

The Effects of a Comprehensive and Supplemental Middle School Reading Program

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Abstract

In this article, we describe the results of an evaluation of a multi-year comprehensive middle school reading program. Four public middle schools serving students from rural areas in the southwest and with a large population of limited reading proficiency students participated in a study designed to determine the impact of the reading program. Two hundred thirty-five students with low reading achievement scores on the state Standards of Learning reading assessment were evaluated to determine reading gains. The multi-year reading curriculum included seven units, each taught using explicit instruction. Bundled into the program are four major components: (a) Word Level Instruction, (b) Comprehension, (c) Motivation and Engagement, and (d) Assessment. A quasi-experimental design was used to determine the effectiveness of the intervention. Statistically significant differences were found between the experimental and comparison conditions on measures of reading achievement with some scores favoring the experimental condition. Effect size of the differences ranged from $\eta_p^2 = .01$ to $.46$. The evaluation supports the promise of the reading program to improve the reading achievement scores of middle school students at a level that may narrow the reading achievement gap.

Keywords

adolescent reading, reading disabilities, reading interventions

A significant discrepancy exists between the reading abilities of adolescents with limited reading proficiency (LRP) and proficient readers. In 2017, the average eighth-grade reading score on the National Assessment of Educational Progress (NAEP) was 267 points. For eighth-grade students living in poverty, the average score was 253 points. For students with disabilities, the average score was 232 points and the average score for English learners was 226 points (National Center for Education Statistics, 2017). More significant is how these point differentials translate into basic reading ability. For eighth-grade students living in poverty, 35% of the students are reading *below basic proficiency*. For students with disabilities, 68% of the students are reading *below basic proficiency*, and, for English learners, 61% are reading below the basic level (National Center for Education Statistics, 2017). For the purposes of this article, we define readers with LRP as inclusive of students with low reading achievement scores (between the 15th and 36th percentile on a standardized reading assessment) and living in poverty, those with disabilities, or English learners.

Limited reading proficiency can be a chronic condition that continues for many students, and by high school, they are, on average, three years below grade level in reading (Cortiella & Horowitz, 2014). In Virginia, where this study took place, a similar discrepancy exists: On a statewide basis, 52% of all LRP students are reading below proficiency, compared to 20% of their peers (Virginia Department of Education, 2017). The schools participating in this study report state Standards of Learning (SOL) scores that are also low. For example, one middle school's SOL 8th grade reading scores were worse than 90.7% of the middle schools in Virginia. Another middle school reported that only 60% of all students score at the proficient level in reading (Virginia Department of Education, 2017). Students who score at below basic skill levels are unable to use prior knowledge to make a comparison, describe the central problem faced by a

main character, use context to identify meaning of vocabulary, provide text information to support a generalization, read across text to provide an explanation, or support an opinion with text information or related prior knowledge. Consequently, students reading significantly below a basic level are unable to comprehend much of the written material they encounter in school.

The Magnitude of the Literacy Challenge

University of Kansas Center for Research on Learning (KUCRL) researchers conducted a descriptive study to bring clarity to the nature of the reading skills of adolescents, including students with disabilities (Hock et al., 2009). Students were administered 11 standardized reading tests across five reading domains: alphabets, word level reading, fluency, vocabulary, and comprehension.

The results of the study described the differences across reading domains between proficient readers and readers with limited reading proficiency. In all five domains, students with limited reading proficiency scored statistically and significantly lower than their proficient reader counterparts in each domain and 20 or more standard score points lower than the proficient reader group. Specifically, the study found that 61% of the limited reading proficiency group scored low in all five reading domains.

In a latent class analysis of the same data set discussed above, researchers found five statistically unique subgroups of adolescent readers with low reading achievement: (a) readers with severe global weaknesses, (b) readers with moderate global weaknesses, (c) dysfluent readers, (d) weak language comprehenders, and (e) weak reading comprehenders (Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011). The profiles of these five subgroups demonstrate considerable diversity and are distinguished by their specific strengths and weaknesses. For example, two of the subgroups scored from one to two standard deviations

below the mean on almost all reading measures. Another subgroup showed weaknesses only on the measure of fluency.

Given the significant and comprehensive needs of LRP students and the diversity of subgroups of poor comprehenders, increasing student literacy to the level required by more rigorous standards will be a significant challenge for teachers whose students lack basic reading skills.

The Evidence We Have

Literature reviews, meta-analyses, and recent studies of reading interventions, programs, and instructional methodology aimed at improving reading proficiency among adolescent struggling readers informs our understanding of what works with whom and under what conditions (e.g., Slavin, Cheung, Groff, & Lake, 2008; Torgesen et al., 2006; Vaughn & Wanzek, 2014). For example, the Center on Instruction's Practice Brief (Boardman, Roberts, Vaughn, Wexler, Murray, & Kosanovich, 2008), recommends that interventions designed for adolescents include instruction in the following components: word study, fluency, vocabulary, comprehension, and motivation. In addition to the components of effective instruction, secondary curricular demands and learner profiles of adolescent struggling readers should be taken into consideration (e.g., Brasseur-Hock et al., 2011; Hock et al., 2009).

In a review comparing four approaches to reading programs for adolescent struggling readers, Slavin and colleagues (2008) found that instructional-process programs, which improve daily teaching practices and are accompanied by professional development have greater research support than mixed approaches and programs that focus on technology alone. The Slavin review included 33 separate studies, all using randomized or matched control groups.

In a synthesis of experimental research on reading programs for secondary students,

Baye, Lake, Inns, & Slavin (2018) found that instructional approaches that used one-to-one and small group tutoring, cooperative learning, whole school approaches, and writing-focused approaches showed positive outcomes. The researchers also found reading instruction in social studies/science classes, teaching structured reading strategies, and personalized rotation learning models were effective. However, programs providing an extra hour of reading time and those utilizing technology were no more effective than programs without those features. Researchers found that across 62 reviewed programs effects were relatively small (i.e., $ES = +0.09$ to $+0.13$).

Another synthesis of 14 studies of reading comprehension interventions for middle school students with learning disabilities, conducted between 1979-2009, found large effect sizes for researcher-developed comprehension measures and medium effect sizes for standardized comprehension measures (Solis et al., 2012). All but one intervention in these studies related to strategy instruction on main idea or summarization. However, 12 of the 14 interventions were implemented by researchers somewhat limiting the generalizability of the findings.

In an effort to examine the effects of a year-long, small-group, intensive intervention for 41 eighth-graders who persistently had inadequate response to previous reading interventions, Vaughn and colleagues (2012) found that students showed growth, but still lacked grade-level proficiency. The results showed that students receiving intensive intervention demonstrated significantly higher scores than comparison students on standardized measures of comprehension (effect size = 1.20) and word identification (effect size = 0.49). However, researchers found that most students in the treatment condition continued to lack grade-level proficiency in reading despite three years of intervention.

Vaughn, Swanson, and Solis (2013) reported the results of a longitudinal study of reading comprehension interventions for adolescents with learning disabilities who were provided

support within a response to intervention framework. In this study, researchers developed interventions across three tiers of instruction, with increasing levels of intensity for students who were nonresponsive to less intense instruction. The influence of the interventions with added intensity (i.e., Tier 2 and Tier 3 interventions) on student reading achievement scores showed larger gains for the experimental groups than comparison students. However, the magnitude was considered small ($d = 0.16$). The results of this study and the previous study by Vaughn and colleagues (2012) show that even with explicit and intensive reading instruction, students with severe reading disabilities demonstrated limited reading improvement and clarify the need for intensive instruction for middle school students with severe reading disabilities to close their reading proficiency gap.

In a meta-analysis by Scammacca, Roberts, Vaughn, and Steubing (2015), researchers examined findings from 82 studies of interventions for adolescent struggling readers in grades 4-12. This analysis was conducted as an extension of Scammacca et al.'s 2007 meta-analysis with similar research questions on level of intervention effectiveness and use of reading comprehension measures. In both literature reviews, researchers included interventions designed to impact reading fluency, vocabulary, and reading comprehension. Researchers found that teachers could influence reading outcomes for older students with reading difficulties and that adolescents, including those with learning disabilities, could benefit from interventions that target both word-level and reading comprehension strategies. In the latter review, researchers found that effect sizes in studies of more recent years (1980-2011) showed lower effect sizes, likely due to increased use of standardized measures as the outcome variable for reading comprehension. Additionally, researchers concluded three other causes of lower effect sizes: improved "business-as-usual" (BAU) instruction typically serving as the comparison in

intervention studies, the use of more rigorous research designs, and changes in participant characteristics.

In a review of 22 randomized controlled trials (RCTs) on reading interventions for children and adolescents with reading disabilities, Galuschka, Ise, Krick, and Schulte-Korne (2014) evaluated 49 comparisons of experimental and control groups that included reading fluency, phonemic awareness, reading comprehension, phonics instruction, auditory training, medical treatments, and interventions with colored overlays or lenses. One key finding was that phonics instruction was statistically confirmed as the only approach to affect reading and spelling performance in children and adolescents with reading disabilities. This meta-analysis demonstrated that severe reading and spelling difficulties could be treated with appropriate instructional methods. The authors concluded that systematic instruction of letter–sound correspondences and decoding strategies was the most effective method for improving the literacy skills of children and adolescents with severe reading disabilities. Associated with their conclusions is the recommended approach from the Center on Instruction for phonics instruction with older readers. To respect adolescents' background knowledge in phonemic awareness and phonics learned during their elementary years, instruction should focus on advanced word study and decoding multisyllabic words (Boardman et al., 2008; Torgesen et al., 2007).

In an effort to discover what features of vocabulary instruction have an influence on comprehension of adolescents, Wright and Cervetti (2017) conducted a systematic review of 36 studies of vocabulary interventions with comprehension as their outcome measure. One key finding from this analysis was that instruction focusing on the process of learning new words had a larger impact than teaching definitions of new words. Another finding indicated that there is no evidence to support one particular strategy for solving word meanings, but that students who

actively use a process showed increased understanding of text.

Finally, in a recent article describing the impact of a two-year randomized control trial on 194 fourth-grade students with severe reading disabilities, researchers found no statistically significant differences between students in treatment and those in a BAU condition on measures of word identification, vocabulary, and comprehension (Otaiba, Petscher, Wanzek, Lan, & Rivas, 2018). While there were no significant statistical differences, there were promising effect size gains (ES 0.14 to 0.19). Given these promising gains, the researchers suggest that even more intense intervention for students with chronic and severe reading disabilities may be required.

Amalgamating these findings, we conclude that explicit, comprehensive reading strategy instruction is effective, to varying degrees, for LRP. Furthermore, these findings support the need to learn more about the instructional conditions that could close the reading gap for these readers, using standardized outcome measures similar to those used by schools regularly to monitor reading progress and judge reading proficiency of all students. Evidence showing that teachers are able to deliver interventions in practical settings with as much efficacy as researchers is also needed. Finally, additional research is needed on the impact of multi-year, intensive, and comprehensive reading instruction designed to address all the critical reading component skills identified as essential to have high impact on the reading achievement of LRP.

A Response to the Challenge

In an attempt to address this challenge, in January 2015, the Virginia Department of Education (VDOE) provided several schools in the state with materials and professional development on Fusion Reading (FR), a comprehensive intervention for struggling adolescent readers (Hock, Brasseur-Hock, & Deshler, 2012). VDOE did this for several reasons. First, they believed that the intervention could provide LRP students with the basic skills they so

desperately need (e.g., decoding, fluency, vocabulary knowledge, comprehension). Second, previous reading interventions for these students had little or small effects. And third, they believed that the intervention's use of literature that was engaging and relevant to the lives of adolescents would increase their students' motivation and desire to engage in reading. The overarching goal of the project was to determine the level of impact on students with low reading achievement scores on the state SOL reading assessment and whether or not SOL scores improved so that student performance was considered meeting state standards in reading.

Findings from Previous Studies of the Reading Program

Multiple studies have shown the impact of FR. For example, as part of an IES grant, an underpowered random assignment study of struggling 9th- and 10th-grade readers in urban high schools was conducted to bolster claims of promise for the intervention. Comparison condition students received Second Chance Reading (Showers, Joyce, Scanlon, & Schnaubelt, 1998). All students were administered the Group Reading and Diagnostic Evaluation (GRADE; Williams, 2001). An independent analysis of the data was conducted by the University of Houston's TIMES Center. Thirty-four students received FR and 35 students received Second Chance Reading. The data were analyzed using a hierarchical linear modeling approach as implemented in SAS PROC MIXED. The dependent variables were the standard and raw scores on the GRADE comprehension composite test score. A significant interaction was found between treatment and measurement occasion for the standard score on the GRADE Comprehension Composite score, $F(2, 88) = 3.53, p = .03$. The pre- to post-test gain for the experimental group was statistically significant, $F(2, 88) = 4.59, p = .01$. The within-subjects effect size for this subtest score is Hedges' $g = .70; F(2, 93) = 3.06; p = .05$ raw score and Hedges' $g = .66; F(2, 93) = 3.73; p = .03$ for standard scores (Hock, Bulgren, & Brasseur-Hock, 2017).

In another study, a quasi-experimental matched comparison group study was conducted using FR and Corrective Reading (Hock, Brasseur-Hock, Hock, & Duval, 2017). There were 40 middle school students with learning disabilities in the study, 20 in each condition. Students attended a suburban school district. The GRADE (Williams, 2001) was administered pre- and post-test and the Measure of Academic Progress (MAP) (Northwest Evaluation Association, 2011) was administered at multiple time points. The difference in GRADE Total Test reading score was statistically significant. Given the nested nature of the data, a repeated-measure ANCOVA was conducted on the overall GRADE total scores. There were significant differences between the intervention and comparison group over time; $F(1, 32) = 6.67, p = .015$, Hedges' $g = 1.66$. A second repeated-measure ANCOVA was conducted on MAP scores. There were significant differences between the experimental and comparison groups over time; $F(1, 27) = 5.16, p = .031$, Hedges' $g = 1.04$. In another analysis of the same data set, an independent-samples t -test was conducted to compare the difference in Total Test scores of the GRADE. The mean score for the experimental group post-test ($M = 33.60, SD = 10.29$) was significantly greater than the mean score for the comparison group posttest ($M = 21.70, SD = 7.31$), $t(38) = 4.216, p < .001$. The standardized effect size index, Cohen's d , was $= 1.35$ (Hock, et al., 2017).

Expanding the Evidence

The evaluation reported in this article extends the research on the intervention to include students with limited reading proficiency from impoverished rural school districts and cultures.

Specific research questions included:

1. What is the impact of Fusion Reading on the reading achievement scores of middle school adolescents with limited reading proficiency?
2. What is the magnitude of the gain score difference (effect size) for students in Fusion Reading

when compared to students in a BAU reading comparison condition?

3. What was the level of fidelity of implementation for intervention dosage and curriculum implementation?

Method

Setting

This study took place in two rural school divisions (districts) located in southwest Virginia. One division was a medium size school division with a total student population on 9,182 students across 10 elementary schools, four middle schools, and four high schools. The other division was a smaller school division with a total student population of 2,042 students across two elementary schools, one middle school, and one high school (VDOE, 2017). A total of four schools participated in the study with three schools from the larger division and one school from the smaller division. Students were from 6th, 7th, or 8th grade middle school classrooms. Three schools taught LRP students the intervention program, Fusion Reading, and one school served as a BAU comparison condition.

Student Participants

A total of 235 students participated in the study. One hundred-fifty-three were in the experimental condition and 82 were in the comparison condition. All students in the study were considered to be LRP. The adolescent limiter reading proficiency students were defined as students with documented disabilities and reading goals, English language learners with low reading achievement scores, or students living in poverty. All students had low reading achievement scores. Students (a) were enrolled in Grades 6, 7, or 8; (b) scored between the 15th and 36th percentile on a standardized reading assessment; (c) scored below proficient on the division's reading screening test; and (d) scored below proficient on the Virginia reading

Standards of Learning (SOL) test. See Table 1 for additional information on student participants.

[Table 1 about here]

Of the 153 students in the experimental group, 54 were in 6th grade, 54 were in 7th grade, and 45 were in 8th grade. A total of 82 students from these same grade levels were in the comparison condition. All students were required to have parent or guardian consent to participate in the study and students provided their assent to participate.

Teacher Participants

A total of four teachers who expressed interest in the study and signed letters of consent were selected to participate. All teachers in both the experimental and comparison groups were licensed teachers by VDOE. The experimental group was taught by three teachers who were new FR program implementers but who were experienced teachers in the districts.

Components of the Comprehensive Intervention

Fusion Reading (FR; Hock, Brasseur-Hock, & Deshler, 2012) is an evidenced-based reading program published by McGraw-Hill Education. The program is a supplemental reading course and is usually taught as an elective. The program can be taught in multiple years. The curriculum includes seven units, each taught using explicit instruction. Bundled into the program are four major components: (a) Engagement and Motivation, (b) Word Level Instruction, (c) Comprehension, and (d) Ongoing Assessment.

The *Engagement and Motivation Component* includes the use of highly engaging teen literature, lessons designed for student success through explicit instruction, multi-level reading material, positive and corrective feedback, ongoing performance assessment, and Possible Selves for Readers (PSR). PSR is used to focus students' attention on the importance of becoming expert readers and how being expert readers can help them reach their hopes and dreams as

learners, persons, and in career areas. For example, students participate in structured interviews in which they describe themselves as an individual, as a learner, and as a worker. They also identify their hopes, expectations, and fears for the future in each of these areas. From this examination of what is possible for each individual, an action plan is developed that clearly shows the linkage between reading and the attainment of the student identified goals. PSR is an ongoing experience and reflects the dynamic nature of student goals.

Word Level Instruction is taught through The Bridging Strategy (TBS). Bridging consists of four core units: phonics, decoding, word identification, and reading fluency. When students apply TBS, they use multiple skills and strategies to quickly and accurately recognize words in connected text. When students encounter an unfamiliar multisyllabic word, they learn to apply a four-step strategy in which they break unrecognized multiple syllabic words into pronounceable word parts. These word level skills are explicitly taught to a level of automaticity and practiced with expository and narrative text using multi-level text. Teachers provide positive and corrective feedback to small cooperative groups and, as needed, to individual students.

The *Comprehension Component* of FR consists of four key strategies: (a) Summarization, (b) Prediction, (c) Vocabulary, and (d) Strategy Integration. With the Summarization Strategy, students learn to identify important clues in the text, link the material to prior knowledge, read short chunks of information, find main ideas, and summarize major sections of text. In the Prediction Strategy, students learn how to make predictions and draw inferences with their reading. With the Vocabulary Strategy, students learn a seven-step process that allows them to determine the meaning of unknown vocabulary through the analysis of affixes and context clues and extensive classroom discussion of multiple word meanings, word usage in different contexts, and similarities of the target word to other words. Finally, and most importantly, through

Strategy Integration, students learn how to apply and adapt all of the reading strategies they've learned to their core class reading materials in math, science, language arts, and social studies. They practice application of strategies in the FR class using the core class text materials and receive feedback from their teacher. Core class teachers and co-teachers then cue students to use the strategies during core class activities. About 60% of FR instruction focuses on core class reading material.

Two activities embedded in the Comprehension component, Thinking Reading and Book Study, are designed to increase the amount of time disengaged readers spend engaged in the reading process. Thinking Reading is an instructional process used to demonstrate expert reading behaviors, to forecast strategy application, and to provide opportunities for students to practice strategy application in the context of authentic reading material. Thinking Reading is similar to Reciprocal Teaching (Palincsar & Brown, 1984) in that the teacher eventually transfers the role of expert reader to students. However, in Thinking Reading, teachers use highly engaging reading materials in an effort to get disengaged readers reengaged with text. Book Study is designed for extension and application of learned reading strategies outside the classroom. Students select books in their areas of interest and at their independent reading level. Then they complete assignments that are directly related to the strategies and vocabulary being taught. The goals of these activities are to get disengaged readers' "eyes on print" (Vaughn, 2006, p. 172), provide multiple exposures to expert reader models, provide readers with an opportunity to practice new reading strategies, and extend reading practice beyond the classroom.

The *Assessment Component* is designed to provide individualized data that informs and personalizes instruction. Individual student progress is carefully documented in each instructional unit. Formative assessment data are gathered daily for each strategy's instructional

lesson and during the various practice activities. Thus, regular measurement of motivation, engagement, word-level skills, and comprehension are embedded with the program and collected regularly by the teacher. This information helps assess individual student progress and provides immediate, individualized, positive, and corrective feedback to students. Progress measures are embedded within each major unit of the curriculum. These measures inform the learner and teacher as to the level of student mastery of a particular reading strategy, mastery of skills being taught, and comprehension of reading material. The measures are also used to make future program curriculum decisions for individuals or groups of students. Overall achievement gains are documented by division end of grade assessments, and/or standardized reading measures.

A key structure of FR is the Daily Lesson Format. The DLF provides a structure for the class that ensures all critical instructional activities are included in each class session. For example, during a 60-min class, teachers and students rotate through five activities: Warm-up (5 min), Thinking Reading (12 min), Explicit Instruction (20 min), Vocabulary (18 min), and Wrap-up (5 min). The instructional activities are as follows: (a) Students do a Warm-up activity as soon as they enter the class. The Warm-up is usually a vocabulary question related to the novel the class is reading. Students earn points for completing the activity. (b) Students transition to Thinking Reading, which involves the teacher modeling the behaviors and thinking of an expert reader. Students read highly engaging novels during Thinking Reading and eventually demonstrate and practice the reading strategies they are taught. (c) Explicit Strategy Instruction is when teachers explain a strategy, model the strategy, have students practice the strategy, and then provide feedback to students. Students are taught the individual course reading strategies during this time. (d) Next, students study Vocabulary. The vocabulary learning process is described later. (e) During lesson Wrap-up, students are given a quick assessment of the main

skill taught. Usually, this involves having students complete an exit ticket assignment. Also, the next lesson is previewed. The DLF structure helps ensure that each class has instructional variety and that every minute possible is an opportunity for explicit instruction.

The Comparison Condition

The comparison condition for this study was BAU instruction. BAU was teacher-designed remediation lessons using the grade-level English curriculum. For example, students in need of reading assistance were scheduled during an academic resource period that met five days per week for 45-minute sessions throughout the school year. The students were provided tutoring support for their English language course assignments. Students with disabilities were primarily instructed by special education teachers with some exceptions. Adolescents with LRP and without disabilities were instructed by their grade-level English teachers.

Professional Development

Each FR teacher received extensive blended PD from one of the program developers and two certified FR trainers. That is, face-to-face PD was provided in combination with online modules designed to provide personalized professional learning. Blended professional development, for this study, is defined as having both online digital media and face-to-face PD and coaching from FR coaches. In addition, building and district-level administrators responsible for curriculum and instruction received PD. The importance of deliberately including building and district leaders in secondary school PD plans is well documented (e.g., Bredeson, 2006; McDonald, Klein, & Riordan, 2009). The model employed to provide all PD was based on validated practices for professional learning (e.g., Darling-Hammond, Hyler, & Gardner, 2017; Fullan, 2005, Knight & van Nieuwerburgh, 2012, & Kurz, Reddy, & Glover, 2017).

The specialized PD provided to FR teachers was scheduled based on the pace of their

implementation and included the following: (a) Teachers with responsibility for teaching FR were identified by building administrators before instruction was to be delivered. Building administrators met with FR coaches to clarify who may be a good fit for FR. Once this decision was made, FR teachers were notified and they planned for PD to be held that summer of 2016. Summer PD for Year 1 was conducted over two consecutive days, July 25th and July 26th. These two days were strategically chosen because they were close to students beginning the 2016-2017 school year, and teachers could immediately go into their buildings to begin FR classroom set-up. PD included information on attributes of struggling readers, theoretical underpinnings of FR, classroom routines and set up, instructional methodology, student grouping strategies, progress monitoring, and an overview of the instructional materials. In addition, the FR teachers were taught how to instruct students during the first unit of the curriculum entitled Establish the Course. (b) During the fall semester of Year 1, each FR teacher was provided a substitute teacher and received three additional days of PD over the course of three months that included instruction on the Prediction Strategy, Possible Selves for Readers, and The Bridging Strategy. PD for the Prediction Strategy and Possible Selves for Readers was conducted over two half-day sessions on different dates in the form of a Professional Learning Community (PLC) coming together at a central location within their school division. The PLC allowed for FR teachers to collaborate with and support one another with the learning process. This PLC watched the online modules for each of these strategies and had in-depth conversations about implementation and next steps in combination with their FR coaches. The Bridging Strategy PD was implemented differently due to the content of this strategy. Past FR teachers had found PD for the Bridging Strategy to be more challenging compared to other strategies. FR coaches made the decision to have PD over the course of an entire day from one of the program developers and certified FR

trainers at a location outside of the school division. Since one of the program developers was delivering the PD, all FR teachers within the state of Virginia meet at a central location for all drivers considered. Whether it was during a PLC or from one of the experts, FR teachers were able to demonstrate the use of each of the strategies, have numerous opportunities for teachers to practice teaching the strategies and receive feedback, plus opportunities to reflect, ask questions, problem solve, and debrief. (c) FR coaches and professional developers were in frequent contact with the curriculum director and special education coordinator to respond to questions and monitor progress. Furthermore, FR coaches provided monthly coaching to each of the FR sites for fidelity of implementation. A coaching session entailed FR coaches employing strategy checklists, classroom modeling requested by the FR teacher of specific strategy components, problem-solving and comparing checklists during planning period, and they provided encouragement and motivation for each of the FR teachers. Coaching techniques followed the principles of Partnership Instructional Coaching (e.g., Knight, 2007, 2009). Each FR coach had completed the 30 hours of professional development with the online coaching course and participated in multiple book studies over the past several years including *Instructional Coaching* (2007), *Unmistakable Impact* (2011), and *High-Impact Instruction* (2013). Each FR coach was well equipped with the necessary resources and tools desired when providing coaching. (d) In June 2017 of Year 1, FR teachers were provided with a full day review of the following information from Year 1: data analysis from each of the FR sites, student success stories, a review and refresher of *Thinking Reading* and administration and scoring of the TOSCRF-2, FR alignment with Virginia's SOL, teacher survey review of Year 1 FR, and finally, began planning the launch of FR Year 2 for the 2017-2018 school year.

Measures

Two measures were used in this study: the state of Virginia Reading Standards of Learning (SOL) assessment (VDOE, 2017) and the Test of Silent Contextualized Reading Fluency (TOSCRF; Hammill, Wiederholt, & Allen, 2006). The **Virginia Reading Standards of Learning (SOL)** assessment contains two types of tests, the online passage-based computer adaptive test (CAT) and the traditional test. A passage-based CAT is a customized assessment where each student receives a unique set of passages and items. This is in contrast to the traditional test in which all students who take a particular version of the test receive the same passages and respond to the same test questions. The reading test covers the SOL in the reading strand of the English SOL. The SOL are grouped into categories, labeled as reporting categories, that address related content and skills. For example, a reporting category for the reading SOL test is: *Use word analysis strategies and word reference materials*. Each of the SOL in this reporting category addresses skills using word analysis strategies or word reference materials. When the results of the SOL tests are reported, the scores are presented for each reporting category and as a total test score. The Virginia Reading SOL assessments provide no data on reliability or validity. However, the tests are developed with teacher input and are aligned with the state standards which provides some measure of validity.

The TOSCRF was normed on a nationally representative sample of 1,898 students ranging in age from 7 years to 19 years. The test measures the speed with which students can recognize the individual words in a series of passages that become progressively more difficult in content, vocabulary, and grammar. The TOSCRF measures a variety of reading skills including recognizing print words and knowing their meaning, use of syntax and morphology, using word knowledge and grammar to grasp the meaning of words, sentences, paragraphs, contextual

material, and to understand contextual material with silent fluency. The TOSCRF also measures fluency. Its test-retest reliability ranges from .93 to .97. Correlations of the TOSCRF with other comparable assessments (WJ-III; .69), (GORT-4; .67), and (Stanford 9; .68) are strong.

Research Design

The research design for this study was a quasi-experimental comparison group design involving intact groups. One division with three middle schools was selected by VDOE to implement and evaluate the FR program. In order to strengthen the evaluation, a comparison middle school from another division agreed to participate as the comparison condition. The comparison school was given the opportunity to adopt FR after the study was completed. Table 1 compares the characteristics of the participating schools.

[Table 1 about here]

The three schools implementing FR were labeled Fusion Reading 1, Fusion Reading 2, and Fusion Reading 3. These three schools made up the experimental condition. A comparison condition was made up of the fourth middle school and offered LRP readers BAU support for reading instruction.

Fidelity of Implementation

Instructional checklists designed to measure implementation of the FR program and a Fusion Reading Teacher Reflection (FRTR) Form were developed to measure fidelity of implementation for the experimental condition (see Figure 1). Fidelity was conceptualized as the difference between the intended program model, based on FR lesson plans, and the FR program actually implemented by the teacher. The first checklist, What's Fusion Reading Looking Like?, was divided into two major sections: global fidelity to the lesson format and fidelity to specific instructional procedures. The fidelity checklist measured how closely the design of the Daily

Lesson Format and instructional practices were followed by the FR teacher. The fidelity checklist observation measure was administered for all six lessons: (a) Classroom Climate, (b) Daily Warm-up Activity, (c) Thinking Reading, (d) Explicit Instruction, (e) Vocabulary, and (f) Wrap-up. The second checklist, Vocabulary Instruction (VI), was intended to help guide FR teachers through the entire 7-Step vocabulary process which in turn allowed students to be engaged with meaningful discussions and make decisions about the meaning of a given word. The third checklist, Thinking Reading, evaluated how well FR teachers implemented the Thinking Reading process. That is, did the teachers model how a strategic reader reads, as well as, how a strategic reader thinks while making sense of the text? The final form, titled How's Fusion Reading Going?, was emailed to FR teachers a week prior to a scheduled monthly coaching visit. This form allowed FR teachers to provide FR coaches with feedback on how they had been progressing with FR. The information provided by teachers helped FR coaches to plan their visit and address any fidelity issues or barriers a FR teacher may have documented.

FR coaches learned how to utilize each of the checklists through the online modules prepared by the FR program authors. FR coaches met monthly to compare checklists and feedback given to FR teachers to ensure consistent decisions about fidelity of instruction among FR coaches. Furthermore, FR trainers met with the FR authors using a virtual conferencing tool to deepen the understanding and generalization of coaching FR with each of the FR schools. All information gathered during these meetings was deliberated and shared amongst all FR coaches.

FR coaches made observational notes regarding fidelity of FR implementation based on instructional component checklists. Additional fidelity information was gathered directly from the FR teachers when they completed the FRTR form prior to a scheduled monthly coaching visit. Checklists and observational notes were the foundation of coaching conversations and

were given directly to FR teachers by the coaches. Goals for the next coaching session were established and grounded on these checklists and any anecdotal information provided to the FR teacher. Additionally, FR coaches demonstrated specific components of FR when requested by the FR teacher. Qualitative analysis of all data gathered indicated that two of three FR teachers implemented FR with a high level of fidelity. The teacher who was the exception to having a high-level fidelity had numerous absences from the 2016-2017 school year due to documented medical reasons, and consequently was unable to focus her attention on the new intervention being implemented.

[Insert Figure 1 about here]

Analysis and Results

An analysis of outlier status using percentiles and boxplots (Tukey, 1977; using SPSS version 22) was conducted in accordance with standard practice to protect against inflated error rates and distortions of statistical estimates. The scores of zero students were outliers and thus all scores were included in subsequent analyses.

To determine whether there were differences in performance between comparison and FR students, an analysis of covariance (ANCOVA) with grade level (6th grade, 7th grade, and 8th grade) and group/school (Comparison, Fusion 1, Fusion 2, and Fusion 3) as between-subjects variables and 2016 “scores” as a covariate was conducted on students’ TOSCRF scores. Partial eta squared was used as a measure of effect size in the current study (Richardson, 2011). The grade-level group difference between 6th, 7th, and 8th grade students’ mean TOSCRF scores was non-significant after statistically controlling for 2016 “scores”, $F(2, 222) = 0.27, p = 0.773, \eta_p^2 = 0.08$. There was insufficient evidence to indicate a difference in performance between the three grade levels. In contrast, the group difference between comparison and FR schools’ students’

mean TOSCRF scores was significant after statistically controlling for 2016 “scores”, $F(3, 222) = 8.67, p = 0.01, \eta_p^2 = 0.81$. However, this main effect was qualified by a significant interaction between grade-level and group, $F(6, 222) = 4.07, p = 0.001, \eta_p^2 = 0.10$.

To investigate this interaction, the data from each grade-level were examined separately. The 6th grade students’ average TOSCRF scores differed significantly as a function of group, $F(3, 69) = 11.92, p < 0.00, \eta_p^2 = 0.34$, after statistically controlling for 2016 “scores”. Using Bonferroni correction, (adjusted $\alpha = .0167$), pairwise comparisons of 6th grade students’ data revealed that the scores of students who received the FR intervention were higher than the scores of students who received the comparison intervention (BAU) (see Table 2). The 7th grade students’ average TOSCRF scores differed significantly as a function of group, $F(3, 71) = 10.30, p < .000, \eta_p^2 = 0.30$, after statistically controlling for 2016 “scores”. Using Bonferroni correction, (adjusted $\alpha = .0167$), pairwise comparisons of 7th grade students’ data revealed that the scores of students who received the FR intervention were higher than the scores of students who received the comparison intervention (see Table 2). The 8th grade students’ average TOSCRF scores also differed significantly as a function of group, $F(3, 80) = 20.35, p < .000, \eta_p^2 = 0.43$, after statistically controlling for 2016 “scores”. Using Bonferroni correction, (adjusted $\alpha = .0167$), pairwise comparisons of 8th grade students’ data revealed that the scores of students at two out of the three FR intervention schools were higher than the scores of students who received the comparison intervention (see Table 2).

[Table 2 about here]

In addition to TOSCRF scores, we were also interested in whether the intervention improved students’ scores on the Virginia Standards of Learning (VA SOL) assessment. An analysis of covariance (ANCOVA) with grade level (6th grade, 7th grade, and 8th grade) and

group (Comparison, Fusion1, Fusion2, and Fusion3) as between-subjects variables and 2016 “scores” as a covariate was conducted on students’ VA SOL scores. The group difference between students’ mean VA SOL scores at comparison and FR schools was non-significant after statistically controlling for 2016 “scores”, $F(3, 260) = 1.68, p = 0.27, \eta_p^2 = 0.46$. There was insufficient evidence to indicate a difference in performance between the various schools. In contrast, the group difference between 6, 7, and 8th grade students’ mean VA SOL scores was significant after statistically controlling for 2016 “scores”, $F(2, 260) = 5.17, p = 0.046, \eta_p^2 = 0.62$. However, this main effect was qualified by a significant interaction between grade and school/group, $F(6, 260) = 2.18, p = 0.045, \eta_p^2 = 0.05$.

To investigate this interaction, the data from each grade-level was examined separately. The following pair-wise comparisons controlled for multiple comparisons through the Bonferroni adjustment for multiple comparisons ($\alpha = 0.0167$). The 6th grade students’ average VA SOL scores were marginally significant as a function of school/group, $F(3, 81) = 2.16, p < 0.10, \eta_p^2 = 0.07$, after statistically controlling for 2016 “scores”. Pairwise comparisons of 6th grade students’ data failed to reach statistical significance; however, inspection of individual schools indicates that student scores at two of three FR schools improved (see Table 3). The 7th grade students’ average VA SOL scores differed significantly as a function of school/group, $F(3, 77) = 7.01, p < .001, \eta_p^2 = 0.22$, after statistically controlling for 2016 “scores”. Similar to 6th graders data, student scores at FR intervention schools were higher than the scores of students who received the comparison intervention; however, only one pairwise comparison reached statistical significance (see Table 3). There was insufficient evidence to indicate a difference in 8th grade students’ average VA SOL scores as a function of school/group, $F(3, 100) = 0.47, p = 0.71, \eta_p^2 = 0.01$, after statistically controlling for 2016 “scores”.

[Table 3 about here]

Discussion

The findings from this study of adolescents with limited reading proficiency in middle schools indicated that students who received the FR program performed significantly higher on a standardized measure of reading skills than students in a comparison middle school. Specifically, when reading skills were assessed using the TOSCRF, FR students, across the three grade levels, scored significantly higher than comparison students. The TOSCRF measures a variety of reading skills including recognizing print words and knowing their meaning, use of syntax and morphology, using word knowledge and grammar to grasp the meaning of words, sentences, paragraphs, contextual material, and to understand contextual material with silent fluency. In previous studies, we have found the TOSCRF to be sensitive to the FR program.

Significant differences were not found between the FR students and the comparison students on the state reading SOL measure. However, the SOL assessment requires sixth grade students to be able to discuss the impact of setting on plot development, describe character development, differentiate between first and third person point of view, differentiate between free verse and rhymed poetry, explain how an author's choice of vocabulary contributes to the author's style, skim materials to develop a general overview of content and to locate specific information, identify transitional words and phrases that signal an author's organizational pattern, identify organizational pattern(s), identify the elements of narrative structure, including setting, character, plot, conflict, describe how word choice and imagery contribute to the meaning of a text, identify and analyze the author's use of figurative language, and analyze ideas within and between selections providing textual evidence (VDOE, 2017). Most of these skills are not a focus of the supplemental FR program. These skills are typically addressed in English

language arts classes. However, while FR does focus on supported generalization and integration of reading skills and strategies necessary for success in core classes, enhancements to the integration process seem warranted. That is, more explicated instruction and extended practice with elaborated feedback as students apply reading skills and strategies to actual English language arts course material may help students acquire the language arts skills measured by state SOL assessments.

In sum, FR shows promise as a supplemental and comprehensive reading program for adolescent readers with LRP whose low reading achievement is related to a lack of basic word level, vocabulary, and reading comprehension strategies. How and if FR can address the specific language arts skills on the Virginia SOL assessment (or other state reading assessments) is unclear. Some language arts standards may need to be woven into the FR program.

Fidelity of Implementation

One of the study goals was to measure fidelity of implementation of the FR program. Measures and checklists of fidelity, developed during previous studies, were used to measure fidelity across several domains including (a) global fidelity, (b) instructional procedures, (c) Thinking Reading procedures, and (d) the vocabulary instructional process. The checklist score sheets and actual data were used to inform instructional coaching sessions between teachers and researcher/coaches. During the coaching sessions, the fidelity checklist data sheets were given to teachers to help inform instructional decision making. While researchers were unable to retrieve all the measures and conduct a statistical analysis of fidelity data, they were able to make informed decisions about the overall level of fidelity from coaching notes and logs. Researchers concluded that two of three experimental teachers had a high level of fidelity and one had a low level of fidelity due to, in large measure, chronic health and absentee issues. Given these data

limitations, the study goal for measuring fidelity of implementation was not able to be fully documented.

Limitations

There are several limitations to this study. First, the fact that there is no direct data on fidelity of implementation of the BAU program limits the comparison. Whether BAU was fully implemented as designed and whether and where instructional overlap occurred between BAU and FR is unknown. For example, both the BAU and FR could have had elements of explicit instruction, and explicit instruction has been found to positively impact reading outcomes for students with disabilities (e.g., Swanson, 1999). Not knowing if BAU skills and strategies had been taught explicitly or were even taught limits our understanding of what works. In addition, and as explained above, much of the fidelity of implementation data were missing at the end of the study and the statistical analysis of fidelity of implementation was limited. Beyond the consensus of FR coaches, to what extent the FR program was implemented with fidelity in its totality is unknown.

Second, the sample size of the comparison condition is smaller and from one school and could impact findings. In addition, while the comparison school was matched on several key points, the quasi-experimental design limits the strength of the findings.

Finally, the potential impact of extensive PD for the FR teachers and, more important, the potential impact of extensive instructional coaching may have had an effect on student outcomes. The extent of PD and coaching for the comparison condition is unknown. Our focus on PD and instructional coaching (Knight, 2007, 2009) may have helped most teachers implement FR at a deep level. We hypothesize that PD is important and instructional coaching is essential for fidelity of implementation and improved student achievement. The impact of PD and coaching

on student reading outcomes is an area in need of future research.

Implications

Supplemental reading programs can be effective if certain systems and structures are in place (Bemboom, & McMaster, 2013). For example, a supplemental course requires scheduling support, extensive PD and coaching, a dedicated classroom, and instructional materials. Teachers need extended time to teach; FR requires that students attend the class five times a week for at least 50 minutes each day. Scheduling challenges in middle and high schools need to be addressed before effective supplemental instruction can be delivered to all adolescent LRP readers.

We are convinced that there is no short-term solution to the challenge of improving the reading outcomes of adolescent struggling readers and have designed FR as a multi-year curriculum. Finally, the direct link of supplemental reading courses to core class material is critical for generalization of reading skills. Supplemental reading programs that are decontextualized from core class text materials may be one reason for the limited long-term effects of some current reading programs. We believe that additional focus may be needed to support integration and application of reading skills and strategies to authentic core class materials. While comprehensive, intensive adolescent reading programs may be part of the solution to the challenges facing adolescents with limited reading proficiency, the integration of instructional that makes practice and elaborative feedback more personalized may be another.

Declaration of Conflicting Interests

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Table 1: Student Demographics

School	Students Enrolled	Free/Reduced Lunch	% IEPs	% ELL	Black	Hispanic	White
Exp. 1	448	69.4%	15.6%	1.1%	29.7%	4%	66.3%
Exp. 2	648	53.9%	13.3%	1.2%	11.9%	9.3%	78.7%
Exp. 3	517	65.4%	17.2%	1.4%	29%	7.2%	63.8%
Comp.	576	57.5%	10.2%	9.4%	23.6%	18.4%	58%

Note: IEP= Individualized Education Program; ELL: English-language learner

Table 2. Mean (and Standard Error) TOSCRF scores.

Grade-Level	Group	N	Mean TOSCRF (SE)	<i>p</i> -value (versus comparison school)
6 th Grade	Comparison	20	18.35 (5.00)	
	Fusion 1	16	48.85 (4.36)	<0.001
	Fusion 2	21	53.50 (4.60)	< 0.001
	Fusion 3	17	57.29 (5.20)	< 0.001
7 th Grade	Comparison	22	24.42 (4.65)	
	Fusion 1	15	58.27 (5.66)	< 0.001
	Fusion 2	24	50.09 (4.46)	0.001
	Fusion 3	15	56.98 (5.64)	< 0.001
8 th Grade	Comparison	40	28.32 (3.12)	
	Fusion 1	10	64.92 (6.24)	< 0.001
	Fusion 2	15	68.30 (5.10)	< 0.001
	Fusion 3	20	36.12 (4.41)	0.919

Note: *p*-values reflect Bonferroni adjustment for multiple comparisons.

Table 3. Mean (and Standard Error) VA SOL scores.

Grade-Level	Group	N	Mean VA SOL (SE)	<i>p</i> -value (versus comparison school)
6 th Grade	Comparison	27	381.66 (6.76)	
	Fusion 1	17	377.28 (8.29)	0.999
	Fusion 2	23	392.25 (7.02)	0.999
	Fusion 3	19	402.56 (7.81)	0.309
7 th Grade	Comparison	26	387.15 (6.03)	
	Fusion 1	15	387.56 (7.99)	0.999
	Fusion 2	25	422.66 (6.16)	0.001
	Fusion 3	16	394.13 (7.71)	0.999
8 th Grade	Comparison	54	373.16 (4.55)	
	Fusion 1	12	384.63 (9.66)	0.999
	Fusion 2	19	378.57 (7.68)	0.999
	Fusion 3	20	378.66 (7.48)	0.999

Note: *p*-values reflect Bonferroni adjustment for multiple comparisons.

Figure 1: Fusion Reading Fidelity Checklist

Teacher Observed _____ Observer(s) _____

Date _____ Unit: _____ Lesson: _____

<p>1. CLASSROOM PROCEDURES <input type="checkbox"/> Followed by students? <input type="checkbox"/> Mentioned by teacher or posted? <input type="checkbox"/> Students engaged? Time 1: % engaged _____ Time 2: % engaged _____ Time 3: % engaged _____</p>	<p>COMMENTS:</p>
<p>2. WARM-UP <input type="checkbox"/> Time allocation followed? <input type="checkbox"/> Warm-up posted? <input type="checkbox"/> Vocabulary-type question? <input type="checkbox"/> Questions about novel? <input type="checkbox"/> Student work reviewed or scored?</p>	
<p>3. THINKING READING <input type="checkbox"/> Teachers uses strategies while reading aloud? <input type="checkbox"/> Students have “eyes on the page?” Time 1 _____ Time 2 _____ Time 3 _____ <input type="checkbox"/> Students answer questions?</p>	<p>NOTE TYPE OF THINKING READING: <input type="checkbox"/> Teacher led? <input type="checkbox"/> Forecast? <input type="checkbox"/> Teacher guided? <input type="checkbox"/> Apply? <input type="checkbox"/> Student led? <input type="checkbox"/> Integrate?</p>
<p>4. EXPLICIT INSTRUCTION <input type="checkbox"/> Did the teacher describe a skill or strategy? <input type="checkbox"/> Did the teacher model a skill or strategy? <input type="checkbox"/> Did the teacher provide student practice feedback?</p>	<p>NOTE THE LESSON ACTIVITY: <input type="checkbox"/> Vocabulary <input type="checkbox"/> Book study <input type="checkbox"/> Classroom Procedures <input type="checkbox"/> Possible Selves <input type="checkbox"/> Reading strategy taught-- _____</p>
<p>5. VOCABULARY <input type="checkbox"/> 7-step vocab process followed? <input type="checkbox"/> % students engage in discussion? <input type="checkbox"/> 1-2 vocab words taught?</p>	
<p>6. WRAP-UP <input type="checkbox"/> Current lesson summarized? <input type="checkbox"/> Next lesson previewed? <input type="checkbox"/> Exit ticket activity conducted?</p>	