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Building Tier 3 Intervention for Long-Term Slow Growers in Grades 3–4: A Pilot Study

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Building Tier 3 Intervention for Long-term Slow Growers in Grades 3-4: The Kitchen Sink

Approach

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Abstract

Tier 3 interventions are necessary for students who fail to respond adequately to Tier 1 general education instruction and Tier 2 supplemental reading intervention instruction. We identified 8 students in 3rd and 4th grade who had demonstrated a slow response to Tier 2 reading interventions for three years. Students participated in a researcher-developed Tier 3 intervention for 8 weeks that focused on skill development in word analysis, word identification, and reading rate. Prior to Tier 3, students were making minimal growth in reading; however, during Tier 3, the 8 students demonstrated strong growth on measures of word identification and reading rate. Given that educators can easily implement a similar Tier 3 intervention in their own schools, results are promising for poor readers who are difficult to remediate.

Building Tier 3 Intervention for Long-term Slow Growers in Grades 3-4: The Kitchen Sink

Approach

Researchers are well into the second decade of studying layered, or tiered, approaches to early intervention in reading and using student response to early intervention (i.e., Response to Intervention, or RtI) as part of the process for identifying students with learning disabilities (LD). While many students benefit from more intensive instruction in RtI approaches—also called Tier 2 interventions--as many as 20-50% of Tier 2 students fail to achieve average scores in reading skills (McMaster, Fuchs, Fuchs, & Compton, 2005; O'Connor, 2000; Simmons et al., 2008; Torgesen, 2000).

These statistics were found initially in studies where RtI was used in kindergarten and 1st grade, which is earlier than most students with LD are identified formally. Studies of students in 2nd grade and beyond suggest the problem of response may be graver than first reported. In a large national sample of 3rd graders, Hernandez (2011) found that one-third were unsuccessful reading 2nd grade text. Moreover, students who read poorly in 3rd grade had four times greater likelihood of dropping out of high school than those who scored proficient. Adding fuel to Hernandez's fire are notions of early intervention that imply "a window of opportunity wherein reading difficulty is more easily altered by instruction" (Simmons et al., 2008, p. 159), and widespread belief suggests that window typically closes around third grade (Lovett, Lacerenza, & Borden, 2000).

Given this urgency, models of RtI have proliferated, some with the goal of boosting performance of children very early in their reading careers to decrease the incidence and severity of reading disability (Coyne, Kame'enui, Simmons, & Harn, 2004; O'Connor, Bocian, Beach, & Sanchez, 2014; O'Connor, Bocian, Sanchez, Beach, & Flynn, 2013; O'Connor, Fulmer, Harty, & Bell, 2005; Simmons et al., 2008) and others with the goal of improving identification of students with LD (Compton, Fuchs, Fuchs, & Bryant, 2006; Speece & Case, 2001). Behind both

goals was the notion that if classroom instruction was adequate, and intensive additional instruction was provided (i.e., Tier 2), most students would improve their rate of progress. Moreover, those who did not improve with Tier 2 might have "real LD", which could be verified through the formal evaluation process of special education. As research continued, several studies identified a phenomenon that wrinkled the process, which was that many students with LD respond well to intensive instruction (Lloyd, Forness, & Kavale, 1998; O'Connor & Klingner, 2010; Swanson, Hoskyn, & Lee, 1999), and it is only when that level of support is removed (e.g., the child is returned to general class instruction, or Tier 1) that the need for special education is revealed. Thus, even more intensive intervention--Tier 3—is warranted. Whether Tier 3 is implemented in general education through the RtI network, or is organized through special education, increasing intensity of instruction in the attempt to improve the trajectory of progress is hallmark to Tier 3.

Extensive research has documented features of the first two tiers of instruction in RtI models; however, less is known about how to intensify instruction beyond Tier 2. As Denton (2012) suggests, we especially need studies in which the history of student reading growth has been documented with Tier 2 instruction, so that effects of Tier 3 can be compared (see also Torgesen, Alexander, & Wagner, 2001). Researchers have identified four main areas in which Tier 3 interventions could differ from Tier 2, and these features echo the changes that are made typically for students who shift from a Tier 1 to Tier 2 instructional environment: a) intervention time increases; b) intervention duration increases; c) group size decreases; and d) instructional targets and teacher-student interactions may vary (Denton et al., 2013). The first three of these components involve changes in the logistics of instruction: provide students with more intervention over an increased amount of time with fewer students in the group. The last

component--vary instructional targets and teacher-student interactions—requires changes in instructional model. At its very core, it suggests that because the instruction in Tier 2 has failed to improve student reading adequately, we must change something about this instruction in order to enhance success.

Determining the Logistics and Content of Tier 3 in This Study

We describe in this study the last year of a four-year experiment in which we had provided Tier 2 interventions for up to three years to students whose reading scores were below average. In our last four months, we shifted 8 students whose rate of growth was significantly slower than their classmates in Tier 2 intervention to Tier 3 intervention, addressing each of the four components of intensity above. Like Torgesen et al. (2001), we compared growth rates over a three year span as students received either Tier 2 or Tier 3 instruction.

Time. Denton et al. (2013) increased the amount of time for their Tier 3 intervention for 2nd graders who had not reached average performance with Tiers 1 and 2 in 1st grade. By increasing time from 30 minutes (Tier 2) to 45 min (Tier 3) and continuing intervention for an additional school year, students improved their rate of growth in reading, and on average made significant gains in word-level skills, but not in reading rate or comprehension of lengthy paragraphs.

These increases in time and duration are not easy to arrange as students reach 3rd and 4th grade and teachers prepare for the high-stakes tests often administered in the spring. Time for intervention becomes increasingly scarce, and adding minutes or additional instructional sessions within the same day, as Torgesen et al. (2001) did for their 3rd and 4th grade poor readers, can be difficult to manage. Indeed, just maintaining the intervention time from 2nd into 3rd grade can be difficult (O'Connor et al., 2013), and time becomes even tighter in 4th grade. Nevertheless, because Tier 2 in our study (25 minutes, 3 times per week) was ineffective for accelerating the

reading growth of our eight students, with the cooperation of the classroom teachers we added 15 more minutes daily to our Tier 3 instructional time.

Duration. When RtI is used for the process of identifying students with LD, considerable debate ensues over providing Tier 2 for 8, 12, 20, or more weeks (Fuchs, D., Fuchs, & Compton, 2004). When the purpose of RtI is improving reading development and trajectory, interventions are often delivered for a year, and in some cases longer (Denton et al., 2013; O'Connor et al., 2005, 2013, 2014). Even students making adequate growth in Tier 2 may require intensive interventions over extended periods of time to maintain their reading progress. Students may meet instructional targets at one point but need intense intervention again once instructional targets shift and become more difficult (e.g., decoding one syllable words to decoding multisyllabic words; Simmons et al., 2008). Although funding for our larger Tier 2 intervention study ended (Author, year), we decided to extend intervention for these students for an additional 8 weeks.

Decrease the size of the group. An extensive literature has explored the effects of instructional grouping on student behavior and learning, and we had used the literature on grouping (Elbaum, Vaughn, Hughes, & Moody, 1999, 2000; Polloway, Cronin, & Patton, 1986; Thurlow, Ysseldyke, Wotruba, & Algozzine, 1993; Vaughn, Gersten, & Chard, 2000; Vaughn, Hughes, Moody, & Elbaum, 2001) to design Tier 2 groups of no larger than four students. Benefits of small teacher-led groups over whole class instruction include improved student responding and on-task behavior, as well as increased achievement. Although these studies did not find an advantage for one-to-one instruction over small groups, analyses were at the level of the group, and Tier 3 decisions are usually at the level of the child. In considering whether to adopt one-to-one instruction for our Tier 3, we noted Elbaum et al.'s (2000) finding that while

generally effective, the majority of 1:1 tutoring programs have been studied with students younger than 3rd grade, and might not be appropriate for these 3rd and 4th graders. By contrast, Torgesen et al.'s (2001) shift from small group to one-to-one intervention increased rate of growth considerably, and some of their participants attended 3rd and 4th grade. Because our participants' rate of growth was slow in small group, Tier 2 instruction, we decided to decrease group size by teaching these students individually for the last 8 weeks as students finished their 3rd or 4th grade year.

The Content of Tier 3. We began by analyzing the use of time in the 25-minute, Tier 2 lessons that had been effective for most, but not for these eight students. As in other Tier 2 studies in the primary grades, we had included alphabetics, decoding and sight word instruction, and reading and discussing connected text. With two to three students per group, some of the reading aloud was conducted with peer pairs. Because roughly half of the students in this school were English Learners (ELs) and most students in Tier 2 had depressed language ability, we had also included a few minutes of vocabulary development, discussion of reading, and sentence writing in lessons from 1st through 4th grade. Although word reading skills improved as measured on word attack and word identification scales, they remained below grade level for the students we selected for Tier 3, and reading rate was very low—a phenomenon also mentioned by Torgesen et al. (2001), Simmons et al. (2008), and Denton et al. (2013) as they shifted toward Tier 3 intervention.

We were concerned about these slow rates of reading because studies of the relationship between improved reading rate and reading comprehension (e.g., Markell & Deno, 1997; O'Connor et al., 2013; Therrien, 2004) have demonstrated that by making large increases in rate (e.g., 20 words per minute or more), reading comprehension also improved. Some evidence also

exists that 65-75 words per minute or more may be necessary for adequate reading comprehension among poor reader student samples by 4th grade (O'Connor et al., 2013; O'Connor, White, & Swanson, 2007). None of our Tier 3 participants read more than 62 words correct per minute (wcpm), and six of the eight students read below 60 wcpm. Therefore, we decided to continue word analysis instruction with an emphasis on multisyllabic words, and tripled the amount of reading aloud to build rate.

The Current Study

We designed a Tier 3 intervention that addressed intensity of instruction by increasing instructional time and duration, decreasing group size to one-to-one, and focusing instruction on multisyllabic word analysis and oral reading to an adult. We identified eight students in 3rd or 4th grade, at the close of the larger study, whose rate of learning to read with Tier 2 support had not closed the gap with their peers. These "slow grower" students had access to an RtI model of early intervention since kindergarten or first grade and had received Tier 2 intervention for an average of 81 hours of instruction over 3 years.

Method

Participants

Eight students (7 female) in one school who were, on average, 9.12 years old, in one school participated in the Tier 3 intervention. Three students were in 3rd grade and five students were in 4th grade. The majority were Hispanic (n = 7) and the remaining student was African American. Half of the students were classified as ELs with their primary language indicated as Spanish. Although three of the students were identified for and received Tier 2 instruction in the first year RtI was introduced in their school (as Kindergartners or 1st graders), the other five had reading scores that did not indicate risk in the first year of the study. By Year 2, as 1st and 2nd graders, all of these students were identified as at-risk and received Tier 2 instruction. The

students remained in Tier 2 intervention for Year Three and September through December of Year Four after which Tier 3 intervention began. A description of the hours of instruction students received across the years of RtI are displayed in Table 1. As a comparison, other at-risk students who were responding well to instruction by the third year received approximately half as many hours of instruction as these students who continued on to Tier 3. Inspection of Table 1 will show instructional hours decreasing if students temporarily "caught up" and were returned to Tier 1 (whole class) instruction.

Measures

Students were assessed with standardized and curriculum-based measures of reading throughout their participation in RtI (Years 1 – 3) and pre- and post-Tier 3 intervention to track reading progress.

Woodcock Reading Mastery Tests – Revised (WRMT-R; Woodcock, 1998). Students were administered the Word Identification, Word Attack, and Passage Comprehension subtests of the WRMT-R. Word Identification required students to read increasingly difficult words in isolation, Word Attack required students to decode increasingly difficult pseudo-words, and the Passage Comprehension subtest required students to read 1-2 sentences that included 1 missing word and provide a word that correctly completed the sentence. Reliability for the WRMT-R is adequate for word identification, word attack, passage comprehension, and the basic skills cluster (r_{11} = .98, .94, .94, and .98 for Grade 1; r_{11} = .97, .94, .92, and .97 for Grade 3). Concurrent validity for the WRMT-R subtests with Woodcock-Johnson reading tests are adequate for students in Grade 1 and Grade 3 (r = .69, .82 for word identification; r = .64, .74 for word attack; r = .71, .70 for passage comprehension). The test was administered during spring of each year in RtI.

Gray Oral Reading Test – 4 (GORT-4; Wiederholt & Bryant, 2001). The GORT-4 assessed students' reading rate, accuracy, fluency, and comprehension of short passages that were real aloud by the student. Following this, the examiner read passage-based multiple-choice comprehension questions about the passage to the student. Students were not allowed to refer back to the passage during the comprehension questions. Internal consistency reliability coefficients are adequate for the GORT-4 across the subtests for students that are 7 (α = .89-.95), 8 (α = .87-.94), and 9 years of age (α = .89-.96). GORT-4 demonstrates adequate concurrent validity with other reading tests (median correlations range between .45-.75). GORT-4 was administered during spring of the student's second grade year and each subsequent year.

Dynamic Indicators of Basic Early Literacy Skills – Oral Reading Fluency (ORF; Good, Kaminski, & Dill, 2002). Students orally read three passages for one-minute each to determine the number of words read correctly with the median score recorded. Test-retest reliability ranges from .92-.97; alternate form reliability ranges from .89-.94; and criterion-related validity ranges from .52-.91 (Shaw & Shaw, 2002). Beginning in first grade, the ORF was administered multiple times per year.

Word Identification Fluency (WIF; Fuchs, L., Fuchs, & Compton, 2004). Students were presented with a single page of 100 high-frequency words and were asked to orally read through the list for 1 minute as quickly as they could. The word lists contain 100 isolated words randomly selected from the Dolch pre-primer, primer, and first grade high frequency word lists. Alternate test form reliability is reported to be .92 in first grade. WIF was administered during the fall, winter, and spring of 1st grade. The WIF was used again pre- and post-Tier 3 instruction.

Lastly, the *Peabody Picture Vocabulary Test – 3rd Edition* (PPVT-3; Dunn & Dunn, 1997) and the *Wechsler Abbreviated Scales of Intelligence* (WASI; Wechsler, 1999) were used to

describe the overall language and cognitive performance of the students. The PPVT-3 is an individually administered, norm-referenced receptive vocabulary measure that was given once per year. Students were presented with four images and were required to select the image of the examiner-stated word. Alpha reliability coefficients range between .94 and .95 for students aged 5-9. Additionally, concurrent validity is high with other measures of intelligence (Wechsler Intelligence Scale for Children – Third Edition, r = .82-.92). The WASI is an individually administered, norm-referenced measure of cognitive functioning that was given when the students were in 2nd grade. The vocabulary and matrix reasoning subtests were administered to students. Across subtests, reliabilities ranged from .81-.98, with validity of .66.

Tier 2 Intervention Procedures (Year 4, August-December)

The 8 students received Tier 2 intervention in small groups from August to December in Year 4 of RtI when the students were in 3rd or 4th grade (see Table 1 for instructional time). This intervention was delivered prior to the modified Tier 3 intervention. Tier 2 instruction was supplemental to Language Arts instruction and took place 3 times per week for 25 minutes. Students read in children's literature books, such as books at a beginner stage (e.g., Firecat) and chapter books (e.g., The Magic Treehouse series). The book was selected for reading practice if the student read with 80-85% accuracy on a preselected passage. The accompanying lesson, developed by the research team, practiced multi-syllabic word reading skills, sight word identification, and reading aloud with comprehension and vocabulary discussions among peers and the instructor.

Developing Tier 3 Instructional Procedures

After reviewing the progress of students in our Tier 2 intervention in December, we modified our instruction for these identified 8 students. We administered untimed assessments to

determine the instructional content of our Tier 3 instruction. The first was the *Checklist of the Letter Patterns with Regular Pronunciations* (O'Connor, 2007). The letter patterns were 35 common patterns among the list of 500 most common words in English. The examiner showed students the list of letter patterns and asked students to provide the sound for each. This information determined which letter patterns students already knew and those that still needed to be taught. Second, we administered the checklist for *Commonly Occurring Words in Printed English* (O'Connor, 2007). This is a screening checklist in which students were asked to read aloud a list of the 100 commonly occurring printed words in English. From this set, we developed an individualized sight word list that included the sight words that the student still needed to master. The last screening checklist used was a list of the 30 patterns and words containing these patterns from the medium difficulty cluster packs of *Glass Analysis* (Set 31 – 60; Glass, 1973). The students were asked to provide the sound for each pattern to determine which patterns would be the focus of their Tier 3 instruction.

Tier 3 Intervention Procedures (Year 4, January – March)

Our Tier 3 intervention was a modified version of our Tier 2, which it supplanted. Tier 3 sessions were also 3 times per week, but we increased length from 25 to 40 minutes and taught students 1:1. Students remained in Tier 3 for 8 weeks. The main components of the lesson were: (1) letter patterns; (2) multi-syllabic word practice; (3) reading stories aloud; (4) sight word practice; and (5) Glass Analysis. The greatest difference between our Tier 2 and Tier 3 intervention was the amount of time devoted to skill-building and reading aloud. Table 2 provides a summary of the differences across the interventions, and specific procedures regarding Tier 3 are detailed below.

Based on the *Checklist of Letter Patterns with Regular Pronunciations*, we identified 5 letter patterns to teach across the 8 students: au, ea, ow, er, and ou. Each pattern included a set of 15 decodable words for practice (e.g., pause/taunt for au, peanut/treat for ea). All students began instruction with the letter pattern au and continued until mastery was demonstrated, after which students began a new pattern. Mastery was demonstrated when students could read the entire set of practice words correctly on three consecutive trials (word order in the list varied on each trial). Instruction followed direct explicit procedures where the letter pattern and associated sound were introduced with a sample word. Instructors modeled blending of sounds to form words and specifically praised students for demonstrating decoding, blending, and self-correction skills. Students were given 15 practice opportunities and a brief sentence to read in order to practice the pattern in connected text ("The students will applaud the woman astronaut when she visits the school in August.").

Following letter pattern and decoding practice, students spent 10 minutes reading aloud in books. The same books used in our Tier 2 intervention were used in our Tier 3 intervention; however, books were only selected if the student could read it with 90-94% accuracy, which limited the book options. While seated with the instructor, students read each page aloud twice. If students hesitated for 3 seconds or made an error reading a non-decodable word, the instructor provided the word and had the student reread the sentence ("That word is 'what.' Try the sentence again"). If the word was decodable, instructors provided a prompt to remind students to sound the word out and then reread the sentence. Instructors were explicitly told not to interrupt the reading practice for any discussion; therefore, we did not spend time on comprehension questions or vocabulary during these 10 minutes of reading.

Following this, we used the constant time delay procedure to introduce sight words to the students. Individualized sight word sets were created for each student based on the *Commonly Occurring Words in Printed English* checklist. We created sets of 10 sight words that included 3-5 'unknown' words. Students remained with their individual sight word set until they demonstrated mastery (three consecutive trials of 100% accuracy). Upon completion of sight word practice, students returned to book reading. However, this time the students returned to the first page they read during the earlier book reading and read straight through as far as they could in 10 minutes, with minimal interruptions to maximize reading time. Instructors were responsible for noting errors and self-corrections made by the student during reading and correcting errors by providing the correct word.

Next, students returned to word analysis using Glass Analysis procedures (See Glass, 1973 for detailed descriptions). Students had an individualized list of Glass patterns to master as determined by the *Glass Analysis Checklist*. Students worked through the list of patterns and did not move forward until three consecutive trials of 100% accuracy were demonstrated. Again, specific praise was provided for demonstrating blending of sounds to read words. After Glass Analysis, students returned to reading aloud for 10 additional minutes, but this time students were given a choice of 2 instructor-selected books that the student could read with 90-94% accuracy. The student and instructor took turns alternating sentences.

Results

We present the history of the 8 students' average scores on standardized and curriculum-based measures of reading during Years 1-3 of RtI in Table 3. Students demonstrated close to average scores on measures of word analysis and identification, as one would hope to find for students who had continued Tier 2 intervention in word reading skill areas across years. More

interesting were the students' average scores on curriculum-based measures of ORF and WIF displayed in Table 3. During Year 1 of RtI, students failed to improve their reading rate (ns, *p* =.252). During Year 2 of RtI, the students demonstrated marginally significant growth (approximately 10 words; *p* < .10). By Year 3 of Tier 2, students improved their reading rate by 15 words (*p* =.041). Most notably, the difference between these students and other at-risk students began to grow across the years, with other Tier 2 students reading an average of 68 wcpm by Year 3 and our 8 students only reading 45 wcpm.

Tier 3 Student Performance on Word Reading Measures Before and After Tier 3

Individual student scores on the WRMT-R and GORT-4 pre- and post-Tier 3 are provided in Table 4. These scores account for student age at time of administration. Again, WRMT-R scores on measures of word identification and word attack remained close to average for the 8 students, but 1-2 standard deviations below average for GORT. A paired samples t-test on WRMT-R raw scores indicated a pre- to post-test difference for Word Identification scores only, $t(7) = -4.837$, $p = .002$. A paired samples t-test on GORT-4 raw scores indicated a pre- to post-test difference for fluency, $t(7) = -4.328$, $p = .003$. Students also grew significantly in sight word recognition, as indicated by WIF scores at pre- ($M = 57.2$) and post-Tier 3 ($M = 73.3$; $t(7) = -4.378$, $p < .003$).

Figure 1 and Figure 2 illustrate individual ORF scores over time for students in the 3rd and 4th grade, respectively. Beginning with Figure 1, all three 3rd grade students had read below grade level expectations in 1st, 2nd, and first half of 3rd grade. Tier 3 intervention took place between the Grade 3 winter and spring time points. As the graph illustrates, Student A and Student B made dramatic gains during this period (over 30 words per minute) ending the school year close to typical readers (100 wcpm). Student C also made stronger gains during Tier 3 (15

wcpm improvement) compared to earlier gains in Tier 2 instruction. All five 4th grade students in Figure 2 read far below grade level expectations in 1st, 2nd, 3rd, and early in 4th grade. The graph displays an upward trend for all students once Tier 3 began. The 4th grade students gained between 36 and 61 wcpm by the end of Tier 3 intervention. A repeated-measures ANOVA analyzed average scores across fall, winter, and spring for all 8 students. Results indicated a significant effect for time, $F(2,14) = 64.419, p < .001$. Pairwise comparisons using Bonferroni corrections indicated that students improved from fall ($M = 44.1, p = .023$) to winter ($M = 51.1, p < .001$) and substantially from winter to spring ($M = 84.4, p < .001$).

Tier 3 Student Performance on Comprehension Measures Before and After Tier 3

Paired samples t-tests on WRMT-R and GORT-4 comprehension raw scores indicated pre- to post-test differences, $t(7) = -3.572, p = .009$ and $t(7) = -6.332 p < .001$, respectively. On both tests, post-test scores were greater than pre-test scores, indicating that rate of growth was higher than expected by maturation alone. Additionally, students demonstrated pre- to post-test gains for the GORT-4 ORQ, $t(7) = -2.758, p = .028$ with average scores at post-test ($M = 83.1$) greater than pre-test ($M = 75.6$).

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Discussion

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Although quality Tier 2 instruction in RtI benefits most students, others need much more than Tier 2 typically provides. Our Tier 2 RtI instruction was successful for many at-risk students across our five schools (Authors, year); however, 8 students in one school demonstrated slow growth in response to Tier 2 instruction over time. We intensified Tier 2 intervention to create a Tier 3 intervention focused on skill-building specific to the areas of word analysis and identification and reading rate for these students. The goal of our study was to determine whether strengthening specific aspects of the reading intervention would improve their trajectory of

reading growth. While our Tier 3 intervention only lasted for 8 weeks at the close of our RtI study, the findings are promising for educators who currently work with slow responding students.

Past research on intensive interventions indicate that there are basic tenets of Tier 3 instruction, such as increased duration of intervention and decreased group size, that are standard procedure (Denton et al., 2013; Wanzek & Vaughn, 2010). As best as we could given teacher scheduling at the school, we increased the length of instructional time (25 to 40 minutes) and ensured our instruction was 1:1 for students. However, research is less clear on what instruction at Tier 3 should include, and what is specialized about Tier 3 over Tier 2 instruction. In their review of intensive interventions in K-3rd grade, Wanzek and Vaughn indicated that greatest effects for student reading were found when interventions matched students appropriately with the level of text they read, and included instruction in phonics and blending of words. Each of these elements was included in our Tier 3 intervention. Moreover, tailoring aspects of the intervention around word decoding and fluency may have elicited students' greater gains in these areas.

Our Tier 3 instruction involved simple modifications in a very direct and explicit manner over a short duration of time and generated significant reading gains. Given their trajectory of progress in Tier 2 (i.e., only 7 wcpm gain during 12 weeks of Tier 2 prior to Tier 3 intervention), we were surprised when students gained an average of 30 wcpm during 8 weeks of Tier 3. The additional Tier 3 reading practice (i.e., 3 times as much reading aloud as in Tier 2) likely contributed to the unexpected improvement in reading rate of these 3rd and 4th graders. While widespread belief suggests that by 3rd grade, the window of opportunity to improve reading skill narrows (Lovett et al., 2000), our efforts indicate otherwise. However, it is difficult to pinpoint

which aspects or combination of aspects led to this improvement. Research has suggested that extended time reading connected prose and repeated readings elicit improvements in reading rate (O'Connor et al., 2007; Thierren, 2004), and so we followed this recommendation, but also incorporated aspects of word analysis in our Tier 3 model. Thus, we cannot verify if one or some combination of reading components led to improvements.

While intensive interventions for students in 3rd- 4th grade typically include a multi-component emphasis (i.e., vocabulary and comprehension, word reading and comprehension, or some combination of those and fluency), we streamlined our intervention to be skill-specific (e.g., word reading and fluency). Even though comprehension was not a focus of our intervention, students improved in reading comprehension. It is possible that improving rate directly influenced comprehension, as found by Markell and Deno (1997) and O'Connor et al. (2013). In our case, students exceeded the 20 wcpm gain that Markell and Deno suggested may be necessary to impact comprehension.

Exploring student growth historically, we wondered whether we could identify early indicators of prolonged risk for these students that would have identified them for Tier 3 intervention earlier than Grades 3 and 4. We noticed that although these students responded to Tier 2 intervention with scores near average on untimed word identification, they still were significantly behind their typical reading peers in Tier 1 and even their at-risk peers in Tier 2 on rate-based curriculum-based indicators (i.e., ORF and WIF). While the differences between at-risk peers and these 8 students were marginal during Kindergarten and 1st grade, these differences in rate became larger from 2nd through 4th grade. In reference to the standardized measures the students received, the WRMT-R alone would have failed to identify these students as at-risk across all 4 years. Simmons et al. (2008), Fuchs, D. et al. (2004), and O'Connor and

colleagues (O'Connor, Bocian, Beebe-Frankenberger, & Linklater, 2010; O'Connor & Sanchez, 2011) have all commented on inflated scores on the WRMT-R for students at-risk, possibly due to the increased emphasis on word-level skills in the Reading First Initiative of the No Child Left Behind Act (2001). Although the scope of the larger study focused only on Tier 2, our results indicated that in 3rd and 4th grade difficult-to-remediate students can still demonstrate strong reading improvements, even when intensive Tier 3 intervention is delayed.

Our results provide a path for educators who teach students who have severe reading deficits in word-level skills and reading rate. For current Tier 2 instructors, the modifications to instruction were not difficult to implement and included increasing the amount of time spent decoding, increasing the amount of time spent identifying words, increasing the amount of time students spent reading aloud, and providing clear and explicit modeling, scaffolding, and feedback. The students were actively involved throughout the 40 minutes and were provided with ample practice opportunities. Teachers familiar with special education techniques will recognize these practices.

We decreased our group size to one-to-one in order to facilitate direct modeling, scaffolding, feedback, and time on tasks. Elbaum et al. (2000) reviewed research on one-on-one instruction in reading and indicated that relatively little was known about its potential effectiveness. Their review indicated that scarce research directly compares grouping formats between one-on-one and very small groups for students with LD. Our research indicated that students may have benefited from this modification to our instruction. Unfortunately, of all our modifications, individual instruction may be the most difficult to achieve in schools due to high case loads for reading specialists and special educators.

While our results are promising, several limitations to this research are obvious. Firstly, we had a small sample size. This was due partly to the previous success of the Tier 2 RtI model because most of the students in Tier 2 at this school did not need an increase in instructional intensity. Although other children in other schools in the larger study would have been considered slow responders in our RtI model, we lacked resources at the close of our program to implement this stringent Tier 3 approach across schools. This was our attempt to try a different model and help a handful of children who were in definitive need of more intensive interventions. Given our results, it could be worthwhile to try this intervention with more "slow growers" in RtI to see if additional evidence accumulates.

Moreover, we cannot report with certainty which of the modifications in our "kitchen sink" Tier 3 approach generated these short-term gains because we used multiple strategies to improve word reading and rate. However, these variables could be isolated and manipulated in future studies. For example, focusing on practicing word analysis and identification may still be an effective use of instructional time, especially at Tier 3. Nor do we know whether continuing this combination of features would keep these 8 students in a trajectory to close the gap with their typical reader peers or whether new deficits would emerge once these reading skills improved. Nonetheless, we are moving in the direction of defining the "specialized elements" of Tier 3 interventions that are most effective and helpful for students with severe reading difficulties.

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Table 1.

History of the Hours of Tier 2 Intervention Provided for Individual Students in Years 1 – 3 and the Hours of Tier 2 and Tier 3 Intervention in Year 4 (n = 8).

Participant	Year 1 RtI Tier 2	Year 2 RtI Tier 2	Year 3 RtI Tier 2	Year 4 RtI Tier 2	Year 4 RtI Tier 3
Student A	15.8	15.5	14.2	18.1	25.4
Student B	14.9	9.8	20.7	14.5	14.8
Student C		20.3	22.2	18.1	16.8
Student D	11.9	22.4	25.7	14.9	20.5
Student E		22.3	23.5	16.2	19.1
Student F		17.5	17.6	16.5	12.6
Student G		33.3	22.2	18.1	13.1
Student H		28.7	22.3	17.6	12.4

Table 2.

Major Aspects of Tier 2 and Tier 3 Intervention for the 3rd and 4th Graders.

Lesson Components	Tier 2 Intervention	Tier 3 Intervention
Times per week	3	3
Minutes per session	25	40
Student to teacher ratio	Small group (3:1 or 2:1)	1:1
Teacher	Graduate students	Same graduate students from Tier 2
Curricular materials	Literature books with researcher developed lessons	Literature books with skill driven practice
Sight Words	5-8 sight words per lesson	10 student specific sight words taught until mastery
Word Study	1 – 2 letter patterns per lesson that were derived from the reading	5 letter patterns identified through error analysis, taught individually until mastery, in addition to individually focused Glass Analysis
Reading Aloud	15-20 minutes with vocabulary and comprehension discussion included	30 minutes reading aloud spaced across 3 lesson segments, with emphasis only on fluency and decoding

Table 3.

History of the Reading Performance of Students in Tier 3 During Early Years of RtI (n = 8).

Assessment	RtI Year 1		RtI Year 2		RtI Year 3	
	M	*SD*	*M*	*SD*	*M*	*SD*
WRMT-R						
Word Identification	101.25	3.8	98.38	7.8	94.00	3.9
Word Attack	99.60	10.9	98.38	6.8	91.25	5.0
Passage Comprehension	94.00	6.3	95.63	4.1	92.3	3.6
Basic Skills Cluster	101.00	3.0	97.75	7.1	91.63	3.7
GORT-4						
Fluency			5.00[a]	1.0	5.50	1.1
Comprehension			6.80[a]	1.3	7.50	1.1
Oral Reading Quotient			75.4[a]	4.9	79.0	4.2
PPVT	72.63	17.8	79.13	9.2	76.25	8.5
WASI IQ					84.5	5.9
ORF Fall			20.40	7.4	30.13	13.3
ORF Winter	10.00[a]	5.2	24.63	13.1	37.75	12.2
ORF Spring	13.60[a]	7.6	30.13	14.8	45.38	13.0
WIF Fall	3.60[a]	2.6	8.00	2.6		
WIF Winter	10.80[a]	5.8	19.00	14.0		
WIF Spring	11.80[a]	7.7	23.33	21.4		

Note. Standard scores are reported for the WRMT-R, GORT-4, PPVT, and WASI IQ. WIF scores refer to scores during 1st grade only.

[a]Sample size = 5, only refers to the 5 students who were in 4th grade during Year 4.

Table 4.

Tier 3 Student Performance on Total Reading Measures Before and After Tier 3 Intervention (n = 8)

Tier 3 Students	WRMT-R Word Id.		WRMT-R Word Attack		GORT-4 Fluency		WRMT-R Comprehension		GORT-4 Comprehension	
	Pre	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*
Student A	98	97	81	93	6	6	97	94	7	8
Student B	96	95	90	94	6	7	104	103	7	8
Student C	92	90	91	88	4	5	92	97	7	9
Student D	87	86	88	85	3	8	96	96	6	9
Student E	91	94	92	92	4	3	90	91	10	7
Student F	92	94	94	91	5	5	89	96	8	9
Student G	92	95	89	90	5	7	90	85	7	9
Student H	92	95	80	90	6	7	85	85	8	8
Tier 3 Average	92.5	93.3	89.4	90.4	4.9	6.0	92.9	93.4	7.5	8.4
Tier 3 SD	3.3	3.5	3.9	2.9	1.1	1.6	5.9	4.9	1.2	0.7

Note. Standard scores are reported for the WRMT-R and GORT-4

Figure 1.

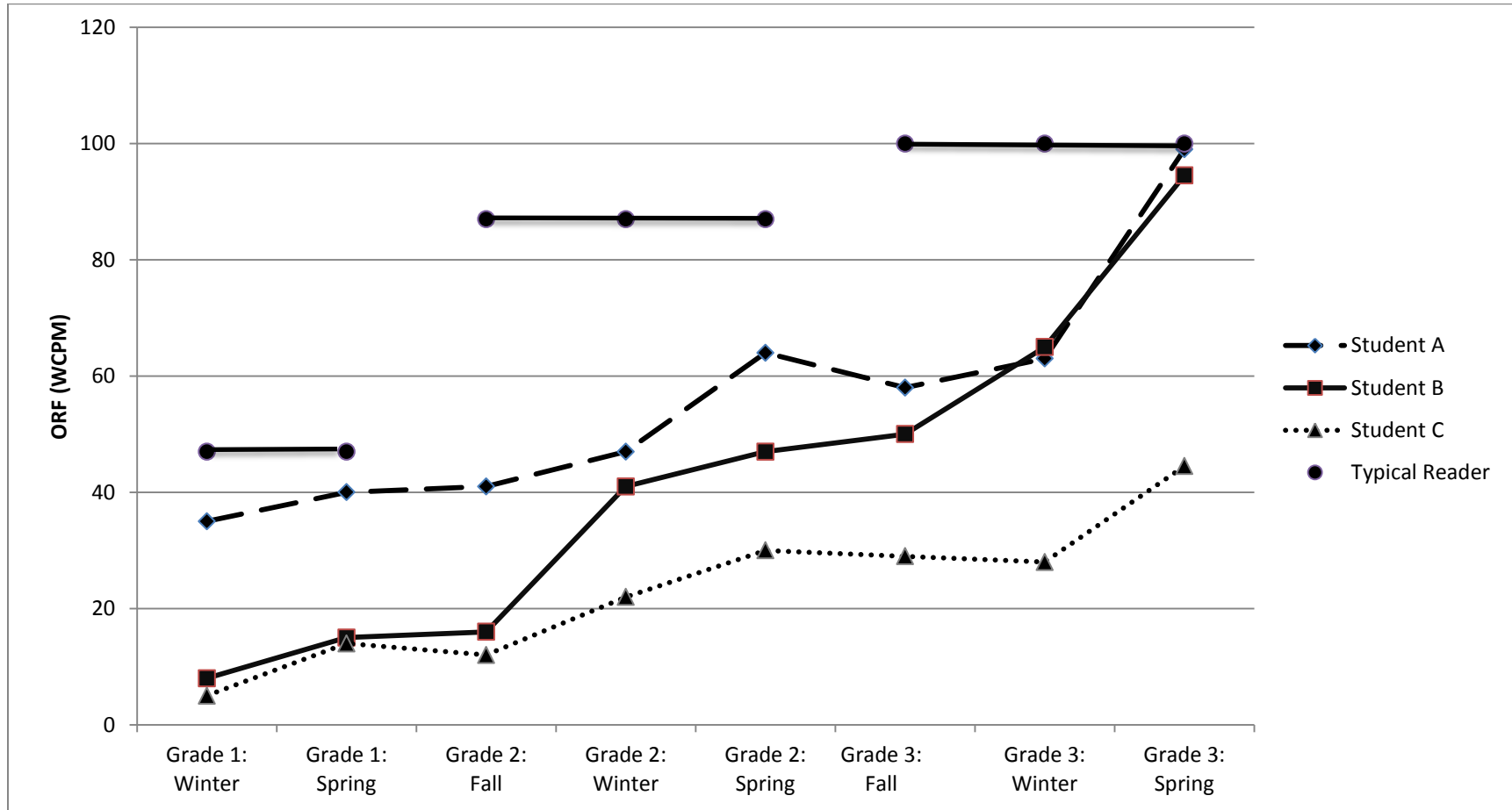*Individual ORF Scores for Third Grade Students from Grade 1 to Grade 3*

Figure 2.

Individual ORF Scores for Fourth Grade Students from Grade 1 to Grade 4.