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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 (Reading Intervention for Adolescents [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 hr a week, whereas 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 Hedges' 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

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 judgments (NCES, 2016). This is problematic because in high school, students are often expected to already possess these skills to 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, Petscher, and Folsom (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 and 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 heterogeneous and complex reading needs, and therefore, it is of utmost importance to

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develop and validate appropriate interventions for this population.

Intensive Reading Interventions for Adolescents

One approach to improving adolescent reading achievement 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 to 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, Brasseur-Hock, Hock, & Duvel, 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 vs. low) and students who performed better on decoding tasks at pretest also performed 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 2 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 Hedges' *g* (Hedges, 1981) effect sizes of 1.66 and 1.04. Although 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 (SWD; 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, 2014; LaBerge & Samuels, 1974). The automatic information processing theory of reading posits that reading is comprised of various subskills 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, 2014, p. 4). Cognitive strategy instruction is rooted in cognitive-behavioral theory, and contends 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 3 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 2 years of the RIA performed significantly higher than comparison students ($g = 0.43$) on a standardized measure of reading comprehension. These data were then disaggregated to determine the effects of the intervention for 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). Although 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 12 studies, of which, two included ELs in the middle school in Grades 6 to 8, and none of which, were conducted with high school participants. In the first study with middle

school participants in this meta-analysis, Lovett et al. (2008), ELs and non-ELs in Grades 2 to 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 hr. 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, whereas students in the comparison condition did not receive intervention. ELs who received either intervention (i.e., standardized and 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 (Hall et al., 2017; Richards-Tutor et al., 2016) reported studies of reading instruction or intervention for ELs in Grades 9 to 12.

In addition to the aforementioned meta-analyses, two additional studies have examined the efficacy of multicomponent reading interventions for middle school ELs with reading difficulties (Denton, Wexler, Vaughn, & Bryan, 2008; Wanzek, Swanson, Vaughn, Roberts, & Fall, 2016). Denton et al. (2008) conducted a randomized control trial of a multicomponent reading intervention for students in Grades 6 to 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 min 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 SWDs who were and were not identified as ELs. They also examined the differential effects for ELs with disabilities versus native–English speaking SWDs. All SWDs who received the PACT intervention significantly outperformed SWDs 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 reading 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. In addition, 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-grade participants were randomly assigned to one of four conditions: (a) the RIA only, (b) a dropout prevention intervention only (DO), (c) both RIA and DO, or (d) a business as usual (BaU) condition. Students assigned to the RIA only, RIA + DO, or DO conditions received intervention for 2 school years. Students who received 2 years of the reading intervention performed significantly better on measures of sentence-level fluency and comprehension ($g = 0.18$) and on a proximal measure of vocabulary ($g = 0.41$) than students who did not receive the intervention (Vaughn et al., 2018).

Purpose

The RIA has proven efficacious for adolescent struggling readers and SWDs, 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 2 years of intervention, so the current analysis examines the effects of the intervention after 1 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 1 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 whether 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 with 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, whereas the ELs with LD in DO only and BaU comprised the comparison group. Because students were nested within three different schools, intra-class correlations (ICCs) were computed to determine whether there was dependence in the data. ICCs ranged from .01 to .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 .36 to .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 5 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. In addition, 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 Proficiency (LEP) or an LEP designation within the previous 5 years, and (b) a score of 1,612 or below, which is one standard error above the failing score of 1,575 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., 2015; Vaughn, Roberts, Schnakenberg, et al., 2015; Vaughn, Roberts, Wexler, et al., 2015). This sample did not include newcomer ELs who had been living in the United States 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 and 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%.

Materials and Procedures

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 min every other day in an alternating A/B day schedule, whereas the third school met with students for 50-min periods for 3 days a week and 90 min on the fourth instructional day. Students received 3.75 to 4.25 hr of intervention

Table 1. Participant Demographics for Students With Disabilities.

	Intervention ($n = 43$)		Comparison ($n = 42$)		Overall ($n = 85$)	
Characteristic	*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; AUT = autism; EBD = emotional and behavioral disorder.

each week. The students continued to receive their regular core classes (i.e., English, math, science, and social studies) and attended RIA in lieu of an elective class.

Phase 1. During the first semester of the school year from September through December, students participated in Phase 1 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 3 to 4 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 minilessons 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: (a) Right There, (b) Think and Search, and (c) 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 2. Phase 2 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 1 to the content area texts. In addition, 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 subheadings, 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: (a) have students pronounce the word, (b) provide a student-friendly definition with visual, (c) have students discuss what is known about the word, (d) provide examples and non-examples, (e) engage in deep processing activities, and (f) have students create powerful sentences with the new word (Vaughn Gross Center for Reading and Language Arts at The University of Texas at Austin, 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 and 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. Finally, the students had free-choice reading and selected high-interest books and magazines to read for 10 min each day.

Instructional enhancements for ELs. 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. In addition, students were taught independent word learning strategies to help them determine the meaning of unknown words. Students were taught to use the fix-up strategies from CSR "Click & Clunk" (Klingner & Vaughn, 1998), which included strategies 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, and 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 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. All interventionists were women, certified in secondary reading or secondary English Language Arts, and had a minimum of 5 years of experience working with secondary students, including those with disabilities or who were ELs. Interventionists participated in 40 hr 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 hr of training before the implementation of Phase 2. Each interventionist taught five or six 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 biweekly 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 2 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 the reading intervention for each lesson. Intervention adherence was rated on a Likert-type 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, 2001), 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.

Component/area	*M*	*SD*
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.

Mean fidelity scores are reported in Table 2 and range from 2.6 to 3.3. Although these fidelity scores appear to be on the low side, they are comparable with 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 with respect to their home life challenges (e.g., poverty and missing parental figures) and the underresourced 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 Junior Reserve Officers' Training Corps (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 on intervention completion. Test administrators were hired and trained by the research team to administer the assessments. Each test administrator received approximately 20 hr 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 s. The *Phonemic Decoding Efficiency* (PDE) subtest measures the number of pronounceable printed nonwords that can be accurately decoded within 45 s. Each subtest is individually administered and test–retest reliability ranges from .83 to .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, MacGinitie, Maria, Dreyer, & Hughes, 2000), which is timed and includes 45 vocabulary questions. Form S was administered at pretest and Form T administered at posttest. 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 posttest. Alternate-form reliability is .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 3-min period and determine the truthfulness of each sentence. Form A was administered at pretest in the fall and Form C was administered at posttest in the spring. Alternate form reliability exceeds .85.

Results

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

Table 3. Descriptive Statistics and ANCOVA Results.

		Pretest			Posttest					
Measure	Group	*n*	*M*	*SD*	*n*	*M*	*SD*	*F*	*p*	ES
TOWRE PDE	T	42	88.05	16.07	43	87.67	14.96	1.90	.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	.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	.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	.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	.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	.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 *g*; posttest means are adjusted.
*Significant at the .05 level.

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 SWDs 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 pretesting. By posttesting at the end of ninth grade, 85 (89%) ELs with LD remained. Of the 10 participants who left the study, one returned to his or 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 mean values and standard deviations for the treatment and comparison groups at pretest, 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 pretest. 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 = 0.00 to 0.25) for the TOSREC, Gates–MacGinitie 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–MacGinitie vocabulary subtest (ES = 0.26).

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). Hedges' *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). In addition, 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, unadjusted standard deviations, *p* values, and Hedges' *g* values.

There were no significant effects of the treatment on any outcome except for the proximal vocabulary measure, $F(1, 81) = 4.42$, $p = .04$. Hedges' $g = 0.41$, 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 measure). A new critical *p* value ($p = .01$) was calculated by dividing the target level of statistical significance value (0.05) by 4 (number of outcomes in the comprehension domain). The original *p* value ($p = .04$) was compared with this new critical *p* value ($p = .01$), and it was determined that the impact of RIA on the treatment group was no longer statistically significant. On the TOWRE-2 PDE subtest, there was no significant effect, $F(1, 80) = 1.90$, $p = .17$, and Hedges' $g = 0.18$. The TOWRE-2 SWE subtest was also not significant, $F(1, 80) = 0.40$, $p = .40$, and Hedges' $g = 0.08$. The impact of RIA on the TOSREC was also not significant, $F(1, 73) = 0.51$, $p = .47$, and Hedges' $g = 0.14$. On the GMRT-4 Vocabulary subtest, there were no significant treatment effects, $F(1, 81) = 0.37$, $p = .54$, and there was a small negative effect of treatment on vocabulary outcomes for students in treatment with Hedges' $g = -0.10$. On the GMRT-4 Comprehension subtest, RIA and comparison students performed similarly, $F(1, 81) = 0.02$, $p = .90$, and Hedges' $g = 0.02$.

Discussion

This study examined the effects of RIA on reading outcomes for ninth-grade ELs with LD after 1 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. Although results were not significant, the RIA did have small, nonsignificant effects on measures of word reading ($g = 0.08$–0.18) and sentence-level comprehension ($g = 0.14$).

Word Reading

Although 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 to 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 with their peers without disabilities. Because students were still struggling with word recognition and decoding after 1 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' (2015) study 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 at pretest. 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 ($g = -0.10$). Although 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. As 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 toward 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 with 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, Roberts, Vaughn, & Stuebing, 2015; Scammacca et al., 2016); our finding is in line with previous studies of vocabulary instruction for older students with reading 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 to 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., Grades 6–8 vs. Grades 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 also 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 for ELs often had a negative effect on text comprehension. Similarly, Hall and colleagues (2017) determined that reading instruction had no significant effect on standardized measures of reading comprehension. In addition, in a randomized controlled trial 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 in addition to below average vocabulary performance, 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 1 year. Although 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). Although 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. Although 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 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 understudied in reading intervention research. Future research should aim to target this population to determine whether 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 SWDs who received 2 years of intervention. This effect was not observed in the current study for ELs with LD; however, students only received 1 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 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, Gion, Horner, Levin, & Kratochwill, 2018).

Second, although 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, et al., 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 but not limited to discipline, attendance, school policies, and scheduling. 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 and below average fidelity, 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.

Finally, 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 whether 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 SWDs, 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 1 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 sentence-level comprehension. 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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