Effects of a Reading Fluency Intervention for Middle Schoolers With Specific Learning Disabilities

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A fluency-reading intervention was developed and used to supplement reading instruction of middle school students with learning disabilities (LD). The daily 5- to 6- min fluency intervention focused on phonics, sight phrases, and oral reading. Repeated readings were used in each area until the student achieved mastery on each respective task. The students were divided in three groups according to the length of the intervention (6–9 months, 10–18 months, and 19–25 months). Dependent t tests were used to test the effects of the intervention. A pretest and posttest curriculum-based assessment (CBA) measure was used for each group to determine progress in reading rate. In addition, progress within the intervention was measured using comparisons of beginning and ending reading levels. Significant growth in reading level and reading rate was found. Implications of these results for students with LD are discussed.

The number of students in the United States who have reading difficulties is alarming. Estimates from well-designed longitudinal studies indicate that by fourth grade 20% of children are dysfunctional readers (Shaywitz, Fletcher, & Shaywitz, 1996). Reports from national assessments of reading progress indicate that approximately 40% of fourth graders read below a basic level of achievement (i.e., little or no mastery of reading knowledge and skills necessary to perform work at grade level; Manzo & Sack, 1997; Orton Dyslexia Society, 1997). The National Education Goals Panel (1995) reported that only 25% of students in Grade 4, 28% of students in Grade 8, and 34% of students in Grade 12 achieve proficient reading standards. Given that many students with reading difficulties drop out of school prior to reaching Grade 12, the low reading performance of 12th graders is especially disappointing. Because instruction after elementary school primarily focuses on subject content rather than on teaching basic skills, the needs of adolescents with reading problems are frequently overlooked. Approximately 75% of poor readers in third grade continue to be poor readers in ninth grade (Lyons, 1995), and, unfortunately, reading disabilities persist into adulthood (Lyons, Alexander, & Yaffe, 1997).

The personal and societal costs of reading problems are substantial. Illiteracy is positively correlated with unemployment, low wages, poverty, crime, and low self-esteem (Brunner, 1993; Kirsch, Jungeblut, Jenkins, & Kolstad, 1993; National Institute for Literacy, 1997). The Orton Dyslexia Society (1997) commented on the growing reading problems and their sobering negative consequences:

Adding to the magnitude of the tragedy is the fact that it is unnecessary—the knowledge children need to master in order to succeed at reading is well-documented, and the kinds of instructional methods that are effective have also been verified. (p. 1)
Moreover, it is apparent that inadequate teacher training in reading, large classes, limited resources, and the increasing number of students with special reading needs who require explicit and intensive reading instruction overwhelm many teachers. In the maze of problems associated with delivering effective reading instruction to so many students with special needs (e.g., Title I, low achievers), the needs of students with learning disabilities who have severe reading disabilities are frequently not being met (Orton Dyslexia Society, 1997). This article focuses on the development and evaluation of a fluency-based supplemental reading intervention for middle school students with learning disabilities (LD) who have severe reading disabilities. The reading intervention used in this study was designed to provide instructional support for teachers who have students with reading disabilities who could benefit from one-to-one reading fluency training with a well-trained and teacher-supervised teacher aide or paraprofessional.

**INTERVENTION DEVELOPMENT**

Reid Lyon coordinates longitudinal reading research programs being conducted through the National Institute of Child Health and Human Development (NICHD) within the National Institutes of Health. This research involves more than 10,000 children with reading disabilities and includes approximately 100 researchers in medicine, psychology, and education in more than 15 research centers. Lyon et al. (1997) discussed the converging findings regarding interventions:

Converging evidence from several NICHD-supported research teams suggests that the most useful interventions for reading disabilities consist of a combination of explicit and direct instruction in phonemic awareness, sound-symbol relationships (phonics), and contextual reading and reading comprehension skills. … These elements must be systematically integrated and the child provided with substantial practice to develop fluency in single word and serial reading. (pp. 4–5)

The intervention in this study focuses on helping students receive the substantial practice needed to develop fluency. Specifically, it features fluency-building activities to teach sound–symbol associations (phonics), recognition of high-frequency words, and repeated readings of stories. The rationale and research for these three components and fluency training are presented next.

**Phonics Component**

Chall (1997) reported that accumulated research over 100 years clearly indicates that code-emphasis reading instruction produces better outcomes in word recognition and comprehension than does meaning-emphasis (whole-word) reading instruction. From their extensive reviews of reading research, Adams (1990, 1997) and Chall reported that direct instruction in phonics combined with an emphasis on meaning and connected reading results in better word recognition, better spelling, better vocabulary, and better reading comprehension than do reading programs that feature implicit or embedded phonics instruction. Explicit instruction in spelling–sound correspondences especially applies to individuals who have learning difficulties (e.g., students at risk for school failure and students with LD; Adams, 1990, 1997; Foorman, Francis, Beezer, Winkates, & Fletcher, 1997; Lyon et al., 1997; Mather, 1992; Stanovich, 1994).

The position for systematically teaching spelling–sound correspondences receives further support from the research regarding factors that best predict beginning reading achievement. The best predictors are (a) rapid (fluent) naming of letters and numbers (lexical access), (b) phonological segmentation or the ability to segment words or syllables into constituent sounds (phonemes), and (c) remembering verbal items presented in sequence (Foorman et al., 1997; Lyon et al., 1997). Numerous researchers have stressed the importance of learning the letter–sound correspondences at a fluent level. Adams (1997) reported that skillful readers are able to process text at rates of approximately five words per second. She noted that research indicated that the remarkable reading speed is due to the reader's capacity to recognize words instantly because of the reader's detailed and automatized knowledge of word spellings and letter–speech correspondences. Recent eye movement research indicated that skillful readers do not sample text and predict words, but instead they see every letter of the text (Stanovich & Stanovich, 1995). Moreover, research confirmed that failure to internalize these letter-to-speech correspondences makes fluent reading essentially impossible. Thus, it is not surprising that slow or inaccurate recognition of spelling-to-speech correspondences is characteristic of students with reading disabilities (Grossen, 1997).

It is apparent from the research that students who have severe reading disabilities need practice to become fluent in recognizing common spelling-to-speech correspondences. The intervention in this study includes a phonics component that provides the student with practice in recognizing common letter–speech correspondences until a fluency level is achieved.

**High-Frequency Word Component**

Lyon (1995) stated that the most reliable indicator of reading disabilities is the inability to recognize or decode single words. The phonologically based reading difficulties (e.g., memory of sound–symbol relationships) that children with reading disabilities exhibit not only interfere with their ability to read independently but very likely limit the development of their sight word vocabulary (Torgesen, Wagner, Rashotte, Alexander, & Conway, 1997). To become proficient readers learners must develop the ability to recognize words rapidly as whole-word units (sight words; Share & Stanovich, 1995). Whereas children with reading disabilities struggle to develop a working sight word vocabulary, the typical reader without reading disabilities in the elementary grades learns approximately 3,000 new words per year or about 8 words per day (Baker, Simmons, & Kameenui, 1995). The difference in the vocabulary development of learners with and without reading disabilities results in
severe and progressive gaps in the vocabulary development of students with reading disabilities.

Given that about 100 words account for 50% of print in children's school books and in the daily reading material of adults, it is important that these high-frequency words be learned and recognized rapidly (Adams, 1990). Because these words occur so frequently in spoken and written language, they readily become part of a student's receptive and spoken vocabulary; thus, their meaning is instantaneous once a student knows how to pronounce the word on sight. Beck, Perfetti, and McKenney (1982) found that average-ability students needed 16 to 22 presentations of a new word before they readily recognized the word and its meaning. Neely (1995) used precision teaching (i.e., daily timed review of target words) to help students at risk for reading failure develop fluency in recognizing target words.

With research documenting the importance of rapid sight word recognition and the deficits that students with reading disabilities have in sight word recognition, it is apparent that most students with reading difficulties need the opportunity to practice high-frequency words to a fluency level. The intervention in this study features a sight word component that provides the student with practice in recognizing high-frequency words until fluency is achieved.

Repeated Readings Component

Explicit phonics instruction is enhanced when students have opportunities to apply their knowledge of letter-sound correspondences by reading decodable words in real situations (e.g., magazines, signs, menus) and with connected text (Adams, 1990; Juel & Roper/Schneider, 1985). Because it is difficult to write meaningful and interesting stories using only decodable words, most connected text includes some sight words that do not have predictable letter-sound correspondences. Fortunately, research on orthographic-processing skills indicates that many children are able to recognize words on the basis of visual information, especially words that cannot be deciphered using letter-sound correspondences. Ehri (1985, 1995) reported that repeated exposure to these sight words in text and in phrases enables the learner to store orthographic representations of the visual features of these words in memory, thus enhancing fluent reading.

Explicit instruction and practice in phonemic awareness, sound-symbol relationships, contextual reading, and reading comprehension are essential components of an integrated and balanced curriculum for students with reading disabilities. Thus, substantial practice in textual reading is necessary for these youngsters to become fluent readers (Adams, 1997; Lyon et al., 1997).

Samuels (1979) created the repeated reading method to help students develop speed and accuracy in reading. Repeated reading consists of having a student read and reread a passage aloud until that student reads the passage with fluency and comprehension. Research on repeated readings indicates that the number of trials to achieve fluency decreases over time and fluency gains made on earlier passages transfer to subsequent passages (Samuels, 1979). A curricular research on repeated reading has been impressive. Numerous researchers (Adams, 1990; Homan, Delsius, & Hite, 1993; Rassotte & Torgesen, 1985; Sindeiar, Monds, & O'Shea, 1990; Weinstein & Cooke, 1992) have found repeated readings to be highly effective in developing the fluency and the reading comprehension skills of students with reading disabilities.

Although the exact influence that speed of text processing has on the development of reading remains unclear, enough research exists to conclude that automaticity makes reading less demanding and, therefore, more comprehensible (Meyer, Wood, Hart, & Felton, 1998). For example, Stanovich and Nathan (1991) noted that the ability to recognize words rapidly and accurately is the key to good reading comprehension. They maintained that when a reader uses a lot of energy on recognizing words, the intensity and slowness of this event detract from comprehension.

Shinn (1989) reported on numerous curriculum-based measurement (CBM) studies that examined the relationship of oral reading rate and reading comprehension scores on standardized tests. Most correlations ranged between .80 and .90. For example, the Passage Comprehension subtest of the Woodcock Reading Mastery Tests-Revised (Woodcock, 1987) yielded correlations ranging from .82 to .89, and the Stanford Achievement Test (1998) yielded correlations ranging from .80 to .91.

It is apparent that a compelling and robust relationship exists between rate of reading and reading comprehension. Unfortunately, in research comparing oral reading rates of readers without LD and readers with LD, the readers without LD read about twice as fast as their peers with LD at every grade level compared (i.e., Grades 1–6; Parrish, Delucia, & Lenzczak, 1994). Thus, it seems essential to provide students with reading disabilities with repeated reading practice to fluency. The intervention in this study includes repeated readings of connected text to fluency standards.

Fluency Component

Binder (1988) defined fluency as the rate of performance that enables skills to be applied in daily activities and remembered after a significant period of practice. Hasbrouck and Tindal (1992) defined oral reading fluency as the combination of accuracy and rate. Most researchers agree that reading fluency includes rate and accuracy and is determined by computing the total number of words read per minute subtracted by the errors (Espin & Deno, 1993; Jenkins & Jewell, 1993; Reutzel & Hollingsworth, 1993). Howell and Lorson-Howell (1990) noted that high levels of fluency allow students to develop automaticity in reading. When automaticity is reached, an individual performs the reading task so rapidly that it occurs effortlessly or without paying attention (Howell & Lorson-Howell, 1990; Laberge & Samuels, 1974). Thus, automaticity in reading frees the reader to concentrate on the meaning of text. Because average reading fluency tends to increase as students mature, rate per minute is regarded as a sensitive measure of overall reading progress (Hasbrouck & Tindal, 1992; Parrish et al., 1994). Moreover, Binder, Haughton, and Van Eyk (1990) reported that fluency training...
helps students with attention deficit disorders to increase their attention to academic tasks significantly.

Throughout prior discussions in this article the importance of fluency in reading subskills (i.e., letter-sound correspondences and word recognition) has been highlighted. This focus on subskills exists because teaching subskills or tool skills to fluency makes them readily available for combining with other skills to perform more complex tasks (Chard, Simmons, & Kameenui, 1995; Haughton, 1972; Johnson & Layng, 1992). Because individual fluent skills combine to create more complex or higher order skills, Goldiamond (1984) maintained that fluency is generative and nonlinear. The generative nature of fluency training is highlighted in the fact that rapid letter naming is a powerful predictor of beginning reading success (Adams, 1990; Torgesen et al., 1997). For example, when a student learns to recognize letters fluently, this skill readily promotes the fluent learning of letter sounds, which, in turn, enhances fluent word recognition, which leads to improved comprehension.

Given the power of fluency in helping students become proficient readers (e.g., fluent with comprehension) and the condition that students with specific LD in reading are deficient in fluency, it is important that fluency training be used with these youngsters. Furthermore, Meyer et al. (1998) noted that research to date supports fluency training regardless of the cause of the reading disability. Repeated readings is the primary technique for building fluency. Thus, the fluency intervention for this study includes repeated readings in letter-sound correspondences, sight words, and connected text.

**METHOD**

The purpose of this study was to develop and evaluate a research-based tutorial reading fluency intervention that can be delivered primarily by nonteachers to students with LD. This approach empowers teachers with instructional support and takes advantage of the many talented individuals in the nation who work in classrooms as paraprofessionals or volunteers.

This study addresses the following general question: Do repeated readings of letter-sound correspondences, high-frequency words, and repeated oral readings of stories implemented to a fluency criteria by paraprofessionals increase the reading achievement of middle school students with LD?

**Setting**

The data were collected at North Marion Middle School, a rural school in a primarily small, urban school district in Ocala, Florida. The school consists of about 1,000 students who live in six to seven small towns and communities surrounding southeast Ocala. Between 30% and 40% of the students are African American, and less than 10% are Hispanic American. Close to 80% of the students in the school are eligible for free or reduced-price lunch.

The school was selected as the site for this research study for several reasons. First, Kenneth Campbell, author of the Great Leaps Reading Program (Campbell, 1995), is a special educator in the school district; thus he has a vested interest in the students and wants to improve their reading skills. Also, administrators and teachers at the school have long indicated a need for an intervention to address the reading needs of the students. The reading intervention was targeted to students with specific LD because of the large number of those students at the school. Finally, the principal and the teachers of North Marion Middle School were committed to the implementation and evaluation of the fluency-based intervention over a 3-year period.

**Intervention**

The intervention was the Great Leaps Reading Program (Campbell, 1995). One-to-one sessions lasted between 5 to 6 min each school day. A certified special education teacher implemented the program in Year 1, and a teacher assistant who was trained for several hours led the sessions in Years 2 and 3. The program was implemented between a period of 6 to 25 school months, depending primarily on the student’s availability. Over the course of a session, there was phonics instruction, sight phrase instruction, and oral readings of passages.

**Instruction in phonics (1–2 min)**

The teacher modeled the correct pronunciation of phonemes, syllables, or nonsense sounds that might need clarification before beginning each session. The phonics lessons included the following sequence of letter–sound combinations: sounds in isolation, consonant blends, consonant r, /k/ combinations, CV–VC, CCV, CCV–VCC, CCCV, CCVC, CCCV, CVC, CVC vowel r, CCVC, CVCC, VCC, final e, and letter combinations. After the teacher modeled target sounds on a specific phonics page, the student was asked to read as many sounds as possible in 1 min from the student’s copy of the reading materials. The student began reading when the teacher said “Begin,” and the student read from left to right and then from top to bottom. During the timed readings, the instructor marked all errors on the instructor's copy of the targeted phonics page, and the instructor provided correct pronunciations of the phonemes the student read incorrectly. If the student did not read the entire page with two or fewer errors within 1 min, the student began the next session with that same page. If the student successfully read the entire page in 1 min with two or fewer errors, the student “leaped” to a more difficult page during the next instructional session. Because knowledge of letter–sound correspondences is essential for fluent reading (Adams, 1990) and the sixth graders in this school had little knowledge of letter–sound correspondences, phonics instruction was deemed appropriate.

**Instruction in sight phrases (1–2 min)**

On the instructor’s prompt, the student was asked to read as many phrases as possible in 1 min from the student copy of the reading materials. The instructor marked the errors on the instructor’s copy and offered correct pronunciation of the words during the timed reading. If the student did not read the entire page within 1 min with two or fewer errors, the student read that page again during the next instructional session. If the student successfully read the entire page in 1 min with two or fewer errors, the student “leaped” and read a more difficult page during the next instructional session.
Instruction in oral reading (1–2 min). The student was asked to read as much of the story as possible in a 1-min timing. The student was encouraged to read no faster than a comfortable speaking rate. The instructor circled all errors the student made on the instructor's copy of the reading selection page. and the instructor offered the correct words during the timed reading. If the student did not read the entire selection in 1 min with two or fewer errors, the student read that selection again during the next instructional session. If the student read the entire selection in 1 min with two or fewer errors, the student "leaped" and read a more difficult passage during the next instructional session.

The rates used to determine when a student reached fluency were the following: early first-grade passages, 30 to 40 correct words per minute (CWPM); late first-grade passages, 40 to 60 CWPM; early second-grade passages, 60 to 80 CWPM; late second-grade passages, 80 to 100 CWPM; third-grade and higher passages, 100 to 180 CWPM. The fluency standards applied in this study for Grades 1 and 2 are consistent with CBM research conducted by Alachua County Schools in Florida (Curriculum-Based Assessment in Alachua County, Florida, 1997) and to those reported by Howell, Fox, and Morehead (1993). The CWPM standards for third through eighth-grade fluency are consistent with those suggested by numerous researchers (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993; Howell et al., 1993; Starlin & Starlin, 1973).

Charting and graphing "leaps" (1–2 min). The student performance chart was used to monitor the progress of the student. Each timed reading in phonics, sight phrases, and oral reading instruction was graphed according to the number of sounds or words read and the number of errors the student made during the timed reading. Charts were shared with the student and used to motivate the student to become involved in setting goals, checking progress, and celebrating goal achievement.

Participants

Students with specific LD who entered the middle school each year for 3 years were the participants in the study. Overall, 49 out of 54 students participated in the fluency reading project long enough for their data to be included in the findings. The 6 students who did not participate in the study failed to remain in the fluency intervention for at least 6 months (e.g., they moved to another school or disobeyed school rules while going to or from the tutoring sessions). Prior to entering the fluency intervention, the students were tested for reading fluency and reading grade level. All students had been diagnosed with specific LD according to the guidelines of the Florida Department of Education. The Florida Department of Education uses the specific learning disability definition (U.S. Office of Education, 1977) featured in the Individual with Disabilities Education Act (1997).

The tests used in computing a severe discrepancy were primarily the Wechsler Intelligence Scale for Children—Revised (WISC–R; Wechsler, 1974) and the Woodcock–Johnson Psycho-Educational Battery—Revised (WJPB; Achievement and Cognitive Tests; Woodcock & Johnson, 1989). The Beery Developmental Test of Visual–Motor Integration (Beery, 1989) and the Bender Visual Motor Gestalt Test (Bender, 1938) and the Cognitive Ability subtests of the WJPB were used to assess process disorders. Unfortunately, permission was not given to use the test scores to describe the students in this study. However, it is known from the specific learning disability identification process and additional testing on reading fluency and reading grade level that all students had a reading standard score on the reading subtests of the WJPB of at least 1½ standard deviations below their standard score of intellectual ability on the WISC–R. All participants did not qualify for an intellectual disability; thus, all had intelligence standard scores on the WISC–R above 70.

Students were grouped according to the amount of time they received the intervention. The students who received intervention for at least 19 school months and not more than 25 school months were placed in Group 1. For Group 2, intervention continued for at least 10 school months and no more than 18 school months. Group 3 received intervention for at least 6 months and no more than 9 school months. Table 1 presents demographic and reading performance data for the individuals in each of the three groups. Table 2 includes a summary of the demographic data for each group.

Pragmatic conditions dictated the assignment of students to groups differentiated by length of intervention. Group 1 was the initial group to receive the fluency reading program and was used to test the general effectiveness and social validity of the intervention. Group 1 consisted of the entering sixth graders with specific LD who had the most severe reading problems. These sixth graders had a mean grade level of 0.7 (primer level) on the curriculum-based assessment (CBA) measures in reading. It was reasoned that if the fluency reading intervention was effective with students exhibiting very severe reading disabilities and was logistically feasible to implement (e.g., scheduling, supervision, cost, space requirements, student acceptance), then it would be worthwhile to expand the program to other students with LD. At the end of 9 months (1 school year), the program was considered a success with a certified special education teacher implementing it. Thus, Group 1 was continued and Group 2 was added. Moreover, a teacher assistant was hired to teach Groups 1 and 2 under teacher supervision. At the end of 2 years, the program was deemed successful with Groups 1 and 2 with the teacher assistant implementing it. Thus, Groups 1 and 2 were continued, and Group 3 was added. This configuration led to Group 1 receiving an average of 24 months of intervention, Group 2 receiving an average of 15.5 months of intervention, and Group 3 receiving an average of 7.2 months of intervention.

Design

The research design selected was an experimental pretest/posttest three-group design to determine potential changes over time in the measurement of the dependent variable, reading rate per minute on graded passages. Each group received the treatment for a different time period. The experimental design is displayed in the following format:
### Table 1
Demographic and Reading Performance Data of Individual Students in Each Group

<table>
<thead>
<tr>
<th>Ethnicity/Gender</th>
<th>Pretest Reading Grade Level</th>
<th>CBM Pretest CWPM</th>
<th>Months of Intervention</th>
<th>Posttest Reading Grade Level</th>
<th>CBM Posttest CWPM</th>
<th>Reading Grade Level Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1 (3-year intervention)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Black/Male</td>
<td>1.0</td>
<td>16</td>
<td>25</td>
<td>3.0</td>
<td>62</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>2. Black/Male</td>
<td>0.5</td>
<td>62</td>
<td>25</td>
<td>4.0</td>
<td>96</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>3. Black/Male</td>
<td>1.0</td>
<td>37</td>
<td>25</td>
<td>3.5</td>
<td>85</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>4. Black/Male</td>
<td>1.0</td>
<td>30</td>
<td>25</td>
<td>4.0</td>
<td>76</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>5. Black/Male</td>
<td>0.5</td>
<td>10</td>
<td>25</td>
<td>3.0</td>
<td>62</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>6. White/Female</td>
<td>0.5</td>
<td>24</td>
<td>25</td>
<td>3.5</td>
<td>60</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>7. Black/Male</td>
<td>0.5</td>
<td>10</td>
<td>24</td>
<td>2.5</td>
<td>62</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>8. White/Female</td>
<td>0.5</td>
<td>21</td>
<td>24</td>
<td>4.0</td>
<td>60</td>
<td>3.5 grades</td>
</tr>
<tr>
<td>9. White/Male</td>
<td>0.5</td>
<td>54</td>
<td>22</td>
<td>8.0</td>
<td>82</td>
<td>7.5 grades</td>
</tr>
<tr>
<td>10. Black/Male</td>
<td>0.5</td>
<td>25</td>
<td>20</td>
<td>2.5</td>
<td>64</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>11. White/Female</td>
<td>0.5</td>
<td>31</td>
<td>25</td>
<td>3.5</td>
<td>55</td>
<td>3.0 grades</td>
</tr>
<tr>
<td><strong>Group 2 (2-year intervention)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. White/Male</td>
<td>1.0</td>
<td>48</td>
<td>18</td>
<td>7.0</td>
<td>87</td>
<td>6.0 grades</td>
</tr>
<tr>
<td>2. White/Male</td>
<td>2.5</td>
<td>62</td>
<td>18</td>
<td>8.0</td>
<td>136</td>
<td>5.5 grades</td>
</tr>
<tr>
<td>3. White/Female</td>
<td>3.0</td>
<td>100</td>
<td>18</td>
<td>7.0</td>
<td>109</td>
<td>4.0 grades</td>
</tr>
<tr>
<td>4. Black/Female</td>
<td>0.5</td>
<td>42</td>
<td>18</td>
<td>4.5</td>
<td>88</td>
<td>3.5 grades</td>
</tr>
<tr>
<td>5. White/Male</td>
<td>4.0</td>
<td>79</td>
<td>17</td>
<td>8.0</td>
<td>101</td>
<td>4.0 grades</td>
</tr>
<tr>
<td>6. White/Male</td>
<td>0.5</td>
<td>54</td>
<td>17</td>
<td>4.5</td>
<td>92</td>
<td>4.0 grades</td>
</tr>
<tr>
<td>7. White/Female</td>
<td>1.5</td>
<td>48</td>
<td>17</td>
<td>4.0</td>
<td>88</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>8. White/Male</td>
<td>3.0</td>
<td>90</td>
<td>17</td>
<td>5.5</td>
<td>73</td>
<td>1.5 grades</td>
</tr>
<tr>
<td>9. White/Male</td>
<td>0.5</td>
<td>31</td>
<td>15</td>
<td>3.5</td>
<td>52</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>10. Black/Male</td>
<td>4.0</td>
<td>60</td>
<td>15</td>
<td>5.5</td>
<td>72</td>
<td>1.5 grades</td>
</tr>
<tr>
<td>11. White/Male</td>
<td>2.5</td>
<td>80</td>
<td>15</td>
<td>5.0</td>
<td>73</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>12. White/Female</td>
<td>2.5</td>
<td>60</td>
<td>15</td>
<td>5.5</td>
<td>97</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>13. White/Male</td>
<td>1.0</td>
<td>42</td>
<td>15</td>
<td>4.0</td>
<td>70</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>14. White/Male</td>
<td>1.5</td>
<td>61</td>
<td>15</td>
<td>5.5</td>
<td>120</td>
<td>4.0 grades</td>
</tr>
<tr>
<td>15. Black/Male</td>
<td>3.0</td>
<td>65</td>
<td>15</td>
<td>3.5</td>
<td>91</td>
<td>5.0 grades</td>
</tr>
<tr>
<td>16. Black/Female</td>
<td>2.5</td>
<td>45</td>
<td>15</td>
<td>5.5</td>
<td>72</td>
<td>1.0 grades</td>
</tr>
<tr>
<td>17. Black/Male</td>
<td>0.5</td>
<td>47</td>
<td>14</td>
<td>3.0</td>
<td>143</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>18. Black/Female</td>
<td>2.5</td>
<td>26</td>
<td>11</td>
<td>4.0</td>
<td>78</td>
<td>1.5 grades</td>
</tr>
<tr>
<td>19. Black/Male</td>
<td>0.5</td>
<td>50</td>
<td>10</td>
<td>3.0</td>
<td>48</td>
<td>1.5 grades</td>
</tr>
<tr>
<td><strong>Group 3 (6-to 9-month intervention)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Black/Male</td>
<td>1.5</td>
<td>31</td>
<td>9</td>
<td>4.0</td>
<td>76</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>2. Black/Male</td>
<td>1.5</td>
<td>57</td>
<td>9</td>
<td>4.0</td>
<td>88</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>3. White/Female</td>
<td>1.5</td>
<td>10</td>
<td>9</td>
<td>2.5</td>
<td>51</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>4. White/Male</td>
<td>3.0</td>
<td>61</td>
<td>8</td>
<td>5.0</td>
<td>108</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>5. White/Male</td>
<td>1.5</td>
<td>34</td>
<td>8</td>
<td>4.5</td>
<td>79</td>
<td>3.0 grades</td>
</tr>
<tr>
<td>6. White/Male</td>
<td>3.0</td>
<td>27</td>
<td>8</td>
<td>4.5</td>
<td>65</td>
<td>1.5 grades</td>
</tr>
<tr>
<td>7. White/Male</td>
<td>0.5</td>
<td>4</td>
<td>8</td>
<td>1.0</td>
<td>39</td>
<td>.5 grades</td>
</tr>
<tr>
<td>8. Black/Male</td>
<td>2.5</td>
<td>30</td>
<td>7</td>
<td>5.0</td>
<td>68</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>9. Black/Male</td>
<td>0.5</td>
<td>42</td>
<td>7</td>
<td>3.0</td>
<td>50</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>10. White/Male</td>
<td>1.5</td>
<td>57</td>
<td>7</td>
<td>3.5</td>
<td>80</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>11. White/Female</td>
<td>1.5</td>
<td>31</td>
<td>7</td>
<td>3.5</td>
<td>82</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>12. Black/Male</td>
<td>2.5</td>
<td>52</td>
<td>7</td>
<td>4.0</td>
<td>90</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>13. Black/Male</td>
<td>0.5</td>
<td>19</td>
<td>6</td>
<td>3.0</td>
<td>76</td>
<td>2.5 grades</td>
</tr>
<tr>
<td>14. White/Female</td>
<td>0.5</td>
<td>9</td>
<td>6</td>
<td>1.0</td>
<td>35</td>
<td>.5 grades</td>
</tr>
<tr>
<td>15. White/Male</td>
<td>0.5</td>
<td>26</td>
<td>6</td>
<td>1.0</td>
<td>48</td>
<td>.5 grades</td>
</tr>
<tr>
<td>16. White/Male</td>
<td>3.0</td>
<td>75</td>
<td>6</td>
<td>5.5</td>
<td>101</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>17. White/Female</td>
<td>1.5</td>
<td>70</td>
<td>6</td>
<td>3.5</td>
<td>70</td>
<td>2.0 grades</td>
</tr>
<tr>
<td>18. White/Male</td>
<td>1.5</td>
<td>50</td>
<td>6</td>
<td>2.5</td>
<td>63</td>
<td>1.0 grades</td>
</tr>
<tr>
<td>19. White/Male</td>
<td>0.5</td>
<td>42</td>
<td>6</td>
<td>2.5</td>
<td>64</td>
<td>2.0 grades</td>
</tr>
</tbody>
</table>

Note: CBM = curriculum-based measurement; CWPM = correct words per minute.
TABLE 2
Demographic Data of Students by Group Assignment

<table>
<thead>
<tr>
<th>Group 1 (3-year intervention)</th>
<th>Group 2 (2-year intervention)</th>
<th>Group 3 (1-year intervention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>Classification</td>
<td>WF</td>
</tr>
<tr>
<td>11</td>
<td>SLD</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>SLD</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>SLD</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. WF = White female; BF = Black female; WM = White male; BM = Black male; SLD = specific learning disabilities.
*aReading grade assessed by graded curriculum-based assessment passages.

The pretest and posttest. The pretest O1 and the posttest O2 consisted of CBA. CBA is an assessment procedure that uses direct observation and recording of a student’s performance in the school curriculum as a basis for obtaining information to make instructional decisions (Deno, 1987). A CBA measure is referred to as CBM. Some of the reasons for selecting CBM as the dependent measure include the following:

1. CBM reading procedures have excellent reliability and validity (Fuchs, 1986; Fuchs & Fuchs, 1986; Rasinski, 1990; Rieth & Evertson, 1988; Shinn, 1989; Shinn, Good, Knutson, Tilly, & Collins, 1992; Tindal & Marston, 1990).

2. CBM reading procedures similar to those used in this study were evaluated with more than 2,000 students in Aiea County, Hawaii, a county adjacent to Marion County. The CBM scores in this evaluation study yielded correlation coefficients ranging from .89 to .99 for reliability, including internal consistency, test-retest reliability, and inter scorer reliability.

3. CBM has been used extensively in research studies involving students with disabilities (Espin & Deno, 1993; Fuchs et al., 1993; Neely, 1995; O’Shea, Sinodelar, & O’Shea, 1985; Paramar et al., 1994; Sinodelar et al., 1990; Weinstein & Cooke, 1992).

4. CBM has high correlations with standardized tests of global reading, comprehension, and word identification (Deno, Mirkin, & Chiang, 1982; Shinn, 1989; Shinn et al., 1992).

The CBM procedures in this study included a collection of 200+ word reading passages from the school district’s adopted reading basal, the Macmillan Series R. Fry’s (1977) Readability Formula was used to determine the reading grade level of each passage. For the pretest, the students read a series of graded passages from the Macmillan Series R for 1 min, and the evaluator recorded the exact passage(s) read and the total words read and number of errors. The evaluator converted the results for the 1-min readings into a fluency score (i.e., total words read minus errors equals correct words per minute) for each grade level read. The highest grade level at which the student read with 10% or less errors on the CBM was recorded as the pretest score. The posttest consisted of the same CBM procedures used in the pretest. A different part of the same stories from the Macmillan Series R was used in the posttest. For example, a student might read Passages 1 and 2 for the pretest and Passages 3 and 4 for the posttest. The student’s ending grade level (i.e., posttest score) was the highest grade level at which the student read with 10% or fewer errors.

Materials

Both instructors (i.e., special education teacher and teacher assistant) used the Great Leaps Reading Program (Campbell, 1995), Grades 5–9. The instructor and the student had a copy of the program. Charts were used to record and graph the students’ daily rates of correct responses on phonics, high-frequency words, and stories. A counter-back timer that made a sound at the end of 1 min was used to time minutes. A highlight pen was used to highlight each score on the chart that indicated fluency was achieved. The instructors had a folder for each individual student to store the charts and pertinent instructional information. The teacher used an acetate cover sheet and an overhead pen to record errors on the instructor’s copy of the reading materials.

Procedures

The intervention was delivered 5 days per week when the students were available. Each day, students read aloud a phonics page, a sight words page, and a story page based on their previous lesson’s performance. If participants hesitated for more than 3 sec, the instructor supplied the sound or word. If the students completed a page in less than 1 min, they were instructed to return to the beginning of the page and continue reading until the minute ended. Pauses longer than 3 sec, substitutions, omissions, and mispronunciations were scored as
errors. If a student misread a proper noun that occurred several times, it was only counted as one error. Self-corrections, additions, and repetitions were not scored as errors. Instruction was provided in the teacher's classroom during Year 1 and in a small office next to the cafeteria during Years 2 and 3. All instruction was one-to-one, and students were scheduled every 7 min. During Year 3, the teacher assistant averaged teaching more than 45 students a day. Given the large number of students with severe reading disabilities in this middle school and the lack of a strong remedial reading program in general education, it was determined that these youngsters needed a tutorial reading program. Thus, Great Leaps was incorporated in their Individualized Education Programs. The general education classes these students attended consisted of literature appreciation and did not feature a component that focused on teaching students how to read. Moreover, the middle school Macmillan R Series Reading basal was considered too difficult for them. Thus, these students did not receive any reading instruction in general education. Throughout this study, the fluency reading program was the only formal reading instruction the students received.

To test the effectiveness of the three interventions, grade-level pretest and posttest scores were compared for each group. Also, the CBM pretest and posttest fluency scores were compared for each group to ascertain the effectiveness of the respective interventions.

Each of the hypotheses was tested using the dependent t test. The results of the dependent t tests are contained in Tables 3 and 4. As can be seen, each of the hypotheses was rejected, indicating that the treatment was statistically significant for each condition for CBM fluency scores at grade-level scores.

Overall, these findings indicate that all groups made significant progress in reading during the intervention. However, the 6- to 9-month group had the highest rate of reading progress but were in the intervention for the shortest period of time. The total reading growth was greater for the group who were in the intervention for the longer periods of time.

**ANALYSIS OF DATA**

At the beginning and end of the fluency intervention, each student's grade level was determined with the graded passages in the Great Leaps Reading Program (Campbell, 1995). In this assessment, the student read graded passages for 1 min, and the teacher recorded the number of words read correctly. The beginning-level assessment served as a pretest grade level, and the ending-level assessment served as the posttest grade level. For example, if a student started on the passage on the first-grade level and ended by achieving fluency at a third-grade level, the student's beginning reading level was first grade, and the ending reading level was third grade. The difference in the two grade-level measures reflect the student's grade-level progress in the fluency intervention.

**DISCUSSION**

During the Great Leaps intervention (Campbell, 1995), three groups made substantial progress. Given the severity of the reading problems of these students with learning disabilities, the growth of all three groups is impressive. For example, Group 1 only achieved primer reading level during Grades K through 5 and achieved 3.14 grade levels during their 19- to 25-month fluency intervention. Group 2 achieved 3.08 grade levels during their 10- to 18-month fluency intervention. Group 3 achieved almost 2 years (1.82) grade level growth in their 6- to 9-month fluency intervention. All group made substantial gains in their fluency scores. Given that posttest fluency scores are based on more difficult reading material, the fluency scores are outstanding. The difference in the relative rate of growth between the 6- to 9-month group and the 19- to 25-month group is most likely due to one or more of the following factors:

**TABLE 3**

Effects of Fluency Intervention Based on Grade-Level Scores

<table>
<thead>
<tr>
<th>Intervention Group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>Growth</th>
<th>Effect Size</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 to 25 months</td>
<td>11</td>
<td>0.64</td>
<td>0.23</td>
<td>3.77</td>
<td>1.51</td>
<td>3.14</td>
<td>13.43</td>
<td>6.71</td>
<td>.0001</td>
</tr>
<tr>
<td>10 to 18 months</td>
<td>19</td>
<td>2.00</td>
<td>1.15</td>
<td>5.08</td>
<td>1.55</td>
<td>3.08</td>
<td>2.67</td>
<td>9.75</td>
<td>.0001</td>
</tr>
<tr>
<td>6 to 9 months</td>
<td>19</td>
<td>1.53</td>
<td>0.90</td>
<td>3.34</td>
<td>1.35</td>
<td>1.82</td>
<td>2.01</td>
<td>10.08</td>
<td>.0001</td>
</tr>
</tbody>
</table>

**TABLE 4**

Effects of Fluency Intervention Based on Curriculum-Based Measurement Scores

<table>
<thead>
<tr>
<th>Intervention Group</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>Growth</th>
<th>Effect Size</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 to 25 months</td>
<td>11</td>
<td>29.09</td>
<td>16.67</td>
<td>69.45</td>
<td>13.16</td>
<td>40.36</td>
<td>2.42</td>
<td>14.30</td>
<td>.0001</td>
</tr>
<tr>
<td>10 to 18 months</td>
<td>19</td>
<td>57.37</td>
<td>19.16</td>
<td>86.53</td>
<td>24.14</td>
<td>29.16</td>
<td>1.52</td>
<td>4.72</td>
<td>.0002</td>
</tr>
<tr>
<td>6 to 9 months</td>
<td>19</td>
<td>38.26</td>
<td>20.55</td>
<td>70.21</td>
<td>19.85</td>
<td>31.95</td>
<td>1.55</td>
<td>9.23</td>
<td>.0001</td>
</tr>
</tbody>
</table>
1. The 19- to 25-month group had the most severe reading disabilities of the three groups. All 10 of the students in this group began the intervention reading at the preprimer or primer level. Only 47% of the students in the 6- to 9-month group were reading as low as preprimer or primer level.

2. Reading progress of students is frequently the highest when a new reading intervention is implemented because of the novelty effect (Adams, 1990). Students in the 6- to 9-month group were in the novelty effect period for a longer portion of the intervention than the 19- to 25-month group. Also, it is probably more difficult to maintain a positive learning curve over time.

3. According to Fuchs et al. (1993), the fastest reading progress typically occurs when students are in first and second grades. Although the students in this study were middle schoolers, the 6- to 9-month group’s pretest mean reading grade level of 1.5 may have positioned these students to make rapid reading progress during a tutorial fluency reading intervention. In contrast, the pretest mean reading grade level of the 19- to 25-month group was primer level.

The significant reading gains for students in this study support the research that indicates that many students with LD in reading benefit from explicit fluency-based reading instruction in phonics, sight words, and oral readings of stories. Given the findings that most students with reading difficulties in third and fourth grades continue to have reading difficulties in secondary school (Juel, 1998; Lyon, 1995), it is noteworthy that most of the middle school students with LD in this study made substantial gains. It is possible that these adolescents were poised to enter the rapid growth stage of reading development that Chall (1983) and Fuchs et al. (1993) discussed. However, it appears that some consideration should be given for examining fluency reading instruction as a viable method for older students who have reading problems. Moreover, it is encouraging that the students in this study were able to benefit from an intervention primarily conducted by a well-trained paraprofessional. Given that reading instruction is stressed more in elementary school than in middle school, it is interesting that most of the students in this study made more total reading progress in 6 to 25 months of being in middle school than in 45 to 54 months of being in elementary school.

The design of this study has several strong features including (a) good stability of intervention implementation by limiting teacher variability, (b) long-term intervention, and (c) use of reliable and valid dependent measures. Although the design has several strong features, some limitations of the study are noteworthy. First, it is well documented that the effectiveness of tutoring is often due to the small teacher–student ratio rather than to the method of instruction (Shanahan & Barr, 1995; Wais & Slavin, 1993). Thus, some of the effects achieved in this study are likely due to the daily one-to-one attention these middle schoolers received from a caring adult.

Second, although research suggests that oral reading fluency is highly correlated to reading comprehension, this study would be enhanced if comprehension had been examined explicitly. Third, although most students in this study responded well to the intervention, an inspection of the progress of each student reveals that a small percentage had minimum reading progress. An examination of these students is warranted to see whether there are factors that help identify these youngsters. It is likely they are individuals who have some of the neurological conditions highlighted in the NICHD studies (Lyon et al., 1997) and who warrant a more intense multisensory-based reading program. Moreover, it is possible that adolescents with LD whose reading problems are the most serious problems need a phonological awareness fluency component.

**IMPLICATIONS FOR PRACTICE**

Although effective reading interventions in early grades are essential for preventing reading failure (Snow, Burns, & Griffin, 1998), the results of this study suggest that one-to-one fluency training with older students who have reading disabilities can produce significant reading progress. Some implications of this study include the following:

**Use Paraprofessionals to Supplement Reading Instruction**

It is imperative that teachers who are well trained, highly knowledgeable, and well supported provide the primary reading instruction for students at risk for reading failure (Snow et al., 1998). However, the efforts of teachers who teach reading at all grade levels can be extended to provide students with supplementary reading activities through the use of paraprofessionals. Many communities have adults who are willing and able to serve as volunteers or paid paraprofessionals. The findings of this study indicate that a well-trained paraprofessional can help boost the reading progress of students with LD.

**Provide Opportunities to Receive One-to-One Instruction**

In some schools, large numbers of students make it difficult for special education teachers to provide differential instruction to students with reading disabilities (Vaughn, Moody, & Schumm, 1998). One-to-one instruction provides a student with individual attention, intense instruction, and corrective feedback. The powerful teaching effects of tutorial arrangements are well documented (Shanahan & Barr, 1995; Wais & Slavin, 1993).

**Provide Oral Reading Fluency Instruction**

The results of this study support the findings of numerous researchers (Adams, 1990; Binder et al., 1990; Fuchs et al., 1993; Samuels, 1979) who have promoted the practice of providing fluency training. Using repeated readings to build reading fluency appears to be an effective reading intervention strategy for improving the reading skills of students with reading disabilities. Repeated readings provide students with opportunities to practice reading text that supports the
Provide Fluency Instruction in Component Reading Skills

Fluency training in the component reading skills of sound–symbol correspondences and sight words used in this study appears to be an effective strategy in assisting students with reading disabilities to improve their oral reading fluency. Fluency training in component skills can supplement the teacher’s instruction by focusing on those subskills being covered in the primary reading program. The practice of teaching reading component skills to a fluency standard is supported by several researchers (Adams, 1990; Chard et al., 1995; Johnson & Layng, 1992; Torgesen et al., 1997).

Overall, the results of this study are encouraging, and more studies are charted to help improve fluency-based reading interventions and answer important research questions. Future studies are planned to add a phonological awareness component; examine fluency-based reading programs across all age groups; introduce a comprehension component; and examine the relationships among the skills of phonological awareness, letter-sound correspondences, high-frequency word recognition, oral reading rate, and comprehension. It is apparent that fluency in reading skills is important and teachable. This component may be a key factor for many students who have severe reading problems. Existing and forthcoming reading research will be examined to learn about the importance of fluency and factors that influence its growth. The wealth of NICHD findings (Lyon, 1999) from the longitudinal research in reading and anticipated findings from their ongoing studies provide an exciting knowledge base for understanding reading problems and how to prevent and correct them. Perhaps the fluency component is part of the intervention solution for many individuals who experience reading failures.

REFERENCES

Curriculum-Based Assessment in Alachua County, Florida: Vital Signs of Student Progress, (1997). Gainesville, FL: Exceptional Student Education, School Board of Alachua County.
LEARNING DISABILITIES RESEARCH


