Effects of an Intensive Reading Intervention for Ninth Grade English Learners with Learning

Disabilities

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Abstract

English learners with learning disabilities (LD) have well-documented difficulties comprehending text. This study examined the effects of an intensive reading intervention (RIA) on reading outcomes (word reading, vocabulary, and comprehension) for ninth grade ELs with LD ($n = 85$). In the RIA, students received instruction in advanced word study, fluency, vocabulary, and comprehension. Participants assigned to RIA received the intervention for the entire ninth-grade school year for approximately 3.75 to 4.25 hours a week, while students in the comparison condition participated in elective courses. After using analysis of covariance to test for treatment effects and controlling for false discovery rate, there were no significant differences between the two groups except on the proximal vocabulary measure ($g = 0.41$). Small, nonsignificant effects were observed on measures of word reading and sentence-level comprehension and Hedge's g values ranged from 0.08 to 0.18. Findings reveal the challenges of improving reading outcomes for English learners with learning disabilities in high school.

Keywords: reading, intensive intervention, English learners, adolescents, high school, learning disabilities

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Disabilities

In the United States, approximately 13.8% of English Learners (ELs) have disabilities

and receive special education services (McFarland et al., 2017). This subgroup of students has

historically demonstrated low reading achievement on reading portion of the National

Assessment for Educational Progress (NAEP), with 89% of ELs with disabilities performing

below the basic level in eighth grade (National Center for Educational Statistics [NCES], 2016).

Students performing below the basic level of proficiency on the NAEP often have difficulty

reading and interpreting literary and informational texts, which includes locating information,

identifying main ideas, theme, or author's purpose, making inferences, determining meanings for

unfamiliar words, and/or providing evidence to support judgements (NCES, 2016). This is

problematic because in high school, students are often expected to already possess these skills in

order succeed in their content area classes, and there is limited time to designate for improving

underlying skill deficits. Low reading achievement is also associated with a higher risk of

dropping out of high school (Hernandez, 2011; National Clearinghouse for English Acquisition

and Instruction Educational Programs [NCELA], 2017; Trainor, Murray, & Kim, 2016), and ELs

with disabilities participate in postsecondary education and employment at lower rates than their

peers with disabilities who are not identified as ELs (Trainor et al., 2016).

Furthermore, ELs with disabilities are most likely to be identified with learning

disabilities (LD) and students with LD most commonly exhibit difficulties in the area of reading

(Fletcher, Lyon, Fuchs, & Barnes, 2007). It follows then, that ELs with LD are likely to have

difficulties in reading that stem from both their language and disability related needs. Solari and

colleagues (2014) examined the reading achievement of ELs with LD in grades 3 through 10 and

determined that ELs with LD had significantly lower reading performance than their peers (i.e., ELs, students with LD) in the areas of comprehension, fluency, and spelling. Similarly, in a study of the reading achievement of sixth-grade ELs with reading comprehension difficulties, Lesaux and Kieffer (2010) found that the majority of the sample had difficulties in vocabulary, and 21.4% had additional difficulties in decoding and fluency. ELs with LD in the secondary grades have heterogenous and complex reading needs, and therefore it is of utmost important to develop and validate appropriate interventions for this population.

Intensive Reading Interventions for Adolescents

One approach to improving adolescent reading achievement in general is through intensive reading interventions (Baker et al., 2014; Kamil et al., 2008). For the purpose of this study, we define "intensive" as those interventions that are not only provided in addition to core instruction, but those that last over an extended period of time. In Wanzek et al.'s (2013) systematic review of "extensive" reading interventions (i.e., those with 75 sessions or more) for students in grades 4-12, interventions had small, but positive effects on reading outcomes (i.e., reading comprehension, fluency, word reading, and spelling). Since the publication of Wanzek et al.'s (2013) review, there have been several other studies of intensive reading interventions for adolescents (Hock et al., 2017; Roberts, Vaughn, Fletcher, Stuebing, & Barth, 2013; Solis, Vaughn, & Scammacca, 2015; Vaughn, Roberts, Schnakenberg, et al., 2015; Vaughn, Roberts, Wexler, et al., 2015). Solis and colleagues (2015) conducted a small randomized control trial of a multicomponent reading intervention for ninth-grade students with reading comprehension difficulties for approximately 80 sessions. Participants in the treatment condition did demonstrate statistically significant differences on measures of reading comprehension; however, treatment students did perform on average 6 standard score points higher than control students.

Furthermore, there was a significant interaction between decoding ability (high versus low) with students performing better on decoding tasks at pretest also performing significantly better on reading outcomes at posttest than students who were low decoders. In another study conducted with middle school students with reading disabilities, Hock and colleagues (2017) provided participants with two years of reading intervention that focused on word level skills, comprehension, and motivation. Participants who received the supplemental intervention significantly outperformed students in the comparison condition on two measures of reading comprehension with Hedge's *g* (Hedges, 1981) effect sizes of 1.66 and 1.04. While these studies suggest that intensive interventions may positively impact reading outcomes for monolingual students with reading difficulties and disabilities, similar studies for ELs with LD in high school have not been conducted.

One particular intensive reading intervention, the Reading Intervention for Adolescents (RIA), is a multicomponent intensive intervention originally developed for use with monolingual adolescent struggling readers and students with disabilities (Roberts et al., 2013; Vaughn, Roberts, Schnakenberg, et al, 2015; Vaughn, Roberts, Wexler, et al., 2015). The RIA is based on two theories: automatic information processing and cognitive-behavioral theory (Dobson, 2010; LaBerge & Samuels, 1974). The Automatic Information Processing theory of reading posits that reading is comprised of various sub-skills which a reader must master with automaticity, before he or she is able to attend to higher order tasks such as comprehension (LaBerge & Samuels, 1974). Cognitive-behavioral theory states that "(1) cognitive activity affects behaviors, (2) cognitive activity may be monitored or altered, and (3) desired behavior change may be affected through cognitive change" (Dobson, 2010, p. 4). Cognitive strategy instruction is rooted in cognitive-behavioral theory, and contents that individuals can be taught strategies to help them

better understand various material (Pressley & Harris, 2008). These strategies can then be maintained and transferred to other learning tasks and settings (Pressley & Harris, 2008). Cognitive strategies help guide students through tasks that may be less structured, such as reading comprehension (Rosenshine, 1995). The RIA provides a set of cognitive strategies through Collaborative Strategic Reading.

The efficacy of the RIA has been investigated in several studies (Roberts et al., 2013; Vaughn, Roberts, Schnakenberg, et al, 2015; Vaughn, Roberts, Wexler, et al., 2015). In a randomized control trial of response to intervention in middle schools (Roberts et al., 2013), students who received continued intervention throughout three years of middle school significantly outperformed those students who did not receive intervention, with a small to moderate effect on word reading and comprehension measures ($g = 0.26$). RIA has also been evaluated with a sample of ninth and tenth grade struggling readers (Vaughn, Roberts, Wexler, et al., 2015). Students assigned to receive two-years of the RIA performed significantly higher than comparison students ($g = 0.43$) on a standardized measure of reading comprehension. This data was then disaggregated to determine the effects of the intervention for students with disabilities (SWDs), and those in the RIA condition significantly outperformed SWDs in the comparison group ($g = 0.44$) on a standardized comprehension measure (Vaughn, Roberts, Schnakenberg, et al., 2015). While the RIA had a positive impact for students with reading difficulties and disabilities, it was not specifically evaluated with students who were ELs or ELs with LD.

Reading Interventions for ELs with LD

There is limited research on the efficacy of reading interventions for ELs with reading difficulties or disabilities at the secondary level. In a meta-analysis of the impact of reading interventions for ELs in grades K-12, Richards-Tutor, Baker, Gersten, Baker, and Smith (2016)

identified twelve studies, of which two included ELs in the middle grades (6-8) and none of which were conducted with high school participants. In the first study, Lovett et al. (2008), ELs and non-ELs in grades 2-8 were screened for reading difficulties and then randomly assigned to receive either the reading intervention or a comparison condition. Participants received daily intervention for approximately 105 hours. ELs performed similarly to non-ELs and all students who received the intervention performed significantly higher than students in the comparison condition on measures of phonological awareness, word attack, and passage comprehension (Lovett et al., 2008). The other study included in this meta-analysis was conducted by Vaughn et al (2011), and middle school students with reading difficulties were randomly assigned to either a standardized or individualized reading intervention daily for an entire school year, while students in the comparison condition did not receive intervention. ELs who received either intervention (i.e., standardized, individualized) performed significantly better than comparison students on measures of letter/word identification and passage comprehension. Another meta-analysis (Hall et al., 2017) investigated the impact of reading instruction on reading outcomes for ELs in grades 4 through 8 and found the mean effect of instruction on all reading measures was 0.35; however, there was no effect of reading instruction on standardized reading measures (ES = 0.01). Neither meta-analysis reported studies of reading instruction or intervention for ELs in grades 9-12.

In addition to the aforementioned meta-analyses, two additional studies have examined the efficacy of multi-component reading interventions for middle school ELs with reading difficulties (Denton, Wexler, Vaughn, & Bryan, 2008; Wanzek, Swanson, Vaughn, Roberts, & Fall, 2016). Denton, Wexler, Vaughn, and Bryan (2008) conducted a randomized control trial of a multicomponent reading intervention for students in grades 6-8 with severe reading difficulties.

Most students in the sample were receiving special education or remedial reading services and were identified as ELs. Participants received either the multi-component treatment or the school provided reading intervention for 14 weeks in small groups for 40 minutes daily. Students in treatment did not outperform students in the comparison condition on measures of word recognition, comprehension, or fluency (Denton et al., 2008). In a study by Wanzek and colleagues (2016), researchers examined the effects of the PACT intervention on content knowledge and reading comprehension for eighth grade students with disabilities (SWDs) who were and were not identified as ELs. They also examined the differential effects for ELs with disabilities versus SWDs only. All SWDs who received the PACT intervention significantly outperformed students in the comparison condition on the measure of content knowledge (ES = 0.51), but there were no differential effects between ELs with disabilities and native-English speaking SWDs, indicating that the treatment was equally effective for both groups of students.

Findings from meta-analyses of ELs and individual studies with ELs with disabilities demonstrate a lack of research on interventions at the high school level. There is a need for higher-quality designs (e.g., randomized controlled trials, quasi-experimental designs) and larger sample sizes to determine which interventions are efficacious for this population. Additionally, most of the aforementioned interventions did not provide instruction for a prolonged period of time, making it difficult to discern the impact of longer, more intensive reading interventions for ELs with LD in the secondary grades.

The Overall Study: RIA with ELs

Most recently, the efficacy of the RIA has been evaluated in a randomized controlled trial of a reading intervention and dropout prevention program for ELs with reading comprehension difficulties (Vaughn et al., 2018). In this study, the RIA was adapted from the original version

(Vaughn, Roberts, Wexler et al., 2015) to include practices associated with improved outcomes for ELs including a focus on academic language through explicit vocabulary instruction and multiple opportunities for students to develop their oral and written language skills (Baker et al., 2014; Francis, Rivera, Lesaux, Kieffer, & Rivera, 2006). Students were screened, and all eligible ninth-participants were randomly assigned to one of four conditions: (1) the Reading Intervention for Adolescents only (RIA), (2) a dropout prevention intervention only (DO), (3) both RIA and DO, or (4) or to a business as usual (BaU) condition. Students assigned to the RIA only, RIA+DO, or DO conditions received intervention for two school years. Students who received two years of the reading intervention performed significantly better than students who did not receive the intervention on measures of sentence-level fluency and comprehension ($g = 0.18$) and on a proximal measure of vocabulary ($g = 0.41$) (Vaughn et al., 2018).

Purpose

Intensive reading interventions have proven efficacious for adolescent struggling readers and students with disabilities, but there is limited evidence on the effects of intensive reading interventions for high school ELs with LD. The current study used data collected from the aforementioned study of RIA for ELs (Vaughn et al., 2018); however, in that study we did not disaggregate data specifically for participants who were identified as ELs with LD. Furthermore, because the intervention was implemented with two separate cohorts of students, not all participants with LD received two years of intervention, so the current analysis examines the effects of the intervention after one year only. The purpose of the current analysis was to analyze the effects of the RIA on reading outcomes (i.e., reading comprehension, vocabulary, and word recognition) after one year of intervention for ninth-grade ELs with LD. As previous research has identified the RIA as having a significant impact on reading comprehension outcomes for

students with LD whose native language is English (Vaughn, Roberts, Schnakenberg, et al.,

2015), we aimed to investigate if the RIA would have a similar impact on ELs with LD and this

shaped our research question which was: What are the effects of a year-long intensive reading

intervention on the reading achievement of ninth grade ELs with LD compared to ELs with LD

who did not receive treatment?

Method

The current study analyzed the treatment effects only for the ELs with LD from the full

sample in the study of the RIA for ELs (Vaughn et al., 2018). Two distinct groups (i.e., treatment

and comparison) were created from the four originally randomized groups to analyze the

treatment effects. The treatment group consisted of ELs with LD in RIA only and RIA+DO,

while the ELs with LD in DO only and BaU comprised the comparison group. Because students

were nested within three different schools, intra-class correlations were computed to determine if

there was dependence in the data. ICCs ranged from 0.01 to 0.09, suggesting a minimal amount

of clustering in the data and a lack of dependence. The DO intervention was a modified version

of Check & Connect (Christenson, Stout, & Pohl, 2012) and we assumed that this intervention

did not impact reading outcomes. The assumption of no DO-related reading effects was tested by

comparing reading outcomes for students in DO group to the BaU group. There were no

significant differences (*p*-values ranging from 0.36 to 0.98), indicating that it was reasonable to

collapse groups.

Participants

Schools. Participants were recruited from three large high schools in a diverse, urban

Southwestern U.S. school district. The three schools were selected due to the number of students

who were currently and previously identified within the past five years as ELs. One school had a

state accountability rating of "Improvement Required" due to low student achievement and lack of student progress, but the other two schools met state accountability standards. In all three schools, most students identified as Hispanic (54.9% - 90.5%) and 13.4% to 49.4% of students were currently-identified as ELs. Additionally, most students received free and/or reduced-priced lunch (75% - 90.2%) and were considered economically disadvantaged.

      Students. The ninth-grade participants in the current study were part of the aforementioned study of RIA with ELs (Vaughn et al., 2018). In this study, eighth-grade students who were expected to attend the three selected high schools were screened for participation using the following criteria: (a) a school designation of Limited English Proficient (LEP) or an LEP designation within the previous five years, and (b) a score of 1,612 or below, which is one standard error above the failing score of 1575 on students' eighth grade high-stakes assessment in reading. In the selected district, LEP was the official term for students who are identified as ELs, so for the purpose of the current study, these two terms are synonymous. The cut score of 1,612 was used because it ensured that students with similar reading skills would receive intervention. The high-stakes assessment, the State of Texas Assessments of Academic Readiness, assesses students' understanding and analysis of literary and informational texts with 44 multiple choice text-based questions (Texas Education Agency, 2016). This assessment has previously been used as a reliable and valid tool for screening for reading comprehension difficulties in studies of struggling readers in middle and high school (Solis et al., 2014; Vaughn, Roberts, Wexler, et al., 2015; Vaughn, Roberts, Schnackenberg, et al., 2015). This sample did not include newcomer ELs who had been living in the U.S. for less than a year, as these students often have very limited English proficiency and RIA was not designed to address the needs of these students. Once identified in the original sample, students were randomly assigned, blocking

on schools, to one of the four original conditions RIA-only, DO-only, RIA+DO, or BaU. In the current analysis, only the 85 participants who were identified by the school as having a disability and receiving special education services were included. Seventy-one participants (84%) were identified with LD. Because all students were first identified as having reading difficulty through the screening procedure, we did not exclude participants with other disabilities that might impact reading achievement (e.g., other health impairment, speech/language impairment), and these participants made up only a small percentage of the sample (16%). Students with severe or profound disabilities were not included in the sample, as they did not participate in the regular state-wide reading assessment and received alternative curriculum. Table 1 provides demographic information for the 85 participants with disabilities. There was some missing demographic data from the district, so categories do not all add to 85 participants or 100%.

<Table 1>

Materials and Procedures

Reading Intervention for Adolescents (RIA). Students assigned to RIA attended their reading intervention class for their entire ninth-grade school year in groups of 10 to 15 students. Two schools met with students for 90 minutes every other day in an alternating A/B day schedule, while the third school met with students for 50-minute periods for three days a week and 90 minutes on the fourth instructional day. Students received 3.75 to 4.25 hours of intervention each week. The students continued to receive their regular core classes (i.e., English, math, science, social studies), and attended RIA in lieu of an elective class.

Phase I. During the first semester of the school year from September through December, students participated in Phase I of the intervention, which focused on word study, fluency, vocabulary, and comprehension. Because many adolescent ELs have difficulties at the word

level (Lesaux, & Kieffer, 2010), the purpose of this phase was to help students build automaticity and fluency necessary for comprehending text (LaBerge & Samuels, 1974). Reading interventionists taught the *REWARDS* Secondary program three to four days each week (Archer, Gleason, & Vachon, 2014). Students had multiple opportunities to practice orally reading multisyllabic words in isolation, sentences, and passages. Interventionists also introduced Collaborative Strategic Reading (CSR (Klingner & Vaughn, 1998), and explicitly taught mini-lessons for each of the CSR components (i.e., preview, click and clunk, get the gist, questioning, and review). Before reading a text, students previewed the text by identifying the topic of the reading and brainstorming what they already knew to activate prior knowledge. Then, the teacher set the purpose for reading the selection. During reading, students monitored their comprehension with the "Click and Clunk" strategy, in which they identified unknown words (clunks) and used fix-up strategies to determine the meaning of those unknown words. While reading, students generated main idea sentences, or "Gists." After reading, students generated and answered three different types of questions from the text: (1) Right There, (2) Think and Search, and (3) Author and You. In the last step of CSR, students summarized the text by developing review statements. After learning the strategies, students were then taught how to collaboratively work in small groups of approximately four students to implement these strategies.

Phase II. Phase II of the intervention began in the second semester of the school year and lasted from January to May. The interventionists taught five instructional units in the areas of: cells, India, viruses, Korea, and evolution and the units corresponded with content from their science and social studies classes. These units were designed to activate and build prior knowledge about a topic, introduce and reinforce key academic vocabulary, and allow students

multiple opportunities to interact with the text to develop a deep understanding of the content. Students worked collaboratively in their CSR groups to apply the CSR strategies that were taught in phase I to the content area texts. Additionally, in each unit, students summarized text and participated in structured discussions. Both activities were designed to allow students to think critically about text and provided them with opportunities to use academic language in speaking and writing.

Each content-area unit began with a statement of the learning goal and its relevance to the students' lives and other coursework. Prior knowledge was activated and built in the CSR *Preview* stage by having students brainstorm about the topic and view short video clips. Students previewed the text by reading headings and sub-headings, completed an anticipation-reaction guide graphic organizer, and set a purpose for reading. Interventionists also explicitly taught six new vocabulary words using a six-step procedure: (1) have students pronounce the word, (2) provide a student-friendly definition with visual, (3) have students discuss what is known about the word, (4) provide examples and non-examples, (5) engage in deep processing activities, and (6) have students create powerful sentences with the new word (Vaughn Gross Center for Reading and Language Arts, 2010). These vocabulary words were reviewed daily and students completed graphic organizers such as word maps, identified word relatives, and answered structured question prompts that used the words in context.

After reading the text and using the *CSR* strategies in small groups, students completed main idea graphic organizers wrote summaries with those main ideas. The summary writing strategy was adapted from the macrorules for summarizing text (Brown & Day, 1983). Interventionists then guided students through a discussion of content area text using a protocol.

Lastly, the students had free-choice reading and selected high-interest books and magazines to read for 10 minutes each day.

     Instructional enhancements for English learners. The RIA was adapted to meet the needs of students who were also ELs. The instructional enhancements were based on instructional practices associated with improved outcomes for ELs (Baker et al., 2014; Francis et al., 2006). The first instructional enhancement addressed academic language development through the explicit instruction of academic vocabulary words. Engaging informational text was selected for each unit and a small set of high-utility academic vocabulary words related to the main ideas in the text were selected for in-depth explicit instruction (Baker et al., 2014; Francis et al., 2006). Students were given a graphic organizer with the words for each unit that included student friendly definitions as well as synonyms, antonyms, sample sentences, and visuals of examples and non-examples of the word. Students had multiple opportunities to interact with these words in writing, speaking, and listening activities throughout the unit. Additionally, students were taught independent word learning strategies to help them determine the meaning of unknown words. Students were taught to use fix-up strategies (Klingner & Vaughn, 1998) such as: re-read the sentence with the unknown word, re-read the sentence before and after the unknown word, break the word into meaningful parts (i.e., prefixes, suffixes, roots), and/or identify cognates in their native language.

     In addition to academic language instruction, the RIA also required students to use oral and written language across the content areas (Baker et al., 2014). Because students were placed in collaborative groups, they also had daily opportunities to discuss content in pairs or small groups. There were also structured activities such as Turn and Talk, where the students had prompts that required them to use their newly learned academic vocabulary words in context

with their peers. Daily writing opportunities were incorporated to increase their written language skills.

Reading interventionists and training. Five reading interventionists were hired and trained by the research team to implement the RIA for ninth grade students. All interventionists were female, certified in secondary reading or secondary English Language Arts, and had a minimum of five years of experience working with secondary students, including those with disabilities or who were ELs. Interventionists participated in 40 hours of pre-intervention training on elements of effective instruction (i.e., explicit instruction), as well as the implementation of *REWARDS Secondary and CSR* (Archer et al., 2014; Klingner & Vaughn, 1998). The elements of explicit instruction training taught teachers to model skills and strategies, how to increase student engagement through increased opportunities to respond, and how to provide affirmative or corrective feedback. We provided an additional 8 to 16 hours of training before the implementation of Phase II. Each interventionist taught 5 or 6 sections of the intervention, with 10 to 15 students in each section, and they did not have duties or other obligations to the school. They also had a daily planning period to review lessons and prepare for intervention implementation. The project coordinator and an instructional coach provided coaching and feedback to each interventionist on the quality of and adherence to the reading intervention. Phone conferences were held bi-weekly with the interventionists and research team to discuss student progress and adjust instruction as necessary.

Implementation fidelity. Fidelity data were collected in three separate waves throughout the year-long intervention. Each wave was approximately two weeks in length and the reading interventionists recorded two of their reading intervention class periods. The classes were recorded on a digital audio recorder and then uploaded to a secure server. An implementation

fidelity protocol was developed to capture the adherence to and quality of the reading intervention for each lesson. Intervention adherence was rated on a Likert scale from 0 (not observed) to 4 (high) for each of intervention components (i.e., word study, vocabulary, comprehension, discussion/interpretation of text, and motivation). Four coders were trained on the fidelity coding procedures. The project coordinator served as the "gold standard" (Gwet, 2000) and each coder had to achieve 90% or higher reliability with the gold standard before coding independently. Forty percent of each interventionist's audio files were coded. Fidelity was calculated as the ratio of assigned points to the total possible points.

<Table 2>

Mean fidelity scores are reported in Table 2 and range from 2.6 to 3.3. While these fidelity scores appear to be on the low side, they are comparable to both the previous study of the RIA with monolingual students with difficulties and disabilities (Vaughn, Roberts, Schnackenberg et al., 2015; Vaughn, Roberts, Wexler et al., 2015) and to the overall study of the RIA with ELs (Vaughn et al., 2018). We provided coaching and guided intervention implementation; however, the teachers faced many challenges implementing the intervention in these settings due to the high-needs of the students due to their home life challenges (e.g., poverty, missing parental figures) and due to the under-resourced school settings.

Comparison condition. Students in the comparison condition were not assigned to receive the treatment and were enrolled in different elective courses while treatment students received the RIA. The comparison condition was characterized by a variety of different classes and schedules for each individual student depending upon their programs of study. Student schedules were examined and project staff confirmed with school administrators that comparison students took courses such as Cosmetology, Information Technology, Art, Welding, or JROTC.

We were not able to conduct classroom observations of these elective classes, as each student had a different course schedule in which they took these classes at different times of the day. However, we are confident that none of the schools provided students with a reading intervention course that incorporated similar features of the RIA.

Data Collection and Measures

Pre-assessment data were collected in September prior to intervention implementation and post-assessment data were collected in May upon intervention completion. Test administrators were hired and trained by the research team to administer the assessments. Each test administrator received approximately 20 hours of training on test administration and data collection procedures. Test administrators were required to have interrater reliability above .90 for each measure.

Word reading. Word reading fluency was assessed with two timed subtests of the Test of Word Reading Efficiency-Second Edition (TOWRE-2; Torgesen, Wagner, & Rashotte, 2012). The *Sight Word Efficiency (SWE)* subtest assesses the number of real printed words that can be accurately identified within 45 seconds. The *Phonemic Decoding Efficiency (PDE)* subtest measures the number of pronounceable printed non-words that can be accurately decoded within 45 seconds. Each subtest is individually administered and test-retest reliability ranges from .83-.96, and alternative-form reliability exceeds .90.

Vocabulary. Two vocabulary assessments were administered to all participants. The first vocabulary assessment was the *GMRT-4* vocabulary subtest (MacGinitie, MacGinitie, Maria, Dryer, & Hughes, 2000), which is timed and includes 45 vocabulary questions. Form S was administered at pre-test and Form T administered at post-test. The alternate form reliability is.83 and Kuder-Richardson Formula 20 reliability is .92 for fall administration of Form S and .91 for

spring administration of Form T. The second vocabulary assessment was a researcher-created proximal vocabulary measure that assessed students' knowledge of words explicitly taught in the intervention. It consisted of 12 items where students had to match the word to the definition.

Comprehension. Reading comprehension was assessed with two different measures, the *Gates-MacGinitie Reading Test-4 (GMRT-4* (MacGinitie, et al., 2000) and the *Test of Silent Reading Efficiency and Comprehension (TOSREC* (Wagner, Torgesen, Rashotte, & Pearson, 2010). The *GMRT-4* comprehension subtest is a timed, group-administered measure that consists of 11 narrative and expository passages and multiple-choice literal and inferential comprehension questions (MacGinitie et al., 2000). Form S was given at pre-assessment and form T was given at post-test. Alternate-form reliability is 0.80 and Kuder-Richardson Formula 20 reliability is .93 for the fall administration of Form S and .92 for the spring administration of Form T (MacGinitie et al., 2000). The *TOSREC* is also a timed measure of reading comprehension administered in groups (Wagner et al., 2010). Students read as many sentences as possible in a three-minute period and determine the truthfulness of each sentence. Form A was administered at pre-test in the fall and Form C was administered at post-test in the spring. Alternate form reliability exceeds .85.

<center>**Results**</center>

This study investigated the effects of the RIA on reading outcomes for ninth grade ELs with LD. First, attrition analyses were conducted to determine that there were no systematic biases due to differential attrition. Then, ANCOVA models were used to determine the intervention effects for each outcome measure separately (i.e., TOWRE-2 Sight Word Efficiency, TOWRE-2 Phonetic Decoding Efficiency, GRMT-4 Reading Comprehension, GRMT-4 Vocabulary, TOSREC, and the proximal vocabulary measure).

Attrition Analysis

Ninety-five students with disabilities were initially randomized to treatment or comparison conditions at the beginning of the ninth-grade school year in the original study (Vaughn et al., 2018). Ninety-four of these students consented and completed pre-testing. By post-testing at the end of ninth grade, 85 (89%) ELs with LD remained. Of the 10 participants who left the study, one returned to his/her home country, two withdrew from school to be homeschooled, five withdrew from school to attend other schools or districts, and it was unknown what happened to the remaining two participants. Four students left the comparison group and six students left the treatment group. What Works Clearinghouse (WWC) criteria were used to calculate overall and differential attrition (Institute of Education Sciences, 2017). Overall attrition was 11% and differential attrition was 3.5%. Using the conservative boundary for attrition suggested by the WWC, this study had low differential attrition and thus, it is not expected that this would impact study outcomes.

Preliminary Data Analysis

Table 3 displays the means and standard deviations for the treatment and comparison groups at pre-test and these were used to determine baseline equivalence. All scores are reported as standard scores, except for the proximal vocabulary measure which is a raw score. Independent samples t-tests were also conducted to compare each measure at pretest, but there were no significant differences on any measure at pre-test. Baseline equivalence was determined using standardized mean differences, which were calculated using the guidelines suggested by the WWC (Institute of Education Sciences, 2017). Baseline differences at pretest were within the acceptable range (ES = .00 to ES = .25) for the TOSREC, Gates-McGinitie comprehension subtest, and the proximal vocabulary measure, but they exceeded 0.25 on the TOWRE-2 sight

word efficiency (ES = 0.37) and phonemic decoding subtests (ES = 0.30), and the Gates-

McGinitie vocabulary subtest (ES = 0.26).

<Table 3>

Main Analysis

To analyze the effects of the RIA on reading outcomes for ELs with LD in treatment

versus comparison, a one-way ANCOVA analysis was completed for each outcome measure,

with pretest scores being used as the covariate. ANCOVA designs control for systematic bias

due to differences at pretest and reduce the error variance, thus making the test for intervention

effects more powerful (Stevens, 2007). Hedge's g effect sizes (Hedges, 1981) were computed for

each outcome measure using adjusted means and unadjusted standard deviations which is the

procedure recommended by the WWC (Institute of Education Sciences, 2017). Additionally,

Benjamini-Hochberg corrections were conducted if there was a significant effect of condition on

the outcome measure (Benjamini & Hochberg, 1995), and these corrections were made

according to the What Works Clearinghouse (WWC) procedures (Institute of Education

Sciences, 2017). ANCOVAs followed by Benjamini-Hochberg corrections were used instead of

MANCOVAs and family-wise corrections because family-wise corrections following

MANCOVAs are often conservative. Benjamini-Hochberg corrections help adjust for the false

discovery rate and provide a more reliable approach for controlling Type 1 error (Benjamini &

Hochberg, 1995). Table 3 also reports the ANCOVA results, including the F-values, adjusted

means, standard errors, p-values, and Hedge's g values.

There were no significant effects of the treatment on any outcome except for the proximal

vocabulary measure ($F(1, 81) = 4.42$, $p = 0.04$). Hedge's $g = 0.41$, indicating a small to moderate

impact of the RIA for the treatment group for vocabulary words directly taught in the

intervention. According the WWC, vocabulary falls under the domain of comprehension, and in this study, there were four measures of vocabulary and comprehension (i.e., TOSREC, GMRT-4 Vocabulary, GMRT-4 Comprehension, and proximal vocabulary). A new critical p-value ($p = 0.01$) was calculated by dividing the original p-value (0.04) by 4 (number of outcomes in the comprehension domain). The original p-value ($p = 0.04$) was compared to this new critical p-value and it was determined that the impact of RIA on the treatment group was no longer significant. On the TOWRE-2 PDE subtest, there was no significant effect ($F(1,80) = 1.90$, $p = 0.17$) and Hedge's $g = 0.18$. The TOWRE-2 SWE subtest was also not significant ($F(1,80) = 0.40$, $p = 0.40$) and Hedge's $g = 0.08$. The impact of RIA on the TOSREC was also not significant ($F(1, 73) = 0.51$, $p = 0.47$) and Hedge's $g = 0.14$. On the GMRT-4 Vocabulary subtest, there were no significant treatment effects ($F(1, 81) = 0.37$, $p = 0.54$) and there was a small negative effect of treatment on vocabulary outcomes for students in treatment with Hedge's $g = -0.10$. On the GMRT-4 Comprehension subtest, RIA and comparison students performed similarly ($F(1,81) = 0.02$, $p = 0.90$) and Hedge's $g = 0.02$.

Discussion

This study examined the effects of RIA on reading outcomes for ninth-grade ELs with LD after one year of intervention. There was a significant impact of the RIA on the proximal vocabulary measure ($g = 0.41$). The RIA did not significantly impact any other reading outcomes. While results were not significant, the RIA did have small, nonsignificant effects on measures of word reading ($g = 0.08$ to 0.18) and sentence-level comprehension ($g = 0.14$).

Word Reading

Though not statistically significant, effect sizes for word reading outcomes for students in the RIA condition were small, as indicated by both the TOWRE-2 SWE ($g=0.08$) and PDE

(g=0.18) subtests. These results are similar to Wanzek et al.'s (2013) review of extensive reading interventions for older struggling readers in grades 4-12, in which reading interventions had a small positive impact on word reading outcomes (ES = 0.15). Despite a full year of intervention, students in the treatment group performed in the low average range according to the adjusted standard scores at posttest (M = 87.67) on the PDE subtest and the below average on the SWE subtest (M = 83.09). This suggests that many ELs with LD may still be struggling with sight word recognition and decoding, especially when compared to their peers without disabilities. Because students were still struggling with word recognition and decoding after one year of intervention, they may not have been able to benefit from the comprehension strategy instruction and this may have impacted comprehension outcomes. This is aligned with the automatic information processing theory (LaBerge & Samuels, 1974) which posits that students must master subskills such as decoding with automaticity and fluency, before they are able to attend to higher order skills such as comprehension. This is also supported by Solis and colleagues' study (2015) of a reading intervention for ninth grade struggling readers, where students with higher decoding skills at pretest made significantly higher gains on reading comprehension outcomes at posttest than students with lower decoding skills. It is possible that the ELs with LD in this study may have needed more practice with decoding, spelling, and/or fluency to develop automaticity to comprehend text.

Vocabulary

On the standardized vocabulary measure, the GMRT-4 vocabulary subtest (MacGinitie et al., 2000), there were no statistically significant differences between students in RIA treatment and comparison condition; however, the overall effects favored students in the comparison condition (g = -0.10). While the RIA explicitly taught academic vocabulary words, this

instruction may not have been robust enough to improve vocabulary knowledge on a standardized measure of reading vocabulary. Since we were not able to observe elective classes for students in the comparison condition, we do not know how much exposure to vocabulary students had during this time. It is possible that comparison students had more opportunities to interact with different vocabulary and text than their peers in the RIA, and this may have caused the effects to trend towards the comparison condition. Furthermore, at the end of ninth grade, both the treatment and comparison groups had standard vocabulary scores in the low 70s, suggesting below average performance compared to the normative population.

Conversely, on the proximal vocabulary measure, students in treatment outperformed students in the comparison condition with a moderate effect ($g = 0.41$). These differences were initially significant, but after controlling for the false discovery rate and multiple comparisons with the Benjamini-Hochberg correction, the effect was no longer significant. This was due to the decreased p-value as the result of multiple comparisons in the comprehension domain; however, we believe that it is important to note that explicit vocabulary instruction in the intervention did improve students' knowledge of words taught in the intervention and these practices could be beneficial for this population of students. Interventions that target vocabulary typically have large effects on vocabulary outcomes for adolescent struggling readers (Scammacca et al., 2015; 2016), and our finding is in line with previous studies of vocabulary instruction for older students with difficulties.

Comprehension

There were also not significant differences on the *TOSREC*, but there were small effects ($g = 0.14$) for students who received the RIA. On the *GMRT-4* comprehension subtest, students in treatment and comparison groups performed similarly, and there were no significant

differences (g = 0.02). In Scammacca et al.'s 2015 meta-analysis of reading interventions for

students in grades 4-12, reading interventions had a small positive impact on standardized

reading comprehension outcomes (ES = 0.24). When these results were further disaggregated by

grade level (i.e., 6-8 versus 9-12), reading interventions conducted at the high school level had

an even smaller impact on standardized comprehension measures (ES = 0.10). Results for the

comprehension outcomes in the current study are similar to those found by studies, syntheses,

and meta-analyses of reading interventions for ELs (Denton et al., 2008; Hall et al., 2017;

Richards-Tutor et al., 2016), in that it is difficult to improve reading comprehension for ELs in

the secondary grades. Richards-Tutor et al. (2016) found that reading interventions that assessed

text comprehension often had a negative effect for ELs. Similarly, Hall and colleagues (2017)

determined that reading instruction had no effect on standardized measures of reading

comprehension. Additionally, in a randomized controlled trail of a multicomponent reading

intervention for ELs with reading difficulties and disabilities (Denton et al., 2008), students who

received the reading intervention did not outperform students in the comparison condition on

measures of comprehension. Because so many participants were still having word-level

difficulties and struggling with automaticity and fluency, we hypothesize that they may not have

been able to access the text in the intervention and on the GMRT-4 comprehension subtest.

Implications

ELs with LD continue to have deficits in word reading, vocabulary, and comprehension,

even after receiving intensive reading intervention for one year. While there were some positive,

effects on word reading and the proximal vocabulary measure, these results were in the small to

moderate range. Furthermore, there were minimal effects on the standardized GMRT-4 subtests

of vocabulary and comprehension (MacGinitie et al., 2000). While the RIA is a phased,

multicomponent reading intervention that targets word reading, vocabulary, and comprehension, it had limited impact on reading outcomes for ELs with LD. These findings are aligned with previous research, which suggest that it is difficult to improve reading comprehension outcomes for adolescent ELs, including those with LD (Denton et al., 2008; Hall et al., 2017; Richards-Tutor et al., 2016). The findings are similar to those in previous studies of the skills of struggling readers who are ELs, in that many adolescent ELs may have heterogeneous deficits in reading (Lesaux & Kieffer, 2010), which makes it difficult to design an intervention to address those needs. In the current study, ELs with LD had below average word reading and vocabulary skills, which also may have impacted their ability to comprehend text. While the current intervention allowed for students to practice using academic vocabulary orally and in writing, oral language instruction was not included in the intervention. ELs with LD may need continued reading intervention that targets word reading, oral language, vocabulary, and comprehension, across multiple school years in order to make improvements in reading outcomes.

Limitations and Recommendations for Future Research

There are several limitations in the current study. First, this study had a small sample size ($n = 85$), which may have reduced the power to find a significant result (Gravetter & Wallnau, 2013). Even though the sample size was small, the current study examined a unique population, ELs with LD, which have been historically under-studied with regards to reading intervention research. Future research should aim to target this population in order to determine if similar effects occur for similar multicomponent reading interventions. In a previous study of RIA for ninth and tenth grade SWDs (Vaughn, Roberts, Schnakenberg et al., 2015), the RIA had a significant moderate effect on the GMRT-4 reading comprehension subtest (ES = 0.44) for students with disabilities who received two years of intervention. This effect was not observed in

the current study for ELs with LD; however, students only received one year of intervention due to scheduling issues with a second cohort. Although the current study did not have statistically significant effects, we argue that the results are a valuable contribution to the field for several reasons because this study used a high-quality design that controlled for threats to internal validity and studied a phenomenon (i.e., reading intervention for ELs with LD) that has received limited attention in prior research (Kittleman et al., 2018).

Second, while implementation fidelity was below average, this study was conducted in high-need urban schools that were representative of the settings in which high school ELs are often enrolled. The intervention provided had comparable fidelity to previous studies and the overall study of the RIA (Vaughn et al., 2018; Vaughn, Roberts, Schnakenberg, 2015). The reading interventionists in this study were trained by the research team and received coaching from project staff, but they were placed in these schools full-time and were met with an array of challenges including: discipline, attendance, school policies, scheduling, etc. Our interventionists reported that students frequently missed class or were significantly late to class. Furthermore, although the interventionists did their best to manage classroom behavior, students often were disruptive and/or distracted by their cell phones. Each participating school had policies on disruptive behavior and cell phone use, but these were not consistently enforced and there were few if any consequences for noncompliant students. When interventionists tried send students to administrators for behavioral issues, they were often sent back to class with no disciplinary action taken. This made it extremely difficult for the teachers to implement the intervention with high levels of fidelity. Interventionists also reported that students did not want to interact with each other. In several situations, students refused to talk to their peers or stated that they preferred to work individually. Although it has been documented that higher levels of fidelity

may lead to increased outcomes (Hulleman & Cordray, 2009), this was difficult to achieve in the current setting due to the aforementioned challenges. This suggests that even typically efficacious interventions such as the RIA, may be more difficult to implement with fidelity in high-poverty, urban settings. In the future, it may be beneficial to study school-level contextual factors that may impact study results.

In addition to the small sample size, it is important to recognize that the comparison condition consisted of a variety of different elective courses for participants. Due to the size of the school and variability in individual student schedules, it was not possible for the research team to conduct in-person observations of the elective classes that the comparison students received. However, we did examine student schedules and had discussions with administrators to confirm that students were not receiving components similar to the RIA. It is possible that the lack of significant effects may be attributed to the content in the elective courses. Students may have had other types of opportunities to interact with their peers and with content area text that was more aligned with their interests.

Lastly, we did not formally assess students' native language or reading proficiency or their motivation for learning. In the current study, we were not able to identify if language proficiency and reading achievement in students' native language moderated intervention outcomes. Future research should examine which measures most appropriately identify students' reading and language abilities in their native language, as well as how those abilities may be potential moderators of intervention effects. Furthermore, we did not formally assess student motivation. It is possible that because students had additional reading intervention instead of an elective class, that they may have been less motivated or less engaged with the intervention. For

struggling adolescent readers and students with disabilities, increasing motivation for reading is critical to improving literacy (Kamil et al., 2008).

Summary

In conclusion, the purpose of this study was to examine the impact of the RIA on reading outcomes for ninth grade ELs with LD. The intervention was delivered for one year by trained interventionists, in groups of 10 to 15 students. There were no statistically significant differences at posttest on any reading outcome measures except for proximal vocabulary ($g = 0.41$), but students in treatment did perform better than comparison students on measures of word reading and the TOSREC. After intervention, students in both the treatment and comparison groups, continued to demonstrate low- and below-average reading performance on all outcome measures. High school ELs with LD may need more intensive reading interventions in addition to school-wide efforts to improve reading outcomes.

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Table 1

Participant Demographics for Students with Disabilities

	Intervention (*n* = 43)		Comparison (*n* = 42)		Overall (*n* = 85)	
	n	%	*n*	%	*n*	%
Gender						
Male	32	74%	28	66%	60	71%
Race						
American Indian or Alaska Native	25	58%	22	52%	49	55%
White	18	42%	23	55%	45	48%
Economically Disadvantaged						
Yes	36	84%	36	86%	72	85%
Disability Category						
SLD	35	81%	36	86%	71	84%
OHI	5	12%	1	2%	6	7%
SLI	1	2%	0	0%	1	1%
ID	1	2%	3	7%	4	5%
OI	0	0%	1	2%	1	1%
AUT	0	0%	1	2%	1	1%
EBD	1	2%	0	0%	1	1%

Note. SLD = Specific Learning Disability, OHI = Other Health Impairment, SLI = Speech/Language Impairment, ID = Intellectual Disability, OI = Orthopedic Impairment, EBD = Emotional/Behavioral Disorder; AUT=Autism

Table 2

Mean Fidelity Scores

Component/Area	Mean	Standard Deviation
Word Study	3.30	0.85
Vocabulary	3.20	0.84
Comprehension	3.00	0.69
Discussion/Interpretation of Text	2.60	1.06
Motivation	2.70	0.82

Note. Scores rated on a 4-point scale, with 4 as the highest score.

Table 3

Descriptive Statistics and ANCOVA Results

Measure	Group	Pretest			Posttest			F	p	ES
		n	M	SD	n	M	SD			
TOWRE PDE	T	42	88.05	16.07	43	87.67	14.96	1.90	0.17	0.18
	C	42	83.31	15.58	41	84.93	16.09			
TOWRE SWE	T	42	84.38	14.19	43	83.09	14.56	1.03	0.31	0.08
	C	42	79.38	12.98	41	82.04	12.91			
TOSREC	T	41	66.66	11.44	42	73.74	12.02	0.51	0.38	0.14
	C	37	67.68	11.88	40	72.15	10.42			
GMRT V	T	42	74.78	9.09	43	72.23	8.72	0.37	0.54	-0.10
	C	42	72.65	7.54	42	73.11	8.28			
GMRT RC	T	42	73.51	8.52	43	75.43	8.37	0.02	0.90	0.02
	C	42	73.17	6.11	42	75.24	7.81			
Proximal Vocabulary	T	42	5.12	3.46	43	7.18	4.55	4.42	0.04*	0.41
	C	42	4.79	3.35	42	5.50	3.70			

Note. TOWRE PDE = Test of Word Reading Efficiency Phonemic Decoding Efficiency subtest; TOWRE SWE = Test of Word Reading Efficiency Sight Word Efficiency subtest; GMRT V = Gates-MacGinitie Reading Test Vocabulary subtest; GMRT RC = Gates-MacGinitie Reading Test Reading Comprehension subtest; ES = effect size as Hedge's g; post-test means are adjusted; * = significant at the 0.05 level