategy program that explicitly teaches phonological skills.

Phonological skill instruction has been incorporated into the PALS program at the kindergarten and first-grade levels and has produced significant increases in phonological skills in students with disabilities as well as in low-, average-, and high-achieving students (D. Fuchs, Fuchs, Thompson, et al., 2000; D. Fuchs et al., 2002; Mathes, Howard, Allen, & Fuchs, 1998). Therefore, to build on this success, the next step should be to develop a peer tutoring program that explicitly teaches phonological skills to older students with RD.

Recently, a CWPT phonological skill program, Linguistics Skills Training (LST; Calhoon, 2003), was developed based on the peer tutoring procedures
of L. S. Fuchs et al. (1999) and L. S. Fuchs, Fuchs, Karns, and Phillips (1993). The LST phonological skill program was designed specifically to accompany the existing PALS reading comprehension program, thereby combining into one program several elements that research has shown to be effective for teaching older students with RD (i.e., small group sizes, directed questioning and responses, guided practice, explicit and direct instruction in phonological skills, extended practice opportunities with feedback, breaking down tasks into component parts, reading fluency, reading comprehension strategies, and contextual reading; Swanson, 1999, 2001; Swanson & Hoskyn, 1998; Vaughn et al., 2000).

Therefore, the purpose of this study was to examine the combined effects of the LST and PALS programs on the reading skill acquisition of middle school students with RD. The primary emphasis of the study was to determine if the combination of the peer-mediated LST phonological skill and PALS comprehension programs (LST/PALS) would result in significantly greater gains in reading comprehension, word recognition, and reading fluency scores than a traditionally taught whole-class remedial reading program. A second question was if successful intervention could demonstrate that LST/PALS could be implemented by special education teachers within special education classrooms.

Method

Participants and Setting

Teachers. Four teachers from two middle schools in a southwestern school district participated in the project. All teachers were selected based on their interest and willingness to participate and were teaching reading in self-contained language arts classrooms for students with RD. To participate in the project, teachers had to have students with chronic reading difficulties in their classrooms. Teachers were randomly assigned to one of two treatment conditions: LST/PALS (two teachers, each with one class, implemented LST/PALS) and contrast (i.e., no peer-mediated reading activities; two teachers, each with one class).

All four teachers were women; three were European American, and one was Hispanic American. Mean age was 45.25 years (SD = 3.09; range = 41–48); the mean number of years of teaching experience was 3.00 (SD = 2.16; range = 1–6). Two teachers were licensed to teach K–8 general education classes. All four teachers were teaching on special education emergency licenses. The highest degree earned was a bachelor’s plus 30 hours for one teacher, and a bachelor’s for the remaining three teachers.

Students. Student participants consisted of 32 sixth, 5 seventh, and 1 eighth grader (n = 38) from four special education, self-contained language arts classrooms. All students (a) met the federal, state, and local eligibility requirements for having a learning disability in reading; (b) were receiving reading instruction in self-contained special education resource rooms; (c) had Individualized Education Program (IEP) reading goals; and (d) were reading at least three grade levels below their current grade placement, as determined by the pretest scores on the Woodcock-Johnson Test of Achievement–III (WJ-III; Schrank, McGrew, & Woodcock, 2001) reading subtests. These students spent an average of 50% to 70% of their school day in special education, self-contained resource classrooms.

Using chi-square analyses on categorical data, no significant differences were found between treatment groups for gender, race, or grade level. However, a significant difference was found between treatment groups for student age. No significant difference between treatment groups was found for grade or IQ. Two of the students’ (one seventh and one eighth grader) IQ scores were not available. See Table 1 for student demographics and statistics.

Measures

The WJ-III (Schrank et al., 2001), a widely used, norm-referenced, individually administered diagnostic achievement test with good evidence for internal consistency (r exceeds .80 for all subtests), was used to assess reading achievement. A pre- and posttest, consisting of the four reading subtests in the WJ-III, was administered 2 weeks before and immediately following the 31-week intervention. The reading subtests administered were (a) Letter–Word Identification, which assesses reading decoding by having the student identify printed letters and words; (b) Word Attack, which assesses phonetic decoding by having the student read phonetically regular nonwords, (c) Reading Fluency, which assesses reading rate by having the student read printed statements rapidly and respond either true or false; and (d) Passage Comprehension, which assesses printed language comprehension by having a student identify a missing keyword that makes sense in the context of a written passage.

Treatment Programs

LST/PALS Program. Based on the peer-mediated procedures of L. S. Fuchs et al. (1993) and L. S. Fuchs, Fuchs, Phillips, Hamlett, and Karns (1995), each LST and PALS activity employed the following features: (a) mediated verbal rehearsal, which models the procedural steps for verbal rehearsal; (b) step-by-step positive feedback for correct responses and corrective feedback for incorrect responses; (c) frequent oral and written interaction between tutor and tutee; and (d) reciprocity (i.e., each student serves in the role of tutor and tutee during each session).

Linguistics Skills Training. The LST program was developed especially for older students (third grade through adult) as an age-appropriate, peer-mediated phonological skill program. Each of the LST lessons begins...
with a scripted teacher-led lesson, followed by teacher-directed practice; students then practice in peer tutoring pairs closely monitored by the teacher. The LST (Calhoon, 2003) program is based on the *York Linguistics Method* program (York, 1973) and uses an intense and explicit linguistic signaling and coding system, composed of written signals (e.g., $^\wedge =$ peak, $\text{˘}$ = lax sound for the letter e, $\vec{e} =$ tense sound for the letter e) for each linguistic skill, and codes ($c =$ consonant, $v =$ vowel) for syllable pattern identification. The signaling system enables students to identify the actual sounds of letters or letter clusters and to recognize the seven basic rules composing the LST program.

LST systematically and explicitly teaches phonological skills through letter–sound correspondence, beginning with the smallest spelling-to-sound units and moving to larger subsyllabic units, while placing an emphasis on the rime. LST directly teaches phonetics (i.e., speech sound identification, vowel and semivowel patterns, phoneme counting, phonetic transcription), phonology (i.e., phonemes and minimal pairs, phonetic variation, systematic variation in speech sound production, sequencing, syllables [vcv, vccv, x, ble]), morphology (i.e., morphemes, individual differences in use of morphology), and English orthography (i.e., historical layers of English orthography, Latinate endings, romance language spellings, orthographic conventions).

To build on the existing program, a form of segmenting and telescoping developed by Carnine, Silbert, Kame’enui, and Tarver (2004) was added to teach phonemic and phonological awareness. This strategy is used in print to anchor the phonemic and phonological skills that focus students’ attention on individual letters within words (Adams, Treiman, & Pressley, 1998; Ehri, 1991; Share & Stanovich, 1995). Students are taught to pay attention to each grapheme–phoneme unit within a word through the use of written signals following a prescribed sequence of structured activities to decode or “build” words. Each skill is taught incrementally and reviewed repeatedly during each sequential lesson (see Calhoon, 2003). LST was implemented 3 days a week, allowing for approximately 51 hours of intensive decoding instruction.

**Peer Assisted Learning Strategies (PALS).** The PALS program (L. S. Fuchs et al., 1995) incorporates three essential reading activities; Partner Reading (Simmons et al., 1995), Paragraph Shrinking (similar to summarization; e.g., Baumann, 1984; Doctorow, Wittrock, & Marks, 1978; Palincsar & Brown, 1983), and Prediction Relay (Palincsar & Brown, 1983). Even though tutoring roles are reciprocal, the coach (*tutor*) reads first for each activity, to serve as a model for the partner (*tutee*). Reading materials in PALS are books chosen by each dyad. Students are encouraged to choose books, with the help of the teacher, at their independent reading level.

Each session begins with Partner Reading, which is designed to improve students’ reading accuracy and rate. After both students have read, one partner then retells for 2 min the sequence of events in the text just read. After Partner Reading, students complete Paragraph Shrinking, which is designed to develop comprehension through summarization and main idea identification (Fuchs et al., 1995). The final activity is Prediction Relay, which extends Paragraph Shrinking to larger units of text and asks students to make

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**TABLE 1**

<table>
<thead>
<tr>
<th>Variable</th>
<th>LST/PALS</th>
<th>Control</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td>$\chi^2(1, N = 38) = .12$</td>
</tr>
<tr>
<td>Boys</td>
<td>$n$ 12</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$%$ 66</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>$n$ 6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$%$ 33</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td>$\chi^2(1, N = 38) = 4.68$</td>
</tr>
<tr>
<td>Hispanic American</td>
<td>$n$ 9</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$%$ 50</td>
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<td></td>
</tr>
<tr>
<td>European American</td>
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</tr>
<tr>
<td></td>
<td>$%$ 38</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>$n$ 2</td>
<td>0</td>
<td></td>
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<tr>
<td></td>
<td>$%$ 12</td>
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<td><strong>Age</strong></td>
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<td>$\chi^2(1, N = 38) = 4.44^*$</td>
</tr>
<tr>
<td>$M$ 12.11</td>
<td>11.71</td>
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<td></td>
</tr>
<tr>
<td>$SD$ 0.67</td>
<td>0.49</td>
<td></td>
<td></td>
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<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
<td>$F(1, 37) = .04$</td>
</tr>
<tr>
<td>$M$ 6.16</td>
<td>6.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$SD$ 0.51</td>
<td>0.41</td>
<td></td>
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</tr>
<tr>
<td><strong>IQ</strong></td>
<td></td>
<td></td>
<td>$F(1, 37) = .394$</td>
</tr>
<tr>
<td>$M$ 90.87</td>
<td>88.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$SD$ 12.04</td>
<td>7.68</td>
<td></td>
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</tbody>
</table>


*p = .05.*
and confirm or disconfirm predictions. For further background and program description, see Fuchs, Fuchs, and Burish (2000). PALS was implemented 2 days a week for 34 hours of separate comprehension instruction time.

Contrast Treatment Group. The contrast group received reading instruction using a widely implemented remedial reading program, Saxon Phonics Intervention (Simmons, 2001), designed specifically for older students. The contrast program was chosen based on the following similarities to the LST program: (a) all lessons are scripted; (b) both programs teach a “language” for talking about phonemes in their phonological skill portion; (c) both programs use a coding and signaling system; (d) both programs require instruction to begin at Lesson 1, which teaches the language, coding, and signaling systems used by the program; and (e) both programs consist of a combination of explicit and direct, teacher-led instruction followed by student practice. These areas of similarity between the programs’ design characteristics permit a controlled comparison of outcomes related to the different methods of instruction (peer mediated vs. whole class). Saxon Phonics Intervention has no peer-mediated activities. A no-treatment contrast group was not used in this study because it would have been unethical to withhold instruction designed to remediate reading skills (Torgesen et al., 2001).

Saxon Phonics Intervention follows the more traditional remedial reading program format by integrating explicit teaching of decoding skills, spelling, vocabulary, reading fluency, and reading comprehension in one single lesson. All skills are taught incrementally and continually reviewed. The Saxon Phonics Intervention program was implemented 3 days a week, allowing for 21 hours of decoding, 10 hours of spelling, 5 hours of reading fluency, 5 hours of vocabulary, and 10 hours of reading comprehension instruction. Saxon Phonics Intervention was coupled with the SRA Skill Acquisition program (Engelmann, Meyer, Johnson, & Carnine, 1999). This comprehension program was chosen for the contrast group because it can be implemented as a separate comprehension program; it is validated and widely used in middle school special education classrooms. The SRA Skill Acquisition program has students individually read a story and then independently answer comprehension questions on a worksheet. The SRA Skill Acquisition program was implemented 2 days a week, allowing for 34 hours of instruction. Total comprehension instruction time for the contrast group was 44 hours.

Procedure

Teacher Training. Teachers for the treatment groups each attended a 1-day workshop that provided explicit training on their individual programs. Furthermore, a research assistant (RA) familiar with the specific program (LST/PALS or Saxon Phonics Intervention and SRA Skill Acquisition) was assigned to each teacher. At least three times per week, the RAs observed either the LST/PALS or the Saxon Phonics Intervention and SRA Skill Acquisition sessions. Moreover, the RAs provided ongoing support, answered questions, and offered corrective feedback throughout the 31 weeks of intervention.

Implementation of LST/PALS. Teachers taught the routine for LST to all students in their classes. Each lesson consisted of a script that included a teacher presentation, overheads for teacher-directed practice, peer-mediated instructional sheets for extended practice, and teacher feedback to students. Lessons for the LST portion of the program occurred three times per week. The PALS teacher training manual and training protocol developed by L. S. Fuchs et al. (1995) was used. Teachers taught the routine for PALS to all students in their classes. Training consisted of scripted lessons that included teacher presentation, student practice, and teacher feedback to students. Training occurred separately for each activity in the program. The training for Partner Reading took two 40-min sessions; for Paragraph Shrinking, four 40-min sessions; and for Prediction Relay, two 40-min sessions. After training on all activities was complete, PALS was implemented twice a week.

Implementation of Contrast Programs. Teachers taught Saxon Phonics Intervention to all students in their classes using scripted lessons, card decks (similar to flash cards), workbooks, and supplementary materials. Each lesson provided a model dialogue and lesson plan for the teacher to follow. The Saxon Phonics Intervention lessons occurred three times per week, with each session lasting 40 min. Teachers taught the routine for the SRA Skill Acquisition program in one class session with follow-up training as needed. The teacher demonstrated how to read the story, then modeled how to answer the questions on the worksheet, how to check their comprehension by looking back at the passage, and how to segment words into syllables. After training was complete, the SRA Skill Acquisition program was implemented twice a week for 35 min each session.

Fidelity

Treatment fidelity was assessed by direct observations made by the author and a RA. The author and RA were trained to use observational checklists based on the instructional elements composing the programs. The observers recorded whether the teacher or student implemented each element correctly. The score on each checklist was the percentage of correctly conducted elements. Because of considerable stability in implementation accuracy (L. S. Fuchs et al., 1994), fidelity was assessed once during the seventh week of intervention. Teachers were not informed when observations were scheduled. The fidelity scores ranged from 90.3 for PALS to 98.7 for LST. For Saxon Phonics Intervention and SRA
Skill Acquisition, implementation fidelity scores were 96.6 and 91.7, respectively.

Data Collection

The reading subtests from the WJ-III were administered to each participant immediately before treatment began and at the end of the 31-week treatment period. The alternate forms of the WJ-III were counterbalanced across testing sessions. All individual testing took place in a quiet, distraction-free area and was administered by trained graduate students. The raw scores for each subtest were entered into the WJ-III Compuscore and Profiles Program (Schrank & Woodcock, 2001), which provided an age-referenced composite standard score for each subtest for each student.

Results

Pretreatment

Univariate analyses of variance (ANOVA)s conducted on pretest scores for the WJ-III reading subtests (Word Identification, Word Attack, Passage Comprehension, and Reading Fluency) revealed no significant differences between the two treatment groups on any of the reading subtest measures (see Table 2).

Posttreatment

Univariate ANOVAes across pre- and posttests for each reading subtest (Word Identification, Word Attack, Passage Comprehension, and Reading Fluency) were conducted on age-equivalency standard scores. The results showed statistically significant differences between groups, with the LST/PALS condition outperforming the contrast condition on Letter–Word identification, Passage Comprehension, and Reading Fluency. To assess growth (pretest scores minus posttest scores), univariate ANOVAes were conducted on each subtest (Word Identification, Word Attack, Passage Comprehension, and Reading Fluency). The results showed significant growth for the LST/PALS treatment group over the contrast treatment group for Letter–Word Identification, F(1, 37) = 14.32, p = .001; Word Attack, F(1, 37) = 13.19, p = .001; and Passage Comprehension, F(1, 37) = 11.35, p = .01. No significant differences were found between the groups for growth on Reading Fluency.

To calculate effect sizes on growth data, the difference between growth scores divided by the pooled standard deviation of the growth/the square root of 2(1–rxy) was used (Glass, McGraw, & Smith, 1981). Effect sizes of 1.10, .99, .94, and –.19 were found for the LST/PALS treatment for Letter–Word Identification, Word Attack, Passage Comprehension, and Reading Fluency, respectively (see Table 2).

Discussion

This study examined the viability of peer tutoring as an instructional delivery model for teaching reading skills (phonological skills and reading comprehension skills) to middle school students with RD. The primary focus was on peer tutoring as a method for delivering reading instruction.

Phonological Skill Acquisition

The LST/PALS program, delivered through peer-mediated instruction, was an effective method for teaching phonological skills to middle school students with RD. Students in the peer-mediated condition made significant gains in Word Attack and Word Identification.

<table>
<thead>
<tr>
<th>Subtest</th>
<th>LST/PALS</th>
<th>Contrast</th>
<th>F*a</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter–Word Identification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>80.22</td>
<td>77.95</td>
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<tr>
<td>Posttest</td>
<td>87.83</td>
<td>87.95</td>
<td>1.17*</td>
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<tr>
<td>Growth</td>
<td>7.61</td>
<td>10.25</td>
<td>12.03*</td>
<td>1.10</td>
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<tr>
<td>Passage Comprehension</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>78.88</td>
<td>77.80</td>
<td>2.25</td>
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<tr>
<td>Posttest</td>
<td>85.44</td>
<td>86.60</td>
<td>7.02*</td>
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<tr>
<td>Growth</td>
<td>6.55</td>
<td>10.25</td>
<td>10.25*</td>
<td>.94</td>
</tr>
<tr>
<td>Word Attack</td>
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<td></td>
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</tr>
<tr>
<td>Pretest</td>
<td>89.27</td>
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<tr>
<td>Posttest</td>
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<td>98.75</td>
<td>10.25*</td>
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<tr>
<td>Growth</td>
<td>8.94</td>
<td>5.25</td>
<td>9.77*</td>
<td>.99</td>
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<tr>
<td>Reading Fluency</td>
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</tr>
<tr>
<td>Pretest</td>
<td>80.33</td>
<td>78.95</td>
<td>0.75</td>
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<tr>
<td>Posttest</td>
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<td>78.60</td>
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<tr>
<td>Growth</td>
<td>−0.16</td>
<td>3.86</td>
<td>4.38</td>
<td>−19</td>
</tr>
</tbody>
</table>

Note. WJ-III = Woodcock-Johnson Test of Achievement–III (Schrank et al., 2001); LST = Linguistics Skills Training (Calhoon, 2003); PALS = Peer Assisted Learning Strategies (D. Fuchs & Fuchs, 2001); ES = effect size defined as difference between means divided by pooled standard deviation.

*a df = 1, 37.

*p = .05.
fication skills in comparison to students in the non–peer-mediated contrast group. The effect sizes were large, ES = 1.10 for Word Identification and ES = .99 for Word Attack. These results, along with those obtained by D. Fuchs et al. (2002), D. Fuchs, Fuchs, Thompson, et al. (2000), and Mathes et al. (1998), which were conducted at the elementary level, demonstrate consistently positive results from the use of peer tutoring to teach phonological skills to students with RD. The positive results obtained in this study of peer-mediated instruction for phonological skill acquisition in older students with RD justifies additional research using peer-mediated LST/PALS to replicate and extend the present findings.

Comprehension Acquisition

The LST/PALS program did significantly increase reading comprehension skills for middle school students with RD (ES = .94) It is interesting to note that the LST/PALS treatment significantly increased the comprehension scores of these middle school students, who received 10 hours less of direct comprehension instruction than the contrast group. This finding replicates and extends results from previous studies for the effectiveness of peer-mediated learning as an instructional technique for teaching reading comprehension to adolescents with RD (L. S. Fuchs et al., 1999; Mastropieri et al., 2001). Furthermore, this study extends findings from other studies using PALS (e.g., D. Fuchs & Fuchs, 2001) at the elementary level and demonstrates a positive trend across grade levels for the use of PALS to teach reading comprehension skills to students with RD.

Overall Reading Acquisition

The generalization of gains and large effect sizes across Word Attack (ES = 1.10), Word Identification (ES = .99), and Reading Comprehension (ES = .94) for the LST/PALS program have been obtained in only a few previous studies using older students with RD (Lovett et al., 1994; 2000). The small group sizes, immediate feedback, and increased student practice provided during the peer-mediated intervention may have contributed to the large effect sizes for the LST/PALS treatment and the generalization across phonological and comprehension skills seen in these students. Another possible explanation for the large effect sizes obtained from the LST/PALS program might be the unique instructional schedule used.

Unlike the present study, most remedial reading programs incorporate a skill-integrated design, consisting of instruction in phonological skills, spelling, vocabulary, fluency, and comprehension all taking place within a single lesson. Research using remedial programs with older students with RD indicates that although skill-integrated designs do accelerate reading growth, they do not significantly close the reading gap (Hanushek et al., 1998; Kavale, 1988; Swanson, 1999; Zigmond, 1996). Such results have led some researchers to question whether an integrated approach to the teaching of remedial reading is the best way to accelerate reading skill acquisition in older students with RD (Lovett et al., 2000; Torgesen et al., 2001).

The LST portion of the program was taught separately 3 days per week, with PALS instruction for comprehension delivered twice a week. The result of this schedule was a total of 5½ hours of isolated phonological skill training and 34 hours of isolated comprehension training for the duration of the 31-week treatment. This isolation of phonological skill training may be one of the reasons for the gains observed across reading subskills (Word Identification, Word Attack, and Passage Comprehension) in this study.

The lack of reading fluency growth for both treatment groups was disappointing, especially as Saxon Phonics Intervention explicitly teaches this skill. This result, however, is consistent with most reading research conducted with older students with RD and corroborates L. S. Fuchs et al.’s (1999) findings that whereas high school students with RD made significant gains in reading comprehension, their reading fluency did not improve. This failure indicates that achievement of phonological skills may not be generalizing to other aspects of reading, such as reading fluency (Olson, Wise, Ring, & Johnson, 1997).

Reading is a complex task, requiring the coordination and procedural sequencing of a multitude of subskills (e.g., consonants, vowels, syllables, grammatical endings, meaningful parts, and the spelling units that represent them; L. S. Fuchs, Fuchs, Hops, & Jenkins, 2001). A breakdown in automaticity of any of the subskills involved in the reading process can have a direct impact on reading fluency (Wolf, 1999; Wolf, Bowers, & Biddle, 2000). As reading fluency is not explicitly taught in the LST/PALS program, it could be hypothesized that the combination of phonetic decoding and comprehension training alone does not automatically generalize to reading fluency gains.

Another interpretation of these findings could be that 34 hours of contextual reading may not allow enough time for newly acquired phonological skills to become automatic or cemented in lexical memory (Share, 1995). Therefore, the lack of fluency gains seen in this study may be attributed to a lack of time spent on contextual reading. It is likely that a more explicit form of instruction for reading fluency needs to be added to the LST/PALS program.

Limitations

This study had several limitations that need to be kept in mind when considering the results. Two limitations were the small sample size and the fact that although the teachers were randomly assigned to condition, the students themselves were not randomly assigned. Scheduling difficulties at the middle school level make the random assignment of students difficult because specific subject times and teacher...
availability are limited. The use of an RA to assist each teacher in implementing the program is an additional limitation. An outside person in the classroom to help with implementation adds a dimension to the classroom that does not normally exist. The random assignment of the classrooms was a limitation. Both LST/PALS classrooms were assigned at the same school, and both contrast programs were assigned at the same school. This could suggest a confounding effect due to school differences.

Further limitations of the study may be the significant difference in age and the missing IQ scores of the two older students in the experimental group. This difference in age may have affected the outcome of the LST/PALS group. Future research could address these limitations by increasing the number of classrooms, randomly assigning students to condition, controlling for age and cognitive development, and using classroom paraprofessionals to assist teachers in implementation rather than bringing in outside RAs.

**Future Research**

The significant gains produced by the LST/PALS program for Word Attack, Word Identification, and Passage Comprehension suggest the need for further research to expand on and replicate these results and improve the instructional schedule. It remains to be determined for which students with RD under what conditions (integrated or sequentially integrated) for which subskill (phonological skills, spelling, reading fluency, and reading comprehension) peer tutoring is the most efficacious. Although the LST/PALS program provided explicit instruction in some of the elements deemed essential to any comprehensive reading program (phonological skills, comprehension), some of the elements were more implicitly taught (fluency, vocabulary). Clearly, studies with explicit instructional strategies for building fluency and vocabulary in older students are needed. One way to accomplish this would be to integrate explicit reading fluency instruction into the LST/PALS program to create a more comprehensive peer-mediated remedial reading program. Research is currently being initiated to determine the differential effects of integrated versus sequentially integrated instructional scheduling for each separate subskill.

The need for practical classroom-based remedial reading programs for older students with RD is critical. The findings from the present study, combined with previous research, suggest that peer-mediated instruction is not only a viable strategy for improving reading comprehension but appears to significantly improve phonological skills in middle school students with RD. Although the findings from this study show promise for the use of peer-mediated instruction as a viable method for phonological skill instruction, replication to validate and extend these results is needed.

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Cover Art for 2006 Journal of Learning Disabilities Sought

The six covers of this volume year of the Journal of Learning Disabilities feature original artwork by Gabriel Lovett, Rachael Seger, and Caitlin Zirkelbach. We plan to continue showcasing the artwork of individuals with learning disabilities on JLD covers; therefore, we are now soliciting art for the 2006 issue covers.

Eligibility. Individuals with learning disabilities of any age are encouraged to submit their original work for consideration. The artwork may be a painting, drawing, photograph, sculpture, computer-generated graphic, or any comparable medium. Work must not exceed a maximum of 11” by 17”; three-dimensional pieces must not exceed 10 pounds. Two entries per participant may be submitted.

Submissions. Each entry must include:
- the artist’s name, age, address, and contact information
- the title of the work
- the specific medium used (computer-generated pieces should include step-by-step information on software used)
- the size of the work

All artwork, including photographic images, must be the original work of the submitting artist. Signed photo releases must accompany any work that includes photo images of people.

The actual submission of the art should be a color reproduction (which will not be returned) in one of the following formats:
- color laser print
- photograph
- slide (35 mm)
- saved as an EPS or TIFF file on Zip disk, CD, or regular 3½” floppy disk

The winner(s) may be asked to send in original art, which will be returned.

Judging. Work will be judged based on originality, creative use of materials, and overall composition and design. The age of the artist will be taken into account.

Entries should be postmarked by October 1, 2005. Judging will take place on or about October 15, and artists will be notified of our selection by December 1, 2005. Entries, requests for more information, or questions should be directed to Peggy Kipping, Periodicals Director, PRO-ED, 8700 Shoal Creek Blvd., Austin, TX 78757-6897, 512/451-3246, ext. 630; FAX: 512/302-9129; e-mail: peggy@proedinc.com. PRO-ED assumes no responsibility for entries damaged in the mail.