Evaluating the Efficacy of Reading Fluency Instruction

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Abstract

Students with weak reading skills are at risk for school difficulty. Among the indicators of reading difficulty, reading fluency is a strong predictor of overall reading problems. A multiple baseline across small groups of students design was used to evaluate the effects of explicit oral reading fluency instruction. Based on universal screening data, 6 fourth grade students who scored between the 25th and 50th percentile were provided with 30 minutes of explicit reading fluency instruction four or five days per week, for a total of 40 sessions each. The explicit instruction included multiple components of reading fluency, including repeated reading, phrase drill error correction, explicit word analysis, and metacognitive reflection using reading-level controlled text. To examine differential effects over time, three of the students received the instruction after a short baseline, and the other students received it after an extended baseline period. Maintenance of skills was evaluated at four and eight weeks post treatment. Dependent variables included third and fourth grade oral reading fluency (ORF) measures as well as scores on the Test of Word Reading Efficiency (TOWRE) and the Word Identification and Spelling Test (WIST). One student left the study because he was referred for a special education evaluation. Of the remaining five students, three showed reading improvements on weekly progress measures and at four and eight weeks post-intervention. The other two students showed variable response to the intervention. The limitations and implications for instruction and future research are discussed.

*Keywords:* reading, intervention, instruction, fluency
**Introduction and Literature Review**

The process of becoming a skilled reader often occurs as effortlessly as acquiring other developmental skills, such as learning to walk, talk, hold a cup or eat from a spoon. For those adults who glide into becoming able readers there is little awareness of when the process began, how it was taught, and the stages through which the skill was developed. Likewise, for children, adolescents, or adults for whom reading skills did not progress as effortlessly, neither do they identify when the process began to break down, how the skills were insufficiently taught, and the stages at which they were continually left behind. For the able reader, reading is an automatic, effortless activity and positive consequences are experienced through environmental and behavioral interactions. Students who experience delays in reading skills also have far less reading practice. Research has established that the amount of reading makes an independent contribution to reading skill. This contribution appears to be mediated by general facilitation that arises from accessing words repeatedly (Rayner, Foorman, Perfetti, Pesetsky, Seidenberg, 2001). The less able reader does not get as much practice as the more able reader and the gap between the more and less able readers continues over time (Stanovich, 1986).

Over a quarter of century of reading research has identified that the smallest unit of sound, an individual phoneme, has an important effect on reading development. The National Reading Panel (NRP, 2000) identified five areas of literacy which are important for successful reading development: Phonemic Awareness, Phonics, Fluency, Vocabulary and Comprehension. When children are phonemically sensitive to the individual sounds in words,
they can learn to map these sounds onto orthographic information, which represents sounds in print. Learning to convert the sound patterns to words using systematic phonics instruction helps children learn more effectively than other reading instruction practices. Moreover, the NRP noted that synthetic phonics programs, larger unit phonics programs, (emphasizing onsets, rimes, phonograms and spelling patterns) and miscellaneous phonics programs did not differ significantly from each other (NRP, 2000). While a number of studies have examined the importance of phonics instruction, less research has considered how combining specific reading instruction methods affects reading outcomes. In particular, little research has explored whether the combination of fluency training, word analysis, and metacognitive strategies improves students' reading skills.

**Importance of Fluency**

The slow, accurate decoding behavior of young readers increases in speed with practice, and with continued practice, eventually results in reading fluency. This development occurs gradually and promotes reading comprehension by freeing the reader to construct meaning from the recognized words. In a sense, the fluent reader is multi-tasking during the reading process by processing the visual symbols, automatically attaching sounds at the lexical or sub-lexical level, activating word meaning, processing syntactic understanding and combining these components for passage comprehension. The NRP (2000) data showed that the most effective instructional procedure which improved word recognition, fluency (speed and accuracy of oral reading), and comprehension with most students was oral reading practice with corrective feedback.

In addition to research findings about the efficacy of reading fluency instruction, other studies have shown that reading fluency improvements with trained texts can be generalized to
novel texts. Daly, Bonfiglio, Mattson, Persamipieri, and Foreman-Yates (2005, 2006) replicated the findings of Daly, Martens, Hamler, Dool, and Eckert (1999) where generalized responding to novel text was measured. The 1999 study results revealed that when instructional material was matched to reading ability and assessment was matched to instruction, reading improvements were observed. Daly et al.'s later studies (2005, 2006) refined their previous research by including antecedent interventions with contingent reinforcement and programming for generalization with third and forth grade students.

In the Daly et al. studies (2005, 2006) three treatment conditions were compared, which included reward, instructional interventions, and reward plus instructional interventions. The reward condition included tangible rewards for achieving predetermined oral reading fluency goals. The instructional intervention conditions included listening passage preview, repeated reading, and phrase drill error correction. The final condition combined the first two conditions, rewards and instruction. The results showed growth over baseline for all instructional conditions, indicating that reading fluency instruction was effective. This study is of interest because the high level of word overlap in the generalized text may have increased its decodability. The generalized text used for assessment contained 87% word overlap of instructional material, thus programming a high degree of match between instruction and assessment. Results revealed the importance of combining both reward and instructional variables to produce generalization of oral reading skills.

Nelson, Alber, and Gordy (2004) evaluated the effects of systematic error correction and of systematic error correction combined with repeated reading on oral reading accuracy and rate in a multiple baseline design with four second-grade students. The design introduced systematic
error correction as the first treatment, followed by error correction, and repeated reading. The final phase condition required students to reread the baseline text, where gains were expected given that this text had been previously read. Results revealed all four students increased their oral reading accuracy and rate over baseline; however, gains were only observable in the second treatment phase, error correction with repeated reading. This finding was unexpected given the increased practice rereading text in the third condition. Nonetheless, these findings extended the literature on repeated reading.

**Word Study**

Researchers have found that word study instruction also can enhance students' reading skills. Vadasy, Sanders, and Peyton (2005) examined how text difficulty level and word study instruction affected reading performance. The authors hypothesized that matching word study components found in text would offer students the opportunity to practice the letter patterns, which may lead to more immediate recognition of these patterns in other words. Two treatments were compared, Word Study and Repeated Reading. The Word Study instruction included a 30 minute instructional lesson using *Sound Partners*, which included instruction in phonics, spelling, and reading a list of decodable words. Outcomes were compared to a 20 minute lesson using *Sound Partners* with 10 minutes of repeated reading of decodable text, and to a control group where classroom instruction used primarily whole language. Results revealed that both treatment groups outperformed the control group on all measures of accuracy, fluency comprehension, and spelling. On most measures the two treatment groups performed comparably, however, significantly higher passage reading fluency and passage reading accuracy were observed for the students who received the repeated reading condition. Moreover, the
Word Study group students who received more intensive phonics and word analysis instruction did not show advantages in word reading or spelling accuracy beyond the group receiving *Sound Partners* plus repeated reading.

**Metacognitive Skills Instruction**

There has been increased research about the metacognitive processes involved in reading skill development and how intentional activation of these processes can result in improved performance. Regular opportunities for reflection that are planned and embedded in instruction can help children become more self-regulated learners. Metacognitive practices which develop children’s ability to reflect on their learning can be embedded in instruction (Paris & Ayers, 1999). Research has demonstrated that cognitive training can help children learn to interpret, remember, manipulate and make use of information (Hayward, Das, & Janzen, 2007). Hayward et al. (2007) compared two cognitive strategy instructional conditions. A group of third grade Canadian First Nations children were divided into two remedial groups and compared with a no risk control group. The first remedial group received the *Cognitive Enhancement Program* (COGENT) throughout the school year while the second group received *COGENT* for the first half of the year, followed by a pullout cognitive enhancement program (*PREP*), for the second half of the year. MANOVA results showed that the students who received the intervention for the whole year made the most gains.

conducted a study of a metacognitive approach for lexical retrieval strategies known as RAVE-O. In this program students were provided with four sets of questions to help them address word finding difficulties. Results showed positive effects for the students who received the RAVE-O instruction. These studies suggest that using metacognitive strategies could be an important element of intervention.

**Measuring Text Difficulty**

Text difficulty is an important variable in reading performance. Text difficulty level can have moderating effects on reading outcomes due to student interest and prior knowledge about the reading material. A recent innovation offers new opportunities to study the effects of directed fluency instruction with texts matched to the student's current reading skills. The Lexile readability measure is a computer-based formula for identifying any text's reading level (MetaMetrics, 2009). Matching students reading level to text difficulty using the Lexile framework for reading is a scientific approach to providing students with texts that match their reading skills. Lexile levels provide a common scale for matching reader ability and text difficulty, allowing for easy monitoring of progress. Lexile measures help teachers to differentiate instruction and select a variety of books including text books, trade books, magazines, and other classroom materials which allow for differentiated instruction. Although one published measure of academic achievement, Measures of Academic Progress (MAP), links students’ results to Lexile scales (Northwest Evaluation Association, 2009), the effect of the difficulty level of text on reading fluency has not been as widely studied.
Late Emerging Reading Difficulties

The complexity of reading is underscored in the population of students who perform at expected early literacy levels on phonological awareness and assessments of early phonics acquisition, and are later identified as at risk for reading difficulty. Leach, Scarborough and Rescorla (2003) examined the characteristics and prevalence of early versus late identified reading disabilities. In a retrospective analysis of fourth grade readers, Lipka, Lesaux, and Siegel (2006) estimated that the prevalence of late emerging reading disabled students may be as high as 36-46%. In a more recent study by Katzir, Kim, Wolf, Morris and Lovett (2008) later emerging reading difficulties were addressed. The underlying causes of poor reading for students whose reading skills were not at grade level were studied. The participants in this study were identified within the sub-types of a reading disability based on Wolf's Double Deficit (DD) Hypothesis. Students with Naming Speed deficits or Phonological deficits performed equally well on word level measures compared with children with DD. On assessments of connected reading, children with Naming Speed deficits performed significantly lower than the Phonologically impaired group on measures sensitive to rate and accuracy.

Bhattacharya & Ehri (2004) conducted a study with adolescents in grades six through ten experiencing below average word reading skills. The study examined whether teaching students to pronounce the spellings of syllables would enhance their ability to retain words in memory for reading and spelling. The students in the syllable treatment were provided with repeated practice in breaking words into syllables and matching the spelling of syllables to their pronunciation. A second treatment included readers who practiced the same word lists through whole word learning; both treatment groups were compared to a control group. ANOVA results revealed
that syllable training was more effective than whole word training (Bhattacharya & Ehri, 2004). Effect sizes for the syllable group were 1.35 for training measures and ranged from .63 to 1.30 on transfer measures. This was in contrast to effect sizes of .02 to .46 and .02 to .77 on the transfer and training measures from the whole word training.

In another study about clustering individual sounds into larger units, the importance of this skill was positively correlated with reading fluency in first graders (Harn, Stoolmiller, & Chard, 2008). Harn et al. (2008) used Ehri’s phase theory (Ehri, 2002, 2005, cited in Harn, et al, 2008) of reading acquisition to examine the relationship between levels of unitization and oral reading fluency using curriculum based measurements of Nonsense Word Fluency (NWF) and oral reading fluency (ORF). The four levels of unitization included, (a) sound by sound, where students read nonsense words sound by sound and did not attempt to blend the sounds, (b) recoding, where students said the sound of each letter and then blended the sounds to form the word, (c) partial blending, where students produced a larger unit of sound beyond individual letter sounds, and (d) full unitization, where students read the non-word as a unit. Students who displayed full unitization read significantly more fluently on winter and spring first grade oral reading benchmarks. In addition, students who were at the partial blending phase in the fall grew more fluent by spring compared to students with more limited and slower alphabetic knowledge. This study reinforced the importance of automatically chunking sounds into larger units to achieve a rate of reading fluency which frees cognitive attention from the decoding of words to understanding text.

In a study by Guthrie, Coddington, Klauda, Wigfield, and Barbosa (2009) the multiple reading needs of older elementary students were addressed by provided a multi-faceted reading
program to high and low achieving fifth grade students. The Concept Oriented Reading Program (CORI) was used to provide instruction in reading comprehension, ecological knowledge, word recognition, reading fluency, and motivational support, and compared to traditional instruction. Students in the CORI group scored higher on post-test measures of word recognition speed, reading comprehension, and ecological knowledge than students receiving traditional instruction. The CORI instruction was also equally effective for high and low achieving students. The authors concluded that explicitly supporting multiple aspects of reading simultaneously appeared to benefit diverse learners (Guthrie et al., 2009).

The five areas of reading development identified by the National Reading Panel (2000) must be mutually supported at all grade levels for maximum benefit to low achieving readers. While there is a greater emphasis on phonemic awareness and phonics at the early elementary level, older, low achieving readers continue to benefit from explicit instruction in these areas as text becomes orthographically and syntactically more complex. As Stanovich (1986) pointed out, the rich get richer and the poor get poorer” (Mathew, 25:29). Stanovich (1986) applied this biblical phrase to reading, noting that poor readers read less than good readers and that because of this difference, year after year, the gap between the two group increases (NRP, 2000). The diminishing returns in reading gain occur in all five areas of literacy, affecting motivation to read as well as skill development.

While there is a great deal of evidence about individual specific methods which improve reading fluency, less is known about how to combine these methods in a systematic way in school settings. In particular, no prior research has examined treatments to improve reading fluency for complex orthographic patterns and connected text, and the generality of these
treatments to other texts. There is also a dearth of research addressing the use of reading level controlled, such as Lexiled, authentic text matched to phonics instruction. The research question addressed here is: does repeated reading of authentic text, with corrective feedback on errors, combined with meta-cognitive reflection, increase oral reading fluency?

Method

Design

A multiple baseline across small groups of students design was used to examine the effects of a multi-component explicit reading intervention. This design builds on work by Rantz, Dickinson, Sinclair & Van Houten (2009). The design included triads of students exposed to an intervention over time. The participants included six students divided into two triads. Following a brief baseline phase during which the students participated in district approved reading instruction, the first group of three students received an explicit multi-component reading intervention while the second group continued an extended baseline phase. After the first triad had demonstrated consistent improvement in oral reading fluency during the intervention, the second group began receiving the explicit multi-component reading intervention. After the reading intervention phase concluded and was withdrawn, three of the students were given probes to measure performance maintenance.

Participants and Setting

A convenience sample of fourth grade students who attended one school in the Northeast U.S. participated. Prior to the beginning of this study, all fourth grade students in the school district participated in universal screening assessments of reading. Two levels of screening were
used. First, the students' third grade Measures of Academic Progress (MAP; Northwest Evaluation Association, 2009) scores were reviewed. At the start of their fourth grade year, all students were screened again using the AIMSweb oral reading fluency (ORF) measure (Pearson Education, 2008). The student data were reviewed and the students who scored between the 25th and 50th percentile were candidates for this study. While students in this percentile range fall within the wide range of average, they may exhibit reading difficulties in the upper elementary grades. Student selection was limited to students who were not currently receiving special education services. Exclusion criteria also included students who had repeated a grade, and students with documented concerns about the possible presence of interfering emotional, behavioral or attentional difficulties. Students were required to attend 80% of lessons in order for their data to be used in the study. A total of six students participated in the baseline phase, however, only five students completed the full study because one of the students was discontinued upon being referred for a special education evaluation. The Institutional Review Board at the University of Southern Maine approved this research. Parents and/or legal guardians provided informed consent prior to beginning the intervention. In addition, the subjects provided their assent.

Materials

The participants' Lexile reading levels were identified based on the students' MAP scores; the Lexiles ranged from 200L to above 600L. A list of children's literature corresponding to these Lexile scores was developed. The books selected were The Secret School by Avi and Sitting Bull by Augusta Stevens. The participants in this study did not have previous access, either in school or at home, to these books. Additional materials for the study included:
1. Photo copy of text for teacher
2. Syllable chart containing a definition and example of the six syllable types
3. Individual photocopies of words selected for Word Study for each student in Arial font, size 36, regular style
4. Red colored pencils for each student
5. A digital display timer
6. Third and fourth grade progress monitoring probes from AIMSweb (student and teacher copies)

For each lesson, the researcher identified words in the story which might be difficult for the students. Selected words reflected all six syllable types. The words were typed and printed so that each student had a copy of the selected words. The students used red pencils to mark text while reading.

**Dependent Variables**

AIMSweb third and fourth grade oral reading fluency (ORF) measures were used to measure student reading performance before, during, and after intervention (Pearson, 2009). Data were collected weekly on two reading behaviors: number of correct words read correctly and number of errors made per minute. Criteria for words read correctly included words that were pronounced correctly and self-corrections read within three seconds; word repetitions were not counted as errors. Errors were words read incorrectly and included mispronunciations, word substitutions, word omissions, and if a subject struggled to pronounce a word or hesitated for more than three seconds. The number of words read correctly in one minute was determined by counting the total number of words read, and deducting the errors.
In order to validate the subjects' reading skill changes, two additional measures of reading skill were administered as pre- and post-tests. The *Test of Word Reading Efficiency* (TOWRE; Torgesen, Wagner, & Rashotte, 1999), measured the students' ability to sound out nonsense words quickly and accurately and the ability to recognize words as whole units. TOWRE test-retest reliability for 10-18 year olds ranges from .83 to .92, and is above .90 for 6 to 9 year old children. Further analysis of word analysis was assessed with the *Word Identification and Spelling Test* (WIST; Wilson & Felton, 2005), which has two core sub-tests: Word Identification and Spelling, and one supplemental test, Sound–Symbol Knowledge. Together, the measures combine to provide a Fundamental Literacy Index score. The Word Identification test measures students’ sight recognition of familiar words and their ability to apply word attack skills in order to decode unfamiliar words. It also measures their orthographic memory of high frequency words with one or more irregularities. The Spelling sub-test assesses students’ ability to spell words correctly from dictation and measures recall of correct letter sequences for familiar words and the ability to apply sound/symbol relationships and rules of English orthography, as well as the ability to recall letter order of high frequency words with irregularities. Test-retest reliability coefficients for the Elementary version are .98 for the Word Identification sub-test, .96 for the Spelling subtest, .97 for the Sound Symbol Knowledge sub-test, and .99 for the Fundamental Literacy Ability Index.

**Inter Observer Agreement**

Inter-observer agreement was used to assess treatment integrity. School psychology graduate students, who used a checklist of the instructional script and sequence, observed 30% of the intervention sessions. Treatment integrity was measured by calculating the percentage of
scripted steps completed correctly by the teacher during the session. Similarly, inter-observer agreement data were collected for 30% of the weekly progress monitoring data sessions. The training for data collectors and those providing inter-observer agreement was provided by the researcher, using the AIMSweb training slides for oral reading fluency. This training included practice scoring and co-scoring with another examiner to the mastery criterion. Point-by-point inter-observer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100.

**Procedures**

The intervention was provided by two paraprofessionals who worked at the school. One of the paraprofessionals taught the lessons for students 1, 2, and 3, while the other taught the sessions for the remaining students. Prior to the start of the study, the researcher provided intervention training. Training sessions included treatment modeling, direct instruction, and guided and independent practice. Training included a mastery criterion in which the trainees demonstrated 90% accuracy with the teaching and correction procedures. The 30 minute intervention sessions were provided four or five days a week during the morning 90 minute literacy block. Students 1, 2, and 3 participated in the intervention four days per week and students 4 and 6 participated five days a week; all students participated for a total of 40 lessons (student 5 discontinued). The intervention included a sequence of five instructional components (a detailed lesson plan format and instructional script is contained in Appendix A) with the following steps:

1. **Oral Reading (5 minutes)**- Beginning with an unpracticed reading of the passage, students took turns reading for a total group oral reading duration of 5 minutes. Each
student read orally for 60 seconds, and continued to rotate through the group until the entire 500-700 word passage was read. The error correction procedure included the teacher correcting the error immediately after a word was pronounced incorrectly, as well as asking the student to repeat the word and continue reading. To facilitate error recording and correction, the teacher recorded student errors on a photocopy of the story. The errors were coded according to deviations from print in the following manner:

**Substitutions**- A slash through any word or word part which has been substituted for a different word. The substituted word was written above the substitution.

**Self Corrections**- A self correction was noted by S/C above the word.

**Omissions**- Omissions were noted by drawing a line through the omitted word(s).

**Additions**- Added words were noted by using a carrot sign and writing the word above the sign.

2. **Word Study (10 minutes)** – Prior to the start of the lesson, the researcher selected six to ten words from the 500-700 word passage. During the lesson, the teacher highlighted syllable types, vowel sounds, and orthographic patterns found in the words. The words were taught and practiced in isolation and then read again during the next step.

3. **Oral Rereading Guided Practice (10 minutes)** - students took turns orally reading the passage. Each student read orally for 60 seconds. If errors were made during this second oral reading, the Phrase Drill Error Correction procedure was used.

4. **Phrase Drill Error Correction Procedure** - When students made errors during re-reading, the teacher cued the student to practice the word correctly in the phrase immediately.
5. Meta-cognitive reflective feedback (approximately 5 minutes) - Specific questions were generated by the teacher to stimulate students’ attention and reflection on the relationship between isolated word study and repeated reading.

**Baseline and Pre-Post Assessments.**

Before beginning the intervention, brief and extended baseline assessments of the target behaviors were conducted using third and fourth grade progress monitoring probes from *AIMSweb*. For students 1, 2, and 3 brief baseline data were collected according to *AIMSweb* procedures. The brief baseline assessment data were collected in one day immediately prior to the start of the intervention. Students 4 and 5 participated in weekly extended baseline sessions for ten weeks. Students were tested individually while seated at a desk with the student reading prompt. The baseline reading measures were administered and scored according to the *AIMSweb* administration and scoring manual to determine total scores for words read correctly and errors.

In addition, to the baseline data, the TOWRE and WIST were administered to the students on the day before the start of the intervention and the day following the 40th lesson. These assessments were administered according to the procedures detailed in their respective user manuals. Graduate students in school psychology previously trained to use these measures conducted all TOWRE and WIST pre- and post-test assessments.

**Explicit Reading Instruction**

After a stable baseline ORF rate was established, and the pre-tests were concluded, the intervention began. The procedure and script for the intervention are contained in Appendices A and B. Lessons were conducted in a small room nearby the students’ classroom.
Follow-up Testing

Follow-up (maintenance) testing at four and eight weeks post-intervention using the AIMSweb progress monitoring probes was conducted for students 1, 2, and 3. Such testing was not possible for the remaining students because the school year ended.

Data Analysis

The data from the baseline, intervention, and follow-up phases were graphed and interpreted using visual inspection of the data. The student's rate of improvement (ROI) in units of words gained per week were compared to national AIMSweb ROI for the fourth grade level. Treatment effects for each student were considered.

Results

Results are described based on visually discriminable changes in students’ oral reading fluency across the weekly progress monitoring data as well as from their TOWRE and WIST scores. A summary of participant data is shown in Table 1. All students were Caucasian and none received free or reduced lunch. As noted, student 5 was withdrawn from the study prior to receiving the instruction because he was referred for a Special Education evaluation. A summary of the treatment integrity data is shown in Table 2 and indicates that the intervention was taught with a high degree of treatment integrity. A summary of the inter-observer agreement data is shown in Table 3 and shows a high degree of accuracy between the two raters. Table 4 depicts third and fourth grade rates of improvement (ROI) data. Tables 5 and 6 show the students' pre- and post-intervention scores on the TOWRE and WIST respectively. Figure 1 shows the
Table 1.

**Participant Demographic Data**

<table>
<thead>
<tr>
<th>Student</th>
<th>Age</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9 years, 8 months</td>
<td>Male</td>
</tr>
<tr>
<td>2</td>
<td>9 years, 2 months</td>
<td>Female</td>
</tr>
<tr>
<td>3</td>
<td>9 years, 11 months</td>
<td>Male</td>
</tr>
<tr>
<td>4</td>
<td>9 years, 4 months</td>
<td>Female</td>
</tr>
<tr>
<td>5</td>
<td>10 years, 2 months</td>
<td>Male</td>
</tr>
<tr>
<td>6</td>
<td>10 years, 5 months</td>
<td>Male</td>
</tr>
</tbody>
</table>

Table 2.

**Treatment Integrity Data**

<table>
<thead>
<tr>
<th>Observed Sessions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>Average</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>92%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>99.3%</td>
</tr>
</tbody>
</table>

Table 3.

**Inter-Observer Agreement of Weekly Reading CBM Progress Monitoring**

<table>
<thead>
<tr>
<th>Observation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3</td>
<td>100%</td>
<td>99%</td>
<td>99%</td>
<td>95%</td>
<td>97%</td>
<td>99.5%</td>
</tr>
<tr>
<td>Grade 4</td>
<td>100%</td>
<td>100%</td>
<td>99%</td>
<td>99%</td>
<td>98.5%</td>
<td>100%</td>
</tr>
</tbody>
</table>

students' reading gains based on comparison of their median fourth baseline score with the median of their last three fourth grade progress data points. Figure 2 depicts the students' fourth grade baseline, intervention, and follow-up data; Figure 3 depicts these data on the third grade measures.
Baseline

Fourth grade baseline data for students 1, 2 and 3 revealed that students 2 and 3 had stable baseline trends but student 1 showed an increasing trend. This trend was interpreted as the result of practice effects and the student went ahead and participated in the intervention with the other two students. Fourth grade baseline data for students 4 and 5 revealed very stable trends and indicated that the students did not make significant gains during the extended baseline period. Student 5 was removed from the study at the end of the extended baseline period because he was referred for a special education evaluation. In order to have an additional student in the intervention group, student 6 joined the study; however, only brief baseline data were available for student 6. Third grade baseline data showed improving trends for students 1 and 3, and stable trends for students 2, 4, and 5. Due to late enrollment in the study, no third grade baseline data were collected from student 6.
### Table 4.

**Third and Fourth Grade Rates of Improvement (ROI)**

<table>
<thead>
<tr>
<th>Student</th>
<th>3rd Grade ROI</th>
<th>3rd Grade AIMSweb ROI</th>
<th>4th Grade ROI</th>
<th>4th Grade AIMSweb ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>1.1</td>
<td></td>
<td>.5</td>
<td></td>
</tr>
<tr>
<td>Student 2</td>
<td>4.8</td>
<td>1.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Student 3</td>
<td>.9</td>
<td></td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Student 4</td>
<td>-3.8</td>
<td></td>
<td>-1.1</td>
<td>0.8</td>
</tr>
<tr>
<td>Student 5</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Student 6</td>
<td>2.0</td>
<td></td>
<td>6.0</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5.

**Pre-test and Post-test Standard Scores on the TOWRE**

<table>
<thead>
<tr>
<th></th>
<th>Word Reading Efficiency (WRE)</th>
<th>Phonemic Decoding Efficiency (PDE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Student 1</td>
<td>95</td>
<td>108</td>
</tr>
<tr>
<td>Student 2</td>
<td>95</td>
<td>97</td>
</tr>
<tr>
<td>Student 3</td>
<td>97</td>
<td>91</td>
</tr>
<tr>
<td>Student 4</td>
<td>97</td>
<td>98</td>
</tr>
<tr>
<td>Student 5</td>
<td>86</td>
<td>NA</td>
</tr>
<tr>
<td>Student 6</td>
<td>93</td>
<td>97</td>
</tr>
</tbody>
</table>

### Table 6.

**Pretest and Posttest Standard Scores on the WIST**

<table>
<thead>
<tr>
<th></th>
<th>Word Identification</th>
<th>Spelling</th>
<th>Sound-Symbol</th>
<th>Fundamental Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest</td>
<td>Posttest</td>
<td>Pretest</td>
<td>Posttest</td>
</tr>
<tr>
<td>Student 1</td>
<td>103</td>
<td>107</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Student 2</td>
<td>105</td>
<td>107</td>
<td>99</td>
<td>102</td>
</tr>
<tr>
<td>Student 3</td>
<td>88</td>
<td>93</td>
<td>86</td>
<td>87</td>
</tr>
<tr>
<td>Student 4</td>
<td>72</td>
<td>84</td>
<td>80</td>
<td>81</td>
</tr>
<tr>
<td>Student 5</td>
<td>91</td>
<td>NA</td>
<td>87</td>
<td>NA</td>
</tr>
<tr>
<td>Student 6</td>
<td>99</td>
<td>98</td>
<td>79</td>
<td>81</td>
</tr>
</tbody>
</table>
Figure 2. Data from Fourth Grade Probes during Baseline, Intervention, and Maintenance
Figure 3. Data from Third Grade Probes during Baseline, Intervention, and Maintenance

Baseline | Intervention | Maintenance Data

Sessions

Student 1
- Third Grade ORF
- Third Grade Errors

Student 2

Student 3

Student 4

Student 5
- Student discontinued upon referral

Student 6
- Student added to replace Student 5
**Intervention**

The intervention data revealed that all students except student 4 demonstrated improvement during the intervention as compared to baseline. In addition, the data indicated that students made steps toward meeting the Spring fourth grade ORF benchmark goal of 132 words read per minute. While all the students made improvements in reading performance, there was considerable variability in these gains. Table 4 includes each student's average rate of improvement (ROI) in both third and fourth grade measures. Notably, students 1, 2, and 3 maintained reading gains on the third and fourth grade probes at four and eight weeks after intervention; such data were not available for students 4 and 6 because the school year ended.

**Discussion**

The following section considers the efficacy of the intervention for each student based on rate of improvement (ROI). The ROI provides an indicator of the amount of growth that each student made during intervention. The discussion focuses on the fourth grade data because of limitations in the third grade data. For example, third grade baseline data showed accelerating baselines for students 1 and 3, and there were no third grade baseline data for student 6. These limitations weaken interpretation of the students' improvement in third grade oral reading fluency as a result of the intervention. However, pre- and post-test analysis of the students' TOWRE and WIST scores is provided. These measures are reported as standard scores with means of 100 and standard deviations of 15.
**Student 1**

Student 1 demonstrated a below average ROI, .5, on the fourth grade pre-test to final progress monitoring point, however, his Winter benchmark score was higher than the last progress data point. His gains in ORF continued after the intervention was discontinued as indicated by the four and eight week maintenance data points. Student 1 had an eight week ORF score of 122 words correct, meeting the Winter fourth grade benchmark of 119 WRC but not yet at the Spring benchmark of 132. It must be noted that the increasing trend line during the baseline phase weakens interpretation of his improvement of oral reading fluency, resulting in rejection of the hypothesis. Nonetheless, student 1 showed gains on all TOWRE and WIST scores, confirming overall improvement in reading skills.

**Student 2**

The gains student 2 made confirmed the hypothesis that the multi-component reading intervention would enhance ORF. Student 2 demonstrated an above average ROI, 3.0, on the fourth grade measures. Her scores at four and eight weeks after the intervention ended, 108 and 118, showed that she maintained her reading gains. Student 2's eight week fourth grade ORF score of 118 words correct was within one word of meeting the Winter fourth grade benchmark of 119 WRC, but still behind the Spring goal. Student 2 showed gains on all TOWRE and WIST scores, again confirming overall reading skill improvement.
Student 3

Student 3 exceeded the expected ROI on fourth grade passages, 3.0, supporting the hypothesis that the multi-component intervention would improve reading skills. His gains on the fourth grade passages and at four and eight weeks after the intervention ended demonstrated reading skill improvement. While student 3 did not meet the fourth grade Winter 50th percentile benchmark, he demonstrated impressive ROI relative to his baseline data. Student 3's four and eight week ORF scores were closer to the ending progress data point than those for students 1 and 2, but indicated that gains made during intervention were maintained. Interestingly, student 3's scores on all but one of the TOWRE and WIST subtests either declined or were very small. The one exception was the Sound-Symbol Knowledge score on the WIST, where the student showed a score improvement from 68 to 84. This result suggests that this student's reading performance may have been heavily influenced by poor decoding skills which are highly predictive of reading difficulties. Of note, this student was absent for five sessions due to a family trip and his absences may have contributed to limited gains.

Student 4

Student 4 contributed the most extensive data to the study. She provided both extended baseline and intervention scores. Her ROI on fourth grade (-1.1) passages showed no growth and some regression. But, interestingly, she showed more gains on fourth grade ORF than on third grade. Student 4's scores were notable for their variability and did not support the hypothesis of improved reading performance as a result of the intervention. Like student 3, student 4 showed limited or no gains on most TOWRE and WIST measures, with the same exception of gains on
the Word Identification and Sound-Symbol Knowledge subtest. Student 4 may have been hampered in her reading progress by deficits in decoding similar to student 3.

**Student 5**

Student 5 contributed only extended baseline data to this study because he was referred for a special education evaluation at the conclusion of the baseline phase.

**Student 6**

Student 6 entered the study for the intervention phase only; he replaced student 5 who discontinued due to special education referral. Student 6 was added so that there would be at least two students in the intervention group. The gains student 6 demonstrated on fourth grade ORF scores support the hypothesis of reading skill improvements. Student 6 demonstrated an above average ROI of 6.0 on the fourth grade measures. These results were the strongest indicator of the intervention's benefits for students. On the TOWRE and WIST, student 6 showed gains in all but one subtest, Word Identification. The lower score on this subtest may be an anomaly among student 6's overall reading progress indicators. However, similar to student 3, student 6 also demonstrated a 16 point gain on the Sound Symbol Knowledge subtest of the WIST.

**Differences in Third and Fourth Grade Scores.**

All students began the study reading below the 50th percentile on the fourth grade Fall AIMSweb oral reading fluency benchmark. Students' scores demonstrated heterogeneity in how they responded to the intervention. These differences in response are indicative of their specific
reading skill difficulties and instructional needs. An unexpected finding was the generally lower average rates of improvement on the third grade progress measures compared to the higher rates of improvement on the fourth grade passages for students 3 and 6. Although some students generally performed higher on the third grade ORF baseline measures or initial progress monitoring, they made smaller fluency gains on the third grade passages. This was consistent with findings by Daly and colleagues (2005, 2006) where poor readers performed better on harder than easier passages.

A hypothesis for this unexpected differential wherein third grade average ROI was lower than fourth grade ROI for some students may be explained by passage order effects. Students read the third grade passages before reading the more difficult fourth grade passages. The initial third grade read may have produced a practice effect and activated students’ oral reading skills, which may have subsequently improved their fourth grade rate of oral reading. Alternatively, it may be that the students exhibited a ceiling effect on the third grade passages because they were making gains in their overall reading skills. Future studies should counterbalance the order of grade level passages to determine if there is a treatment effect from reading easier passages before reading more difficult passages. Due to the unstable third grade baselines for students 1 and 3, and lack of third grade baseline data for student 6, the fourth grade data are most likely the better indicators of the students' reading growth during the study.

Overall Reading Improvement

Results of the TOWRE pre-test and post-test (Table 5) showed that the strongest readers, Students 1, 2 and 6, demonstrated gains on the Word Reading Efficiency (WRE) and Phonemic Decoding Efficiency (PDE) subtests, with the most substantial gains on PDE. Successful word
reading ability is influenced by specific skills such as the ability of the student to analyze and blend individual phonemes and larger orthographic patterns into words (Ehri, 1998, cited by Torgesen et al., 1999), recognizing words as whole units, making analogies to other words that are already known, and word meaning context clues. The instructional emphasis in this study included analysis and blending together of spelling patterns as orthographic units for successful identification of words that are not recognized immediately by sight. The difference between the pre- and post-test scores for Students 1, 2 and 6 on the PDE subtest demonstrated a possible functional relationship between the intervention and the performance outcomes. Student 3 was the exception to these score gains. His scores showed a loss of 6 and 2 standard scores points on WRE and PDE, respectively.

Results of the WIST pre-test and post-test (Table 6) illustrate that the students demonstrated differential growth on these subtests. Students 1, 2, 3, and 4 showed gains on the WI subtest, and all the students showed the strongest gains on the SSK subtest, which is the subtest most closely reflective of the Word Study intervention this study. This gain suggests that when students began the explicit intervention they had skill deficits in phonetic and orthographic knowledge, which research has consistently shown to contribute to oral reading fluency (National Reading Panel, 2000). These gains in standard scores are promising because standardized assessments are less sensitive to changes than curriculum based measurements, therefore the differences between pre- and post-intervention scores on the TOWRE and WIST represent a possible relationship between the treatment and the skills assessed on this measure. Explicit spelling practice and instruction were not included in the five part treatment which may explain the minimal growth on the Spelling pre- and post-tests. While gains on the TOWRE and the WIST showed mostly improvement, the gains were not as strong as expected.
These results suggest that some of the students needed more differentiated instruction. As noted by Johnson, Humphrey, Mellard, Woods & Swanson (2010) unique variations in reading performance may be accounted for by specific cognitive processing deficits. For example, Student 4 demonstrated a variable response to the explicit, evidence based instruction provided in this study. Further assessment of underlying cognitive processes including phonological processing may be warranted in order to determine the development of skills which are highly predictive of reading success (NRP, 2000).

Student 4's data indicated highly varied response to intervention and further evaluation of her data was conducted by comparing two aspects of her performance on three selected lessons. The comparison evaluated the difference between her rate and accuracy of oral reading fluency on the initial cold read and on the reread using Phrase Drill Error Correction. The data on these measures were compared to the same data for Student 6 and are shown in Table 7. Her fluency rate when rereading the same text using the Phrase Drill Error Correction procedure increased between 18 and 42 WRC per minute with little change in number of errors. Moreover, her phrasing and prosody were better aligned with the punctuation of the text and story meaning. Student 6 also demonstrated increased oral reading fluency when comparing his initial cold read to the reread using Phrase Drill Error Correction, however, his increases were not as great. This may be explained by the fact that Student 6 began the intervention with higher levels of overall reading fluency and there may have been a ceiling effect. However, both students demonstrated improved oral reading fluency, a finding which is consistent with prior research that found a functional relationship when repeated reading was implemented in conjunction with error corrections procedures (Nelson, Abler, & Gordy, 2004).
Table 7.

**Initial Read and PDEC Data**

<table>
<thead>
<tr>
<th>Student</th>
<th>Initial Read</th>
<th>PDEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lesson 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 4</td>
<td>111</td>
<td>136</td>
</tr>
<tr>
<td>Student 6</td>
<td>127</td>
<td>131</td>
</tr>
<tr>
<td><strong>Lesson 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 4</td>
<td>94</td>
<td>136</td>
</tr>
<tr>
<td>Student 6</td>
<td>149</td>
<td>151</td>
</tr>
<tr>
<td><strong>Lesson 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 4</td>
<td>104</td>
<td>122</td>
</tr>
<tr>
<td>Student 6</td>
<td>126</td>
<td>163</td>
</tr>
</tbody>
</table>

Additional student data comparing students scores on the MAP are shown in Table 8. The students' percentile ranges from pre- and post-intervention are given because they are easier to compare than the MAP Rasch Score (RIT). The data show that all students made progress on MAP except student 3, and provide additional confirmation of reading improvement. Students 4 and 6 made the most dramatic progress. Notably, by Spring 2010 students 1, 2 and 6 exceeded the eligibility for this study.

Table 8.

**Students' Pre- and Post-Intervention Percentile Score Ranges on the Measures of Academic Progress (MAP) Reading Subtest**

<table>
<thead>
<tr>
<th>Student</th>
<th>MAP Percentile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention</td>
</tr>
<tr>
<td>1</td>
<td>39-57</td>
</tr>
<tr>
<td>2</td>
<td>39-60</td>
</tr>
<tr>
<td>3</td>
<td>NA</td>
</tr>
<tr>
<td>4</td>
<td>14-27</td>
</tr>
<tr>
<td>6</td>
<td>29-47</td>
</tr>
</tbody>
</table>
Implications for Reading Instruction

This study evaluated the efficacy of an explicit multi-element reading intervention provided to students as supplemental tutoring. All participating students initially demonstrated reading fluency problems and the intervention was designed to integrate multiple reading fluency instruction components to improve students' reading skills. Results indicated that all the students made reading gains, however, the size (e.g., ROI) across students varied considerably. The source of the differences in students' reading gains may be related to their initial starting points as well as their specific reading skill difficulties. Students 1, 2 and 6 began this study with higher oral reading fluency scores than Students 3, 4 and 5. Students 1, 2 and 6 concluded the study reaching or approaching the fourth grade 50th percentile Spring benchmark score of 132 WRC. Student 5 was discontinued from the study due to his referral to Special Education. Students 3 and 4 concluded the study reading below the fourth grade 50th percentile Spring benchmark score. Their scores were closer to the 50th percentile Winter benchmark for the third grade.

The students' score differences across the third and fourth grade passages may indicate that the nature of the reading materials (i.e., difficulty level) had an important effect on student reading gains. The less difficult text on the third grade passages may have provided more information about what type of instruction students 3 and 4 needed. Poorer readers benefit from more practice reading material with words they know well. In relation to this study, it may be that the types of words on the third grade passages matched better with the students’ skill levels in the areas of decoding and blending across syllable types. The AIMSweb passages, while controlled for grade level, may not provide enough specific syllable type overlap which would enable poorer readers to generalize specific skill knowledge. This observation is consistent with
prior research (Faulkner and Levy, 1994) which concluded that poor readers demonstrate the most reading progress in high word overlap passages, while stronger readers demonstrate the most reading transfer under high content (i.e., idea) overlap conditions (Daly, Martens, et al, 1999).

There are many reading demands which increase in upper elementary school, including fluency and vocabulary, which assume development of basic skills (i.e., phonological awareness and knowledge of sound-symbol relationships) that have been shown to predict later skills (NRP, 2000). Delays in phonics and phonological awareness skills in Students 3 and 4 may underlie their slower improvements in ORF. Katzir et al. (2008) addressed multiple sources of dysfluency and showed that fluency involves the successful integration of information from phonological, orthographic, semantic, syntactic and morphological processes (Katzir et al., 2008). Roshotte and Torgesen (1985, cited by Vadasy, et al., 2005) have shown that poor readers benefit from repeated readings with a high word overlap between passages. The findings in the current study support Roshotte and Torgesen’s prediction. Specifically, student 4 demonstrated a large oral reading difference when comparing her initial read to her repeated reading using Phrase Drill Reading Correction, underscoring the importance of opportunities for repeated practice of learned information.

The relative contribution of self-reflection as a component of this reading intervention is more difficult to assess because of the absence of pre, post and progress data specific to this skill area. The final lesson component required students to reflect on their performance and provide verbal feedback. Specifically, the instructor asked students to reflect on the difference between their initial and repeated reading and the inclusion of text selected words for word study.
Previous research (Wolf et al., 2000) found that by adopting a standard set of questions to assist word retrieval, children internalized these strategies and used them not only for word finding difficulties but also when they encountered unknown written words. Cunningham (1990) found that when first grade children were taught phonemic awareness skills combined with explicit instruction which emphasized the interrelations between phonemic awareness and the process of reading, they were more successful transferring the skill to the activity of reading than children who were taught the same phonemic awareness skills isolated from the meta-level approach.

**Translating Research to Practice**

The student selection process and explicit instruction methods used in this study were developed using resources within the general education setting. The goal of student selection was to capture students who were reading between the 25th and 50th percentile on universal screening benchmarks for early intervention in order to reduce or ameliorate their risk. Student response to the intervention was measured using the AIMSweb progress monitoring system, a curriculum based set of standardized short assessments that have been validated and represent best practices for evaluating the effectiveness of a student’s response to reading instruction. The intervention components included in this preliminary study represent research based activities which have been replicated individually in numerous research studies.

The National Reading Panel (2000) cited repeated reading with correction feedback as one of the most successful evidence based interventions to improve word recognition, comprehension and fluency. Daly and colleagues conducted studies (1999, 2005, 2006) which examined the generality of oral reading fluency from trained to untrained text under variables of easy versus difficult text, text which contained high content overlap (i.e., training passages were
rewritten to contain 87% of the original words creating generalized reading passages) and
reward versus no reward conditions. Growth rates among the students in the current study were
variable, however an increase in generalized responding was observed for most participants. The
conclusions of this study are limited to this form of generalized reading response. The current
study expanded Daly’s research by assessing generalized reading using Curriculum Based
Measurements (CBM), stimuli which are more discrepant from the trained text and by
maintaining the concept of high content overlap, but changing the application from word overlap
to syllable overlap within a the repeated reading condition.

There is research evidence which supports explicit training in orthography as an effective
method for increasing oral reading fluency (Bhattacharya & Ehri, 2004). Explicit orthographic
instruction includes instruction at the lexical and sublexical levels, and isolating and identifying
syllable types within words. This type of explicit instruction has proven to be more effective
than whole word methods and resulted in improved ability to form connections between
orthographic units, pronunciation on trained words and transfer measures in upper elementary
grade students. The current study expanded Bhattacharya and Ehri’s study with a small group of
fourth grade students, and incorporated explicit orthographic and phonological instruction on
syllable types and pronunciation. After participating in explicit word study instruction, the
students demonstrated increased oral reading fluency accuracy under repeated reading
conditions and in untrained reading text, although with variability across students.

There is an emerging body of research providing evidence that increasing students' self-
awareness and knowledge of how strategy instruction in isolated component skills contributes to
independent transfer of skills into textually relevant applications (Cunningham, 1990; Wolf,
Miller et al, 2000). Increasing metacognitive self-awareness of the instructional components was supported in the current study which showed improved reading of connected text. Examples of strategy instruction designed to develop self-reflection included systematic questions, explicit explanations of how highly contextualized isolated skills instruction transfers to decontextualized applications, all of which can elicit internalized understanding and greater generality. It is difficult to measure the application of this instructional component in repeated reading or generalized CBM conditions because external measures of metacognition were not included in this research. Growth observed for all students during the intervention, and from pre-test to post-test on the Sound-Symbol Knowledge subtest of the WIST and on the Phonemic Decoding subtest of the TOWRE for students 1 and 3 suggests generalized responding on external measures of validity.

Implementing the intervention did not require additional costs for materials, personnel or training. This intervention was successfully implemented using paraprofessionals who were previously untrained in the explicit treatment. The methods used in this study can be adapted to diverse grades, educational settings and group size. Moreover, they can be adopted for different genres and content areas including science, social studies, foreign language study which is based on an alphabetic system, vocabulary development and written language including spelling.

Two final areas of instructional implication address the importance of aligning instructional differentiation across educational settings, curriculum assumptions and generalizing behavior change to untaught materials and settings. Students receiving Tier 2 or 3 RTI instruction often leave their general education classroom and receive additional instruction from an RTI intervention instructor. This group of students continues to participate in their general
education classroom for approximately 5 hours a day, often in the absence of differentiated instruction. As seen in the findings here, not all students responded in the same way to this intervention and there was evidence of a need for more student-specific instruction. All of the elements in the explicit intervention can be delivered in general classrooms, suggesting that they could be incorporated into classroom practices. Consistent in the RTI literature is a focus on the importance of having innovative curriculum adaptations be implemented by general education teachers. This responsibility must be shared among all stakeholders whose job it is to promote student education and social well being. We must look to researchers to view the research process as including the extra steps of translating the research tested versions of innovative procedures into instructional practices and materials conducive to use in the classroom (Shinn, Walker, Stoner, 2002).

Finally, teaching students to generalize skills to untaught materials, in different settings and in the presence of different teachers, must be intentionally planned and taught. Cooper et al. (2007) defined setting/situation generalization as the extent to which the learner emits the target behavior in a setting that is different from the instructional setting and response maintenance as the extent to which the learner continues to perform the target behavior after the intervention responsible for the behavior's initial appearance has been terminated. Additionally, Cooper et al. identified explicit methods for accomplishing generalization of learned skills, three of which included increasing the number of examples during instruction, increasing the similarity between the instructional setting and instructional materials and the generalized setting and materials, and teaching the learner to emit the target behavior at the same rate, accuracy, duration and magnitude required in the generalized context. Teaching skills to generalization is often an underestimated and misunderstood instructional area which “should be programmed rather than
expected” (Baer, Wolf & Risley, 1968, p. 97). In conclusion, Donald Baer (1999) offered this reminder to those of us who may be teachers, parents and learners:

Learning one aspect of anything never means that you will know the rest of it. Doing something skillfully now never means that you will always do it well……. *No one learns a generalized lesson unless a generalized lesson has been taught (p.1; emphasis in original).*

**Limitations and Future Research**

Several factors may have influenced the results of the present study and should be regarded as limitations. First, student 1 exhibited instability in fourth grade baseline data. As noted above, this trend was accounted for by reading practice effects and the decision was made to include student 1 in the intervention despite unstable baseline. It is possible that student 1’s gains may not reflect the intervention but rather the increasing trend seen in the brief baseline data. Second, although not known at the time, during the extended baseline phase, student 4 received two 20 minute afternoon sessions of small group Language Arts tutoring from an Educational Technician. The tutoring covered reading comprehension, vocabulary, phonics, and oral reading. This additional assistance may have contributed to her reading performance during the extended baseline. Third, the discontinuation of student 5 created a threat to the internal validity of the findings because only extended baseline data were collected. Although student 6 joined the study and showed reading improvement, the loss of student 5 created a significant gap in the overall validity of findings.
Fourth, there is an absence of third grade baseline data for student 6. Additionally, because this student joined the study late, he had a delayed baseline, containing fewer data points. This is a weakness because longer baselines provide greater predictive power that responding would remain the same if the environment were held constant. Fifth, student 3 was new to the school district in Fall, 2009. MAP pretest scores were not available and it is possible he entered the study with pretest scored below the 25 percentile. Sixth, the limitations with the third grade baseline and the absence of these data for student 6 weakened the interpretation of oral reading fluency improvement for third grade results. The obtained results cannot be generalized beyond this very small group of students. Finally, students in this study represented a wide range of reading skills. Intervention may have been more effective for lower achieving students in a more homogenous skill group.

As with any study of a new intervention, additional research is needed to determine whether the obtained results can be replicated. Specifically, research which examines factors which impact the complexity level of oral reading fluency on unpracticed text is needed. Such factors as genre, syntactic complexity, syllables types and length, and story titles may influence a student’s background knowledge and impact a student’s reading fluency. Faulkner and Levy (1994) addressed the elasticity of oral reading fluency by examining transfer effects of reading speed and accuracy on a second unpracticed text after reading a first text which was related to the first text in one of four conditions. The primary determining factor which predicted benefit was the difficulty level of the text. Specifically, children who read books that were easy for them showed greatest transfer when a pair of stories shared content. When children read stories that were difficult for them, the greatest transfer was demonstrated on stories when there was high word overlap between the stories. The unexpected finding of less improvement on third
grade passages when compared to fourth grade for some students suggests that more needs to be known about how specific features of text difficulty affect reading performance. Future research should consider how reading performance is influenced by text features such as Lexiled text which is theoretically matched to reading ability. The match of reader to Lexile level does not consider fluency rate or control for content. Future research should include participants whose Lexile ranges represent a narrower band of variability than the students selected for the present study. Related to this future area of study is the need to examine methods of tying assessment to the instruction which was actually taught. As noted by Daly, (2005), when instruction was carried out on instructional level reading material and assessment reflected what was taught, reading improvements were observed.

Another area for future research is the degree to which reading interventions provided in small groups outside of the classroom are explicitly supported in the student’s general education setting, and the extent to which these skills generalize to the core literature and content area reading expected in the general education classroom. Gersten, Chard & Baker, (2000), identified factors that are associated with sustained teacher use of research based practices which underscores the importance of professional development which is planned, and administratively supported. Expanding the current treatment to include an explicit spelling component may result in improved reading fluency and spelling. A two part intervention by DeRose et al. (1996) compared reading and spelling skills of children under two treatment conditions which differed only in a spelling component which was a constructed word response with moveable letters. Children receiving the treatment which included the constructed word response out performed children who did not receive this treatment on data collected on trained spelling and generalization words. Additional research which includes students from more
diverse backgrounds is needed. Additional research stemming from Daly (1999) should examine sequential applications of the multi-component reading intervention used in this study to determine the effects of treatment applied hierarchically. Expanding the treatment to include performance feedback, such as graphs and mutual goal setting, may further elucidate effective intervention for delayed readers.

Importantly, subsequent research should address the commonly held assumption that poor word level decoding skills impacts reading fluency which impacts reading comprehension. Research should examine correlations between measures of silent reading comprehension, oral reading fluency, vocabulary and word structure in single case design studies. This has been a relatively neglected area of research and could inform specific areas of reading failure and appropriate interventions. Future research also should examine the presence of possible cognitive processing deficits of phonological processing and processing speed, which have been shown to correlate positively in children with reading delays (Johnson et al., 2010).

Finally, future research combining explicit skill instruction with self-reflections should increase the structure and measurability of student’s reflection on their learning. Examples of future research in this area include explicit instruction for increasing learning awareness of application of skills in multiple contexts, intentional opportunities for peer tutoring and interaction, requirements for students to self-assess the application of skills in multiple and generalized settings, and developing an instructional rubric. Previous research compared kindergarten and first grade children who received explicit phonemic awareness instruction which taught specific skills in isolation with explicit phonemic awareness instruction which emphasized the interrelations and application between phonemic awareness and the process of
reading. The explicit instruction on specific skills combined with the metacognitive application resulted in better transfer of these component skills to reading. Isolating metacognitive awareness and self-reflection as a dependent variable is recommended for future research.

**Summary**

A multiple baseline across small groups of students was conducted to evaluate the efficacy of a multi-component explicit reading intervention. Based on universal screening data, fourth grade students who scored between the 25th and 50th percentile were provided with reading fluency instruction which included repeated reading, phrase drill error correction, explicit word analysis instruction, and metacognitive reflection, using reading-level controlled text. The results indicated that the intervention was effective in increasing reading performance in most, but not all of the students. Those students with higher initial rates of oral reading fluency increased their rates of oral reading fluency gains on third, fourth and/or maintenance probes. These findings support previous research which showed specific intervention in word study transfers to untrained words. (Bhattacharya & Ehri, 2004; Vadasy, Sanders & Peyton, 2005) and extended Daly’s research on generalized responding, (2005) using a type of HCO text. By using non-taught, but equally difficult, graded passages (e.g., AIMSweb), this study contained less overlap between trained and untrained text than prior studies, constituting an even greater degree of generalization.
References


Appendix A

Oral Reading

The teacher has a photo copy of the text from which she is reading.

1. **TEACHER SAYS:** “Today we are going to read pages ---- to ---- from our book, -------. We will take turns reading aloud. If you come to a word you don’t know I’ll tell it to you. I want you to repeat the word and then continue reading until it is the next person’s turn to read.

Word Analysis

1. **TEACHER SAYS:** “I have selected some words from the book which are written on the paper in front of you. We will talk about the vowel sounds and syllable patterns in the words.”
2. **TEACHER SAYS:** “To refresh your memory about syllable patterns, I have a chart which shows the 6 syllable patterns, with an example of each. Let’s start with "". Teacher puts syllable chart on the table for students to reference as necessary. (See Appendix B for syllable chart).
3. **TEACHER SAYS:** “This word is _______, what word is this?”
   a. Students respond in unison.
4. **TEACHER SAYS:** “how many syllables do you hear in this word?”
   a. Students respond by raising their hand and being called on to answer.
5. Teacher: “Let’s find the syllables in the word, ________?”
   a. Using a red pencil, the teacher underlines the syllables. (models)
6. **TEACHER SAYS:** “I’m going to read the word, one syllable at a time and then blend the syllables and read the word quickly.” (models)
7. **TEACHER SAYS:** “Now I want you to practice what I have just modeled for you”
8. Students read the word, one syllable at a time, and underline each syllable with a red pencil. (guided practice)
9. Students orally blend the syllables and fluently read the word. (guided practice).
10. **TEACHER SAYS:** “What is the vowel sound?”
11. Students respond by saying the short or long sound of the vowel.
12. **TEACHER SAYS:** “What syllable types are in this word? How do you know?”
13. Students identify the syllable types and provide evidence. The evidence must include the vowel sound and the orthographic pattern of the syllable. Examples:
   - “This is a **closed** syllable because the vowel is short and it is closed in by one or more consonants”.
   - “This is a **vowel-consonant-e** syllable because the vowel is long, followed by one or more consonants and there is a silent e ending the word. The silent e controls the sound of the vowel”
   - “This is an **open** syllable because the vowel is long and it is not closed in by another vowel or consonant.”
• This is a **consonant l e** syllable because it is the last syllable in the word and there is a consonant followed by an *l* and *e*. The *e* is silent.”
• “This is an *r* controlled syllable because the sound of the vowel is controlled by the *r*. The vowel sound is neither long nor short.”
• “This is **double vowel** syllable because there are two vowels next to each other and together they make the---------- sound.”

**Oral Reading Guided Practice**

1. **TEACHER SAYS:** “now we are going to practice the same passage again by reading it orally.” Students each read for 60 seconds and continue taking turns until the passage is complete or until the designated time has elapsed.
2. The Phrase Drill Error Correction procedure is implemented if an error is made during the oral reading guided practice.

**Phrase Drill Error Correction**

1. This procedure is implemented if the students make an error while reading orally in the above step.
2. As the student reads the text, the teacher notes any word identification errors made and models correct word identification by reading the word within the text phrase.
3. **TEACHER SAYS:** “Stop, (when an error has occurred). This word is ----------“. The teacher reads the word and rereads the phrase.
4. As needed, **TEACHER SAYS:** “Now you reread word and the phrase aloud”.
5. If the sentence contains more than one error, the teacher models correct reading of all error words in the sentence and then has the student read the phrase/sentence.

**Metacognitive Reflection**

1. “Was reading easier for you the second time?”
2. “What was different between the first and second time you read the passage?”
3. “Did you recognize any of the words or syllable types we reviewed when you read the second time?”
4. “Did this help you read the words more easily?”
5. “What did you do when you came to a word you didn’t know?”
Appendix B

Syllable Chart- displayed on an 11x7 inch paper.

**Closed Syllable**— **cat** bath

A syllable which has one short vowel that ends with one or more consonants.

**Vowel-consonant-e syllable** fame bathe

A syllable that has a vowel, followed by a consonant or a digraph and a silent e at the end. The vowel is long and the e is always silent.

**Open syllable**— **hi**

A syllable that ends in one vowel and the vowel sound is long—

**Consonant l e syllable**— **table** apple

A syllable which ends with a consonant, l, e.

The vowel before the consonant may be either long or short

The e is always silent

**R controlled syllable**— **car, her, for, bird, fur**

A syllable which has one vowel followed by an r.

The vowel sound is neither long nor short because it is controlled by the sound of the r

The vowels er, ir, ur all make the same sound

**Double vowels**— **meat, street, toe, etc.**

A syllable in which two vowels are next to each other. One vowel may be silent or the vowels may glide together to produce a different sound, (ouch).