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Effects of an Intensive Reading Intervention on Reading Outcomes for Adolescent English Learners with Disabilities and Comprehension Deficits

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Effects of an Intensive Reading Intervention on Reading Outcomes for Adolescent ELs with Disabilities and Comprehension Deficits

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English Learners with disabilities (ELSWDs) in both eighth and twelfth grades scored significantly lower on the 2015 NAEP reading assessment than English Learners (ELs) only or students with disabilities (SWDs) only. Despite this, there is limited evidence on how to improve reading outcomes through reading interventions for adolescent ELSWDs. The purpose of this quasi-experimental study was to examine the effects of an intensive, year-long reading intervention, the *Reading Intervention for Adolescents (RIA),* on reading outcomes (word reading, vocabulary, and comprehension) for ninth grade ELSWDs (n = 95) with deficits in reading comprehension and to determine if the effects of the intervention varied by limited English proficiency (LEP) status (current versus former). Participants assigned to *RIA* received the intervention for the entire ninth-grade school year, while students in the comparison condition participated in electives such as band, chorus, or computer. Phase I of the intervention focused on advanced word study, fluency, vocabulary, and comprehension, while Phase II of the intervention emphasized vocabulary and comprehension, as well as the application of the strategies learned in Phase I with science and social studies texts.

Participants were assessed at pre- and post-intervention on measures of real and pseudoword reading, comprehension, and vocabulary. After using analysis of covariance to test for treatment effects and controlling for false discovery rate, there were no significant differences between the RIA treatment and the comparison groups. Small effects were observed on measures of word reading, comprehension, and proximal vocabulary, and Hedge's *g* values ranted from 0.08 to 0.40. There were also not significant differential effects of the intervention for students currently identified as LEP versus students formerly identified as LEP. Findings from this study confirm previous research with ELSWDs, in that it is difficult to improve vocabulary and comprehension for this population of students.

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Chapter I: Introduction

According to the 2015 National Assessment of Educational Progress (NAEP) in reading, approximately one-quarter of students in grades eight and twelve scored below the basic level of proficiency, indicating deficits in basic reading skills that are required to comprehend grade level texts (Kena et al., 2016). Students performing below the basic level have difficulty reading and interpreting literary and informational texts, including an inability to locate information, identify main ideas, theme, or author's purpose, make inferences, determine meanings for unfamiliar words, and/or provide evidence to support judgements (National Center for Education Statistics [NCES], 2016). One consequence of low reading achievement is an increased risk for dropping out of school, and students reading at the below-basic level are the most likely to drop out or fail to complete school on time (Hernandez, 2011). Students who dropout and are unable to fully add to the social and economic welfare of society (National Research Council, 2011), and as such have lower rates of participation in the work force, and earn less than those who complete school (Snyder, de Brey, & Dillow, 2016).

Low reading achievement is even more problematic for students identified as English Learners (ELs). According to the U.S. Department of Education's report on the Condition of Education (Kena et al., 2016), ELs have "difficulty speaking, reading, writing, or understanding the English language" (p. 297), and this difficulty impacts their ability to participate successfully in the classroom or society. In the United States, this heterogeneous group includes approximately 9.4% of students in public schools

(McFarland et al., 2017) and they are the fastest growing subgroup of students in the United States (Batalova, Fix, & Murray, 2007; Francis et al., 2006). Even though many of these students participate in programs to increase their skills with the English language, they continue to demonstrate low reading achievement. ELs performed significantly lower on the 2015 NAEP reading assessment than their non-EL peers, with 67% of eighth-graders and 73% of twelfth-graders scoring below the basic level of proficiency (NCES, 2016). ELs are also more likely than non-ELs to drop out of school (Hernandez, 2011; Kennelly & Monrad, 2007) and a recent report of high school dropouts in a large, urban school district indicates that ELs dropped out at a higher rate (43.3%) than other students (32.5%) and re-enrolled at a lower rate (25.6%) (Berliner, Barrat, Fong, & Shirk, 2008).

Students with disabilities (SWDs) are also at increased levels of risk for dropping out when compared to their general education peers, earn fewer credits, take longer to complete graduation requirements, are suspended more frequently, and are overrepresented in juvenile justice systems (Quinn, Rutherford, Leone, Osher, & Poirier, 2005; Reschly & Christenson, 2006; Schifter, 2011; Sullivan, Van Norman, & Klingbeil, 2014; U.S. Department of Education, 2011). They demonstrate consistently low reading achievement on the NAEP, and 60% of eighth grade SWDs and 61% of twelfth grade SWDs score below the basic level on the NAEP (NCES, 2016). Moreover, approximately 13.8% of ELs also have disabilities (ELSWDs) (McFarland, et al., 2017), have even lower reading scores on the NAEP in eighth and twelfth grade, than each group

individually (NCES, 2016). Eighty-nine percent of ELSWDs scored below basic in eighth grade and 94% scored below basic in twelfth grade (NCES, 2016). A recent analysis of the NLTS-2 (Trainor, Murray, & Kim, 2016) examined the population of ELSWDs and found that 15.4% of adolescent ELSWDs dropped out and only 61.2% attended postsecondary education, both of which are similar to rates for students with disabilities who were not ELs; however, ELSWDs participated in postsecondary employment at a significantly lower rate when compared to SWDs-only, 80% versus 91% respectively (Trainor et al., 2016). In order to understand the literacy challenges ELSWDs face, the subsequent sections describe the reading skills of struggling adolescents and ELs.

Reading Skills of Struggling Adolescents

The goal of reading is comprehension - constructing meaning from text (RAND, 2002; Duke & Carlisle, 2011). The Simple View of Reading (SVR) posits that reading is comprised of both decoding and linguistic comprehension (Gough & Tunmer, 1986). According to Gough and Tunmer (1986), decoding involves that ability to read words in isolation with automaticity and accuracy and linguistic comprehension involves the interpretation of words, sentences, and connected text. Adolescents with deficits in reading often have complex and heterogeneous reading needs in either decoding/word recognition, comprehension, or both areas, and these deficits are often different from students in the elementary grades (Biancarosa & Snow, 2006; Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011; Catts, Hogan, & Adolf, 2005; Cirino et al., 2013;

Hock et al., 2009; Leach, Scarborough, & Rescorla, 2003; Spear-Swerling, 2011). Catts, Hogan, and Adolf (2005) conducted a longitudinal study that examined the reading skills (i.e., decoding, linguistic comprehension) of students in grades 2, 4, and 8. For second graders, decoding skills explained much of the variance in reading comprehension (27%); however, by the time students were eighth graders, much more of the variance (36%) in reading comprehension was associated with linguistic comprehension (Catts et al., 2005). Additional analyses indicated that the nature of the reading difficulties changed at each grade level. Students in the elementary grades (2 and 4) were more likely to have word reading deficits (32.3%), while students in grade 8 were more likely to have comprehension deficits (16.3%) (Catts et al., 2005). Despite this, there were still eighth grade students that struggled with word reading (13.3%), or a combination of word reading and linguistic comprehension.

In another study of reading profiles of adolescents, Hock and colleagues (2009) investigated the reading achievement of struggling and proficient readers from urban high schools and found that struggling readers performed lower than proficient readers across several component areas of reading (i.e., word reading, fluency, vocabulary, and comprehension), and these differences were statistically significant. These results were slightly different than the results of Catts and colleagues (2005) in that the participants in the Hock et al. (2009) study had higher rates (61% of the struggling reader sample) of comorbid word reading and comprehension deficits, than comprehension deficits alone. Moreover, students identified with Learning Disabilities (LD) in Hock et al.'s sample

showed similar patterns of weaknesses as the overall struggling reader group, except that students with LD had lower word reading and fluency scores.

Brasseur-Hock and colleagues (2011) used a subset of the same sample of struggling adolescent readers from Hock et al. (2009), and analyzed the component reading skills of adolescents with below average comprehension using latent class analysis. They found that among the group of adolescent struggling readers with below average comprehension, there were distinct subgroups or patterns of weakness, including students who had deficits in reading comprehension, listening comprehension, fluency, moderate weaknesses across components, and severe weaknesses across components (Brasseur-Hock et al., 2011). However, despite these distinct profiles, students scoring at the lowest level on the state reading comprehension assessment, were most likely to struggle across all component areas (i.e., decoding, fluency, and comprehension), rather than just one area alone. Similarly, Cirino and colleagues (2013) extended these findings with a sample of middle school struggling readers in grades 6 through 8 and examined the profiles of typical and struggling readers using confirmatory factor analyses, and found that students with comprehension difficulties often struggled with other component skills such as decoding and fluency. Results from these studies suggest that adolescents often have complex and heterogeneous deficits in reading, suggesting that they may need interventions that target multiple component skills of reading (Biancarosa & Snow, 2006; Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011; Catts, Hogan, & Adolf, 2005; Cirino et al., 2013; Hock et al., 2009; Leach, Scarborough, & Rescorla, 2003;

Spear-Swerling, 2011). These studies have been conducted with adolescents who are monolingual and speak English as their native language; however, it is also important to understand how ELs develop literacy and their profiles, in order to develop interventions to meet the needs of both adolescents ELs with disabilities who have deficits in reading comprehension.

Reading Acquisition and Skills for English Learners

Individuals who are ELs or language minority (LM) develop literacy skills in a similar manner to native English speakers (Chiappe, Siegal, & Wade-Woolley, 2002; Geva & Massey-Garrison, 2012; Lesaux & Geva, 2006). Both ELs and monolingual students need to develop word-level (i.e, decoding) and text-level (i.e., comprehension) skills, both of which are proposed in the SVR that Gough and Tunmer (1986) originally suggested for native English speakers (Lesaux & Geva, 2006). However, while ELs and LMs demonstrate similar levels of proficiency to monolingual students at the word level (e.g., phonological processing, word reading), they often lag considerably behind their monolingual peers in text-level comprehension (Chiappe et al., 2002; Geva & Massey-Garrison, 2012; Lesaux, Crosson, Kieffer, & Pierce, 2010; Lesaux & Geva, 2006). In Geva and Massey-Garrison's (2012) study of the language skills of fifth-grade ELs and monolingual English speakers, they found that poor comprehenders in both groups struggled with language production and understanding. Furthermore, the development of literacy skills and adequate comprehension for ELs is impacted by oral language proficiency and vocabulary (Carlisle, Beeman, Davis, & Spharim, 1999; Lesaux & Geva,

2006; Lesaux & Harris, 2017; Proctor, Carlo, August, & Snow; 2005; Swanson, Rosston, Gerber, & Solari, 2008) and ELs may require extensive instruction both of these areas to supplement word- and text level skills (Lesaux & Geva, 2006; Lesaux & Harris, 2017).

Similar to monolingual adolescents, adolescent ELs are a diverse group of individuals with a wide range of needs (Schonewise & Klingner, 2012). Approximately 57% of adolescent ELs are born in the U.S (Batalova et al., 2007) and are considered long-term English learners, meaning that they have been classified as an EL for seven years or more (Menken et al., 2012). Many of these students demonstrate oral English proficiency, but lack academic literacy skills (Ruiz de Velasco & Fix, 2000; Menken & Kleyn, 2010). Others have varying levels of language proficiency which may impact their academic literacy (Short & Fitzsimmons, 2007). In a study of sixth grade LM and native English speaking students, Lesaux and Kieffer (2010) found that there were three distinct profiles of struggling LM readers, slow word callers, automatic word callers, and globally impaired readers. Slow word callers (60.3% of the sample) had above average decoding skills, but lacked fluency and vocabulary. Automatic word callers (18.3% of the sample) also had above average decoding, but had average fluency, and below-average vocabulary. Globally impaired readers (21.4% of the sample) scored below average on decoding, fluency, and vocabulary. Results from this study suggest that all three groups struggled with vocabulary which impacted their comprehension, but not all students had word or fluency deficits. These results also corroborate the finding from studies of monolingual adolescent struggling readers (Biancarosa & Snow, 2006; Brasseur-Hock et

al., 2011; Catts et al., 2005; Cirino et al., 2013; Hock et al., 2009) that there is heterogeneity within this population with regards to the sources of reading comprehension deficits; however, adolescent ELs who have comprehension difficulties seem to all have low vocabulary skills (Lesaux & Kieffer, 2010). Many teachers lack the professional knowledge for how to provide instruction for adolescent ELs due to the varied sources of comprehension deficits, and there are often few interventions and research-based instructional practices designed to meet their needs (Short & Fitzsimmons, 2007). Moreover, adolescent ELs may have difficulty with comprehending and analyzing complex text that is often seen in the secondary grades, and this may impede their ability to acquire academic content across the curriculum (Francis et al., 2006). One approach to address the complex literacy needs of adolescent ELSWDs who have comprehension deficits is to provide intensive, multi-component reading interventions.

Statement of Purpose

Both the *Improving Adolescent Literacy* guide and *Teaching Academic Content and Literacy to English Learners in Elementary and Middle School* guide published by the Institute of Education Sciences, emphasize the importance of trained specialists providing intensive, small-group and individualized reading and literacy interventions for struggling readers (Baker et al., 2014; Kamil et al., 2008). Additionally, these guidance documents recommend that teachers provide increased opportunities for academic vocabulary development and instruction in comprehension to support acquisition of

academic literacy (Francis et al., 2006). Despite this, there is limited evidence on the effectiveness of reading interventions for adolescents who struggle with comprehension who are ELSWDs. It is of utmost importance to develop and validate appropriate and effective interventions for ELSWDs to increase their academic achievement, school completion, and thus their economic contribution to society (Klingner, Boele, Linan-Thompson, & Rodriguez, 2014; National Research Council, 2011). This used data collected from a blocked, randomized controlled trial of an intervention, the Reading Intervention for Adolescents (RIA), which addressed the word reading and text comprehension deficits of ELSWDs. The overall study (Vaughn, Martinez, Williams, Miciak, & Fall, 2017) examined the efficacy of an intensive two-year reading intervention on reading outcomes for adolescent ELs; however, the original study did not disaggregate data specifically for participants who are dually identified as ELSWDs or after the first year of instruction. The purpose of the current study was to analyze the effects of a year-long intensive reading intervention, RIA, on reading outcomes (i.e., reading comprehension, vocabulary, and word recognition) for adolescent (Grade 9) ELSWDs with reading comprehension deficits.

Chapter II: Review of Literature

This review of the literature summarizes key research in the field surrounding adolescent struggling readers and SWDs, ELs, and ELSWDs. First, because of the emphasis on providing interventions to adolescent struggling readers (Kamil et al., 2008), the research on reading interventions for adolescents is described. Following this section, reading intervention research for ELs and ELSWDs is summarized. Each of these sections emphasizes how the research relates to the Reading Intervention for Adolescents (RIA) in the current study.

Interventions for Adolescent Struggling Readers and SWDs

Over the past 15 years, several syntheses, meta-analyses, and practice guides have provided guidelines or recommendations for improving adolescent literacy, and these recommendations have been incorporated into the development of the RIA (Biancarosa & Snow, 2006; Boardman et al., 2008; Connor, Alberto, Compton, & O'Connor, 2014; Edmonds et al., 2009; Gajria, Jtiendra, Sood, & Sacks, 2007; Herrera, Ruckenmiller, & Foorman, 2016; Joseph & Schisler, 2009; Kamil et al., 2008; Kim, Linan-Thompson, & Misquitta, 2012; Scammacca et al., 2007; Scammacca et al., 2015; Scammacca et al., 2016; Solis et al., 2012; Swanson et al., 2014; Torgesen et al., 2007; Wanzek et al., 2013; Wexler et al., 2008). The recommendations from these sources overlap and provide evidence supporting the focus and components of reading interventions that help increase reading achievement for struggling readers and SWDs with deficits in reading. The recommendations and research supporting them are described in the subsequent sections,

as these provide a conceptual framework for the RIA. First, research is reviewed that supports the areas of focus for adolescent literacy instruction (Boardman et al., 2008) and recommendations improving for adolescent literacy (Kamil et al., 2008), including word study, fluency, vocabulary, comprehension, motivation, intensive interventions, and using content to enhance interventions. Following these sections, the empirical support for the RIA is summarized.

Word Study. Many adolescent struggling readers and SWDs struggle with reading at the word level (Catts et al., 2005; Hock et al., 2009). These students can often read one syllable words with ease; however, they lack strategies for decoding multisyllabic words (Archer, Gleason, & Vachon, 2003). Word reading deficits can be improved with word study, which involves teaching advanced decoding strategies to improve their word analysis and word recognition skills (Boardman et al., 2008; Scammacca et al., 2007). Effective word study teaches students about the structure of words and how to break words into parts and then blend those parts together to read the words (Boardman et al., 2008). Additionally, successful word study instruction teaches students to analyze word parts for meaning, (e.g., pre = before, so prewrite would mean to write before). Several recent syntheses and meta-analyses have examined the impact of word study interventions on reading outcomes for older struggling readers (Joseph & Schisler, 2009; Scammacca et al., 2007; Wanzek et al, 2013). Joseph and Schisler (2009) synthesized the research from 1986 to 2006 on teaching word reading skills to adolescents. Word reading interventions had a large impact on reading fluency (ES =

1.31), and a moderate impact on word recognition (ES = 0.55), pseudoword reading (ES = 0.55), and comprehension (ES = 0.55). Scammacca and colleagues (2007) conducted a meta-analysis of reading interventions for struggling older readers in grades 4-12 from 1980 to 2006. Word study interventions had positive effects on general reading achievement (ES = 0.60) and reading comprehension outcomes (ES = 0.40). In Wanzek et al.'s (2013) review of extensive reading interventions for older struggling readers, reading interventions had a small positive impact on word reading outcomes (ES = 0.15). Results from these meta-analyses and syntheses suggest that teaching word study to adolescent struggling readers has a positive impact on word reading outcomes.

Fluency. Another area of focus recommended for adolescent literacy instruction is reading fluency (Boardman et al., 2008; Torgesen et al., 2007). Fluent reading occurs when students read words automatically and effortlessly as is expected at their grade level. Fluency promotes comprehension as it frees up cognitive resources so students can think about text meaning rather than word decoding thus enhancing comprehension of text (Boardman et al., 2008; LaBerge & Samuels, 1974; Perfetti, 1985). This theoretical relationship between fluency and comprehension has been challenging to support through intervention studies. In a synthesis of fluency interventions for secondary struggling readers, Wexler and colleagues (2008) found that while fluency interventions had a small to moderate effect on fluency outcomes, the increases in fluency did not necessarily lead to improved reading comprehension outcomes. Similarly, in the meta-analysis by Scammacca et al. (2007), fluency interventions had a small positive impact on all reading

outcome measures (ES = 0.26) and reading comprehension measures (ES = 0.26); however, when standardized, norm-referenced measures were analyzed and did not include researcher-developed measures, the effects disappeared. For all standardized reading outcome measures, the effect size was 0.04 and for standardized comprehension measures, there was a negative effect of -0.07 (Scammacca et al., 2007). Results from these meta-analyses suggest that for older struggling readers, increasing reading speed may not be as beneficial as it is for younger struggling readers (Scammacca et al., 2007; Wexler et al., 2008). Recent research since 2010 has demonstrated an increased focus on reading comprehension within multicomponent interventions, and less of an emphasis on single component interventions such as word study and fluency (Scammacca et al., 2016). Interventions that include fluency training may need to be part of a multicomponent reading intervention that targets other skills areas such as comprehension.

Vocabulary. Vocabulary knowledge is highly correlated with reading achievement in the secondary grades (Beck, Perfetti, & McKeown, 1982; Cunningham & Stannovich, 1998). According to Boardman et al. (2008), "vocabulary knowledge involves word consciousness, the awareness of the richness and varied uses of language" (p.13). Typically developing students learn vocabulary words through repeated exposures in text; however, struggling readers lack this exposure to text and often fall behind their grade-level peers, and this has been coined, "The Matthew Effect" (Stanovich, 1986). Multiple sources recommend incorporating direct and explicit vocabulary instruction to

improve text comprehension for struggling readers and SWDs (Boardman et al., 2008; Elleman, Lindo, Morphy, & Compton, 2009; Kamil et al., 2008; Torgesen et al., 2007). Kamil et al. (2008) recommends that teachers (1) schedule time to explicitly teach vocabulary, (2) plan for repeated exposures to words in oral and written contexts, (3) allow for multiple opportunities for practice, and (4) teach students strategies for independent vocabulary learning. Scammacca and colleagues (2015; 2016) have found that vocabulary interventions often have large effects on vocabulary outcomes, but more recently have been included in multicomponent reading interventions that also target comprehension. In an earlier meta-analysis of reading interventions, Scammacca et al. (2007) found that vocabulary interventions had a mean effect size of 1.62 on all reading outcomes combined. In a meta-analysis conducted by Elleman and colleagues (2009), vocabulary instruction improved reading comprehension measures that were aligned to the treatment condition (ES = 0.50), but were less effective for standardized measures of reading comprehension (ES = 0.10). But, when students with reading difficulties received vocabulary instruction, their reading comprehension improved three times as much as students without reading difficulties (Elleman et al., 2009), suggesting that vocabulary instruction may be more beneficial for struggling readers.

Comprehension. Multiple sources recommend providing direct and explicit comprehension instruction to struggling readers and SWDs (Biancarosa & Snow, 2006; Boardman et al., 2008; Herrera et al., 2016; Kamil et al., 2008; Torgesen et al., 2008). When readers struggle with comprehension, they fail to monitor what they read and they

do not make connections to content they have previously learned (Boardman et al., 2008). Students benefit from learning comprehension strategies that have them summarize main ideas, ask and answer questions, paraphrase text, draw inferences, and use graphic organizers (Kamil et al., 2008). Edmonds and colleagues (2009) synthesized the literature on reading interventions from 1994 to 2004 for students in grades 6 through 12 and found that comprehension interventions had a large positive impact on comprehension outcomes (ES = 0.89). Smaller effects were found for standardized measures of comprehension (ES = 0.47) and larger effects for researcher-developed measures (ES = 1.19). They also conducted a moderator analysis for type of intervention (i.e., word study, fluency, comprehension, multicomponent), and found that word study and fluency interventions did not significantly improve comprehension outcomes, but both multicomponent and comprehension interventions did have a significantly large positive impact on comprehension outcomes.

Scammacca et al. (2007) investigated the impact of the effectiveness of reading interventions for older struggling readers in grades 4 through 12 from 1980 to 2004. Thirty-one studies were included in the meta-analyses and reading interventions had a significant positive effect on reading comprehension outcomes (ES = 0.97). In the moderator analysis, interventions that taught comprehension strategies had an effect size of 1.35 on all reading comprehension measures and a slightly smaller effect of 0.54 on standardized reading comprehension measures, which is similar to the findings of Edmonds et al., (2009). Multicomponent interventions also had a large positive impact on

all reading outcome measures (ES = 0.80) and on standardized reading comprehension measures (0.59). This meta-analysis also conducted a moderator analysis using the LD status of the participants (i.e., all LD, some LD, none LD) in the original studies, and found that when all or some of the sample in the original studies were identified with LD, that participants made significant gains on reading outcomes. When all participants were identified with LD, the effect size was 1.19 across all outcome measures, 0.51 for standardized measures, and 1.33 for all reading comprehension measures (Scammacca et al., 2007). Similarly, when some of the sample was identified with LD, the effect size for all outcome measures was 0.86, 0.44 for standardized measures, 0.82 for all reading comprehension measures, and 0.45 for standardized reading comprehension measures.

In 2015, Scammaca and colleagues updated the 2007 meta-analysis to include additional published research from 2005 to 2011, and the goal was to reexamine the overall effectiveness of interventions, as well as identify and trends over time in the research. Reading interventions had a positive impact on reading comprehension outcomes, however the effect was smaller than in the 2007 analysis (ES = 0.45). Additionally, reading interventions also had less of an impact on standardized measures of reading comprehension (ES = 0.24). When disaggregating by type of intervention, Scammacca et al. (2015) found that comprehension interventions had the largest impact on comprehension outcomes. Furthermore, moderator analyses were conducted to examine the impact of interventions at the middle school (grades 6 through 8) versus the high school (grades 9 through 12) levels, and the results suggested that interventions

conducted in high schools had a smaller impact on reading comprehension outcomes (ES = 0.28) than those conducted in middle-school (ES = 0.55). Differences were even more pronounced for standardized comprehension measures, and high school reading interventions had an effect of 0.10 compared with middle school effects of 0.30.

In 2016, Scammaca and colleagues further updated this line of research for a review of 100 years of research in reading instruction. They now included studies published from 2010 to 2014 and examined trends across time. Of interest was the fact that the type of the intervention, type of participants, and the comparison conditions had changed considerably over the years. In the past, interventions had focused solely on word study or fluency; however, research since 2010 overwhelmingly focused on comprehension or multicomponent interventions (Scammacca et al., 2016). Additionally, instead of focusing on disability groups (e.g., LD, EBD), the newer corpus of studies used participants identified as struggling readers. Lastly, Scammaca and colleagues noted that the comparison or Business as Usual (BaU) group had changed. Since the advent of frameworks and research to support struggling readers, participants in comparison conditions were now receiving higher-quality instruction, possibly leading to a decline in the overall effectiveness of reading interventions (Scammacca et al., 2016).

Other syntheses and meta-analyses have also been published that examine the impact of comprehension interventions for middle school students with LD (Kim et al., 2012; Solis et al., 2012). Kim et al. (2012) analyzed various features of comprehension interventions from 1990 to 2010 and found that comprehension strategy instruction was

beneficial for students with LD. Main idea and summarization strategies had an effect of 1.41 on all reading comprehension measures and an effect of 0.84 on standardized measures. Other common strategies in the interventions included self-monitoring, identifying text structure, collaborative strategic reading, and identifying themes (Kim et al., 2012). Solis et al. (2012) synthesized the research on comprehension interventions for students with LD from 1979 to 2009 and found that most of the interventions used strategy instruction to teach main ideas and summarization.

Results from these syntheses suggest that for adolescent struggling readers and SWDs with deficits in reading, comprehension interventions and multicomponent interventions with comprehension components are beneficial and lead to improved comprehension outcomes, although greater effects are seen for proximal measures. Additionally, as adolescents transition from middle school to high school, it seems to be more difficult to detect effects on proximal and standardized measures of reading comprehension, indicating a need for continued intervention at the high school level (Scammacca et al., 2016).

Motivation. For struggling adolescent readers and SWDs, increasing motivation for reading is critical to improving literacy (Biancarosa & Snow; Boardman et al., 2008; Kamil et al., 2008; Torgesen et al., 2007). Several studies have examined the relationships between motivation and reading in adolescents. McGeown, Duncan, Griffiths, and Stothand (2015) found that reading motivation was a predictor of comprehension and summarization when controlling for word reading and text reading

speed for students ages 11 to 16. Guthrie and colleagues (2013) conducted a quasi-experimental study of the effects of a collaborative and strategy-based reading intervention (Concept-Oriented Reading Instruction, CORI) on reading motivation and engagement outcomes for seventh grade students, and found that students who participated in the intervention had higher levels of motivation, engagement, and achievement. Additionally, they determined that motivation mediated achievement and increased motivation was related to increases in reading achievement (Guthrie, Klauda, & Ho, 2013). In another study of the CORI intervention, Guthrie and Klauda (2014) examined the impact of CORI with embedded supports for engagement and motivation for seventh graders with a within-subjects design. The CORI intervention had a positive impact on informational text comprehension (ES = .26).

Results from these studies highlight the importance of motivation for adolescents, particularly those who are struggling readers and in need of intervention. In the *Improving Adolescent Literacy* practice guide, Kamil et al. (2008) provide four different research-based recommendations for increasing motivation with struggling adolescent readers:

> (1) establish meaningful and engaging content learning goals around the essential ideas of a discipline as well as the specific learning processes students use to access those ideas
>
> (2) provide a positive learning environment that promotes students' autonomy in learning

(3) make literacy experiences more relevant to students' interests, everyday life, or important current events

(4) build in certain instructional conditions such as student goal setting, self-directed learning, and collaborative learning to increase reading engagement and conceptual learning for students. (pp. 28-29)

These recommendations provide insight into strategies for increasing motivation and in turn, increasing academic achievement for adolescent struggling readers and SWDs. Each of these recommendations have been incorporated in the RIA to increase student motivation.

Intensive Intervention. The last recommendation in the guide for improving adolescent literacy is to provide intensive and individualized interventions for struggling readers (Kamil et al., 2008). Intensive interventions are typically implemented within a Response to Intervention (RTI) framework, which is a multi-tiered system of support in schools which aims to address the academic needs of students through screening, monitoring, and data-based decision making (National Center on Response to Intervention, [NCRTI], 2010). The first level of prevention, or Tier 1, emphasizes high-quality research-based instruction in all classes, and the second level of prevention, Tier 2, emphasizes evidence-based, small group instruction that supplements Tier 1 instruction (NCRTI, 2010). Students who do not respond to Tier 1 or Tier 2 interventions typically begin receiving more intensive support or interventions in Tier 3. Tier 3 interventions, also known as "intensive interventions" can be made more intense through quantitative

changes such as reducing the number of students in an intervention group, increasing instructional time through session frequency or length, and/or creating more homogenous instructional groups (Danielson & Rosenquist, 2014; Vaughn, Denton, & Fletcher, 2010; Vaughn, Zumeta, Wanzek, Cook, & Klingner, 2014). Qualitative changes can also be made to increase intervention intensity. These changes include providing more explicit and systematic instruction and/or additional opportunities for practice with high-quality feedback (Danielson & Rosenquist, 2014; Vaughn, Denton, & Fletcher, 2010; Vaughn, Zumeta, et al., 2014).

Many struggling readers and SWDs need intensive reading interventions that are designed to address their unique needs, and recently there has been an increased emphasis on implementing intensive reading interventions (Fuchs, Fuchs, & Vaughn, 2014; Vaughn et al., 2010; Vaughn & Wanzek, 2014). The Office of Special Education Programs funded the National Center on Intensive Intervention in 2011 (www.intensiveintervention.org). This center provides technical assistance to districts to help them implement intensive interventions through technical review committees to evaluate intervention programs, assessment tools, and implementation strategies, and evaluation of the use of intensive interventions in schools. Additionally, the Division for Learning Disabilities (DLD) released a position statement recommending that students at-risk for and with LD are provided with intensive evidence-based interventions to supplement their accommodations and modifications so that they can fully access the general education curriculum (Vaughn, Zumeta, et al., 2014).

Wanzek and colleagues (2013) conducted a systematic review of what they defined as "extensive" reading interventions (i.e., those with 75 sessions or more) in grades 4-12 from 1995 to 2011. Studies of extensive reading interventions were found to have small, but positive effects on reading outcomes (i.e., reading comprehension, fluency, word reading, and spelling). Since the publication of this 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 approximately 80 sessions. Treatment students did not outperform control students on measures of reading comprehension; however, treatment students did perform on average 6 standard score points higher than control students, suggesting that there may have been a lack of statistical power to detect an effect (Solis et al., 2015). Furthermore, there was a significant interaction between decoding ability (high versus low), and students with higher decoding skills performed significantly better on reading outcomes 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 effect sizes of 1.66

on the GRADE assessment (Williams, 2001) and 1.04 on the Measures of Academic Progress (MAP) assessment.

Using Content to Enhance Instruction. Both Biancarosa and Snow (2006) and Torgesen and colleagues (2007) emphasized the importance of using content area texts in language arts, social studies, science to help enhance reading skills. Teachers can embed cognitive strategies such as visual imagery, self-questioning, paraphrasing into lessons using content area texts (Biancarosa & Snow, 2006). Furthermore, teachers can enhance their content area instruction by using graphic organizers, outlines, reviews, and discussions (Biancarosa & Snow, 2006; Torgesen et al., 2007). In 2007, Garjria et al. synthesized 29 studies that were conducted to improve expository text comprehensions for students with LD. They found that two types of interventions were commonly used to support expository text comprehension: content enhancement routines and cognitive strategy instruction (Garjria et al., 2007). The content enhancement routines included activities such as using advanced organizers, graphic organizers, visuals, mnemonics, computerized instruction, and the cognitive strategy instruction included teaching students about common text structures, how to identify main ideas, summarizing, question generation, cognitive mapping, and reciprocal teaching (Garjria et al., 2007). More recently, Swanson and colleagues (2014) conducted a synthesis and meta-analysis of reading interventions that used social studies content on reading and content outcomes for students with LD and found a mean effect size of 1.02. While the analysis included studies of students in all grades, studies with students in grades 7-12 had greater effects

than those for younger students. The studies included in this analysis used a variety of content area strategies in the interventions, including some of those suggested by Biancarosa and Snow (2006) and Torgesen and colleagues (2007). Interventions with social studies content included graphic organizers, mnemonics, reading and answering questions, guided notes, and multicomponent comprehension instruction (Swanson et al., 2014).

Seifert and Espin (2012) examined the effect of three different reading approaches for science text for tenth grade students with LD. In the first approach, text reading, students practiced reading content words in isolation and then completed repeated readings of science text. In the vocabulary condition, students had to read ten words and their definitions aloud until they could repeat the definition and answer two basic questions about the word. In the third condition, students received both the vocabulary and the text reading approaches. Both the text-reading and combined conditions positively impacted reading fluency measures. Additionally, the researchers found that students who received vocabulary intervention alone or in the combined intervention performed significantly higher on vocabulary outcomes than students in the text reading only or control conditions. There were no differences between groups on the comprehension outcomes. Results from this study suggest that science text can be incorporated into reading interventions for adolescent SWDs as a means of improving reading fluency and vocabulary. The RIA incorporates this body of research and uses

science and social studies text, as well as cognitive strategy instruction to enhance reading instruction.

Summary. A review of research on SWDs and struggling readers reveals several practices associated with improved outcomes: (1) providing intensive interventions, possibly across multiple years, (2) incorporating word study, fluency, vocabulary, and comprehension strategy instruction into those intensive interventions, (3) adding motivational supports to improve outcomes, and (4) using content to enhance reading instruction. In the current study, we explore the efficacy of RIA, which is an intensive intervention that incorporates each of the aforementioned components and enhancements. The following section describes research on reading interventions with ELs, and highlights the similarities to the recommendations for adolescent struggling readers.

Reading Interventions for English Learners

Many adolescent ELs continue to struggle with vocabulary and reading comprehension even after developing proficient word reading skills (Lesaux & Harris, 2017; Lesaux & Kieffer, 2010). While these difficulties are well established, considerably less is known about effective reading interventions for ELs in middle and high school. Many of the syntheses and meta-analyses of reading instruction for ELs have focused on all grade levels (K-12) (Richards-Tutor, Baker, Gersten, Baker, & Smith, 2016; Shannahan & Beck, 2006) or on either combined elementary and middle school populations (Baker et al., 2014; Cisco & Padron, 2012; Gersten & Baker; 2000; Hall et al., 2016) or elementary-only populations (Cheung & Slavin, 2012). None have focused

exclusively on the secondary grades or high school. The following section will describe the results from these syntheses and meta-analyses, with an emphasis on the impact of interventions for secondary students. It is important to note that throughout these syntheses and meta-analyses, "ELs" are defined somewhat differently; however, they each emphasize that participants' native language is not English. Then, individual studies pertaining to reading instruction for adolescent ELs will be described.

In 2000, Gersten and Baker conducted a qualitative synthesis to examine the available research on effective instructional practices for ELs in the elementary and middle grades. At this time, only nine studies consisted of interventions for ELs and there were 15 descriptive studies. Gersten and Baker (2000) identified three themes from the research: (1) language development should be incorporated into content area learning, (2) there exists a relationship between promising approaches for ELs and the research on effective teaching, and (3) there was confusion about the role of oral language in the classroom. In the second theme, Gersten and Baker (2000) identified several promising practices for ELs that included the use of strategies for vocabulary development with visuals to reinforce instruction, cooperative and peer-learning groups, strategic use of native language to support instruction, and different cognitive and language demands for instructional activities.

In 2006, Shannahan and Beck conducted a synthesis and meta-analysis of effective literacy interventions for ELs as part of the report of the National Literacy Panel on Language-Minority Children and Youth. Seventeen studies that taught individual

components of literacy in isolation (e.g., word reading, fluency, comprehension) were included in the review, and only three focused on high school participants. Twenty-two studies examined multicomponent literacy interventions, and only two of those studies were conducted with participants in high school. Shannahan and Beck (2006) concluded that while there was a lack of studies with high quality designs, the approaches used for native English speakers also appeared to work for ELs. Despite this, overall effects on reading outcomes (e.g., word study, comprehension) were much lower than the effects seen with native English speakers, and many of the studies reviewed had negligible effects on comprehension.

More recently, Richards-Tutor and colleagues (2016) examined the impact of reading interventions for ELs in grades K-12 from 2000 to 2012. Twelve studies were included in the synthesis, of which ten were conducted in the primary or elementary grades (K-5) and only two included older ELs in the middle grades (6-8). Approximately half of the studies were multicomponent interventions, while the other half focused on individual components of reading (e.g., word study, fluency). For the studies conducted with older students, small to moderate effects were observed for word study outcomes. Furthermore, even though ELs struggle with oral language and vocabulary, only four studies measured vocabulary or oral language, and negligible effects were found for those outcomes (Richards-Tutor et al., 2016). Eight studies did assess comprehension on cloze tasks and the median effect on these measures was 0.22 and only two studies assessed

text comprehension and the median effect was -0.48. Results from this synthesis demonstrate a need for more high-quality research for older struggling ELs.

One synthesis and one meta-analysis examined reading instruction for students in the middle grades (Cisco & Padron, 2012; Hall et al., 2016). Cisco and Padron (2012) examined studies from 1989 to 2010 that emphasized vocabulary and strategy instruction designed to increase comprehension for ELs in grades 5 through 8. Eleven studies were included in this qualitative review and results highlighted the importance of providing vocabulary instruction for supporting comprehension development, using students' first language to support comprehension, and providing strategy-instruction to support comprehension (Cisco & Padron, 2012). In the meta-analysis conducted by Hall and colleagues (2016), the impact of reading interventions for ELs in grades 4 through 8 was investigated. The mean effect of interventions on all reading measures was 0.35; however, there was no effect of the interventions on standardized reading measures (ES = 0.01). Multicomponent interventions that targeted comprehension had a larger impact on comprehension outcomes than those that focused on vocabulary alone (Hall et al., 2016).

The practice guide, *Teaching Academic Content and Literacy to English Learners in Elementary and Middle School* (Baker et al., 2014), also provides recommendations for instruction for ELs based on an analysis of available literature. Baker and colleagues (2014) recommend:

(1) Teach a set of academic vocabulary words intensively across several days using a variety of instructional activities

(2) Integrate oral and written English language instruction into content area teaching

(3) Provide regular, structured opportunities to develop written language skills

(4) Provide small group instruction intervention to students struggling in the areas of literacy and English language development. (p. 3)

Several studies of reading interventions with adolescent ELs have incorporated some or all of these practices recommended by Baker et al. (2014). Vaughn and colleagues (2017) randomly assigned teachers to deliver a reading intervention with social studies content, Promoting Adolescents' Comprehension of Text (PACT), that was modified to include enhancements for ELs or continue regular practices with eighth grade students. ELs who received intervention scored significantly higher than ELs who did not receive intervention on measures of content knowledge acquisition and content-related reading comprehension. Vaughn and colleagues (2009) conducted a similar evaluation of the PACT intervention with two non-overlapping samples of seventh grade ELs and found that students who received the intervention performed significantly higher on measures of vocabulary and comprehension, and that the intervention was beneficial for both ELs and native-English speakers. The Reading Intervention for Adolescents (RIA) incorporates these recommendations from Baker et al. (2014) into the intervention and emphasizes academic vocabulary, as well as instruction and structured opportunities for students to develop oral and written language in the content areas.

Summary. While several syntheses and meta-analyses have been conducted to examine the impact of reading instruction and interventions for students who are not native-English speakers, there are few studies that address the needs of adolescent ELs who struggle with reading. From the studies that do focus on this population, it can be concluded that interventions: (1) integrate vocabulary instruction to support comprehension outcomes, (2) teach comprehension strategies, and (3) provide opportunities for students to develop oral and written language. These recommendations are similar to those suggested for native English speaking adolescents who are struggling readers, as they emphasize both vocabulary and comprehension instruction, and thus, are incorporated into the RIA.

Interventions for English Learners with Disabilities

In the United States, there are approximately 665,000 (13.8%) ELs who also have disabilities (ELSWDs) (McFarland et al, 2017). Adolescent ELSWDs struggle with reading achievement and score significantly lower on the eighth and twelfth grade NAEP than ELs only or SWDs only (NCES, 2016). An analysis of the NLTS-2 conducted by Trainor, Murray, and Kim (2017) found that most ELSWDs were Hispanic, living in poverty, and receiving special education services in the areas of Learning Disability (LD), Intellectual Disability (ID), Emotional/Behavioral Disorder (EBD), and Speech/Language Impairment (SLI), with LD being five times more prevalent than other disability categories.

Even though there is a growing population of ELSWDs across the country and many continue to struggle with reading achievement, there are relatively few studies of reading interventions for struggling readers who are ELSWDs (Klingner, Artiles, & Barletta, 2006). Two studies have examined the efficacy of multi-component reading interventions for adolescent ELSWDs with reading difficulties (Denton, Wexler, Vaughn, & Bryan, 2008; Wanzek, Swanson, Vaughn, Roberts, & Fall, 2016). Denton and colleagues (2008) conducted a randomized control trial of a multicomponent reading intervention for students in grades 6-8 with severe reading difficulties. The majority of the students in the sample were receiving special education or remedial reading services and were identified as ELs, and students received either the multi-component treatment or the school provided reading intervention. The treatment lasted 14 weeks and was conducted in small groups for 40 minutes daily. Students in treatment did not outperform students in the comparison condition who received either remedial reading or special education classes on measures of word recognition, comprehension, or fluency (Denton et al., 2008). In the study conducted by Wanzek, Swanson, Vaughn, Roberts, and Fall (2016), researchers examined the effects of the PACT intervention on content knowledge and comprehension outcomes for eighth grade SWDs who were and were not identified as ELs within the previous two years. They also examined the differential effects of the intervention for ELSWDs versus SWDs only. All SWDs who received the PACT intervention significantly outperformed students in the comparison condition on the measure of content knowledge (ES = .51). There were no differential effects between

ELSWDs and native-English speaking SWDs, indicating that the treatment was equally effective for both groups of students.

Two additional studies of adolescent ELSWDs have investigated single-component interventions (i.e., vocabulary, phonics) on reading and writing outcomes (Helman, Calhoon, & Kern, 2015; Reed, 2013). Helman, Calhoon, and Kern (2015) conducted a single-subject multiple-baseline design study with three ninth and tenth grade ELSWDs to examine the impact of a science vocabulary intervention on vocabulary outcomes. Each of the participants in the study showed an increase in strategy use following the intervention. Reed (2013) examined the impact of an explicit phonics and sight word intervention on letter-sound and word identification of 4 eighth-grade ELs with ID. This study employed a randomized single-subject design. Both the explicit phonics and sight word treatments led to increases on the Basic Phonics Skills Test-III. Both of these studies (Helman et al., 2015; Reed, 2013) had very small samples used single-subject designs. Findings from the corpus of studies with ELSWDs with reading difficulties indicates that very little high-quality quasi-experimental and randomized controlled trials exist in this field. Additionally, most of these interventions were short in length and did not provide instruction for a prolonged period of time.

Summary. It is difficult to discern the effectiveness of reading interventions for adolescent ELSWDs due to the weaknesses in the aforementioned body of research. Thus, the RIA aims to address these weaknesses by providing a high-quality, quasi-experimental, multi-component intensive reading intervention for one full year for ninth

grade ELSWDs with deficits in reading comprehension. The following section describes the RIA and how it relates to the recommendations for improving adolescent literacy for ELs and SWDs.

Reading Intervention for Adolescents (RIA)

The purpose of the current study was to evaluate the effects of the Reading Intervention for Adolescents (RIA), which is a multicomponent intensive intervention previously developed for use with monolingual adolescent struggling readers and SWDs. The efficacy of RIA has been evaluated across multiple studies (Roberts et al., 2013; Vaughn, Roberts, Schnakenberg, et al, 2015; Vaughn, Roberts, Wexler, et al., 2015). RIA consists of two different instructional phases, which are derived from the aforementioned research on reading interventions for struggling adolescent readers and SWDs, ELs, and ELSWDs. Phase I emphasized word study, fluency, vocabulary, and comprehension at the sentence and paragraph level, while Phase II of the intervention built on Phase I instruction and emphasized vocabulary and comprehension with content area texts. Each phase lasted for approximately four months of the school year.

Phase I. In the current study, word study, fluency, and vocabulary were addressed through the *Reading Excellence: Word Attack and Rate Development Strategies (REWARDS) Secondary* program (3rd edition), which is an explicit instruction program designed for students in grades 6-12 (Archer, Gleason, & Vachon, 2014). The program taught students a flexible strategy for decoding multisyllabic words which involves (1) looking for prefixes, suffixes, and vowels, (2) saying the parts of a word, (3) saying the

whole word, (4) making it a real word. Additionally, it focused on building vocabulary knowledge through teaching students to read and understand common affixes and academic vocabulary they were likely to encounter in their content area classes. Lessons were sequenced to review the prerequisite skills for advanced multisyllabic word reading, such as correct pronunciation of vowel sounds, affixes, and word parts in isolation, and students had multiple opportunities to practice reading those words in isolation, sentences, and passages to develop automaticity.

REWARDS Research. The impact of *REWARDS* programs (both intermediate and secondary) has been examined as a part of multi-component reading interventions, as well as in stand-alone evaluations (Kundert et al., 2012a, Kundert et al., 2012b, Kundert et al., 2012c; Shippen et al., 2005; Vaughn et al., 2010; Vaughn, Roberts, Schnackenberg et al., 2015). In several technical reports from the *New York State Striving Readers Review*, Kundert and colleagues (2012a, 2012b, 2012c) found that students receiving the *REWARDS* intervention significantly outperformed students not receiving the intervention in the areas of multisyllabic word reading in isolation, mean oral reading fluency, and reading comprehension. In another study, *REWARDS Secondary* (Archer, Gleason, & Vachon, 2005) was compared to *Corrective Reading Decoding* (McGraw-Hill, 2008), and while there were no significant differences between treatment groups, all participants increased their word reading efficiency, reading rate, reading accuracy, and reading fluency (Shippen et al., 2005). Teachers reported that the programs were feasible to implement; however, students reported liking the *REWARDS* program more than

Corrective Reading Decoding (Shippen et al., 2005). Vaughn and colleagues (2010; 2015) used *REWARDS Intermediate* and *REWARDS Secondary* as part of multi-component reading interventions for struggling readers in the secondary grades. Although it is not possible to discern the impact of the *REWARDS* programs alone, students who participated in these interventions made statistically significant gains on measures of word attack, spelling and passage comprehension (Vaughn et al., 2010; Vaughn, Roberts, Schnackenberg et al., 2015).

Phase I also included explicit instruction in comprehension strategies through *Collaborative Strategic Reading* (CSR), which is a text-based collaborative learning approach (Klingner & Vaughn, 1998). Previous meta-analyses and recommendations for adolescents have indicated that adolescents benefit from explicit instruction in comprehension strategies (Biancarosa & Snow, 2006; Edmonds et al., 2009; Kamil et al., 2008). CSR teaches students strategies for comprehension before, during, and after reading and they work together in small groups of four to five students to implement these strategies. Before reading text, students learn to preview the text by identifying the topic of the reading and brainstorming what they already know to activate prior knowledge. Then, the teacher sets the purpose for reading the selection. During reading, students learn to monitor their comprehension with the "Click and Clunk" strategy, in which they identify unknown words (clunks), and use fix-up strategies to determine the meaning of those unknown words. The four fix-up strategies are (1) re-read the sentence with the clunk, (2) re-read the sentences before and after the clunk, (3) look for prefixes,

suffixes, and root words, and (4) look for cognates. While reading, students generate main idea sentences, or "Gists." They determine who/what a section of text is about, the most important information about the who/what, and then combine that information into a sentence of about 10 words in length. Students complete the "Click and Clunk" and "Get the Gist" strategies while reading each section of text. After reading, students generate and answer three different types of questions from the text: (1) Right There, (2) Think and Search, and (3) Author and You. Students then summarize the text by developing review statements of one to two sentences in length.

CSR Research. The efficacy and effectiveness of CSR has been evaluated in a few different studies (Boardman et al., 2016; Boardman et al., 2015; Klingner, Vaughn, & Schumm, 1998; Vaughn et al., 2011). Klinger, Vaughn, and Schumm (1998) investigated the use of CSR in fourth-grade social studies classrooms and found that students in the treatment condition significantly outperformed control students on measures of reading comprehension. Similar results were found in a study of the efficacy of CSR on reading comprehension for seventh and eighth grade students (Vaughn et al., 2011). Students who were randomly assigned to receive reading intervention outperformed students in the business as usual (BAU) condition on a standardized measure of reading comprehension. In a cluster randomized trial, middle and high school science and social studies teachers were trained to implement CSR, and students who used CSR in these content area classes at least once a week had significantly higher reading comprehension outcomes that students who did not receive intervention

(Boardman et al., 2015). In an analysis of two separate studies of CSR, Boardman and colleagues (2016) found that higher quality CSR instruction was associated with higher comprehension scores for students with disabilities.

Phase II. Phase II of the intervention focused on vocabulary and comprehension, and emphasized the application of the strategies learned in Phase I with content area text. The units in Phase II were aligned with science and social studies content that students were taught in their core curriculum classes. Each instructional unit was based around a content area text and was 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 comprehension strategies that were taught in phase I. Additionally, in each unit, students practiced summarizing text and participate in structured discussions. Both activities are designed to allow students to think critically about text and provide them with opportunities to use academic language in speaking and writing. High quality discussions give students the opportunity to further their understanding of content (Kamil et al., 2007).

Empirical Support for RIA

The efficacy of the RIA has been tested in several studies (Roberts et al., 2013; Vaughn, Roberts, Schnakenberg et al., 2015; Vaughn, Roberts, Wexler et al., 2015). It was first evaluated in a randomized control trial of response to intervention (RTI) in middle schools (Roberts et al., 2013), and students who received continued intervention

throughout middle school significantly outperformed those students who did not receive intervention, with a small to moderate effect across word reading and comprehension measures ($g = 0.26$). RIA was then tested in a sample of ninth and tenth grade struggling readers in a two-year randomized control trial (Vaughn, Roberts, Wexler, et al., 2015). Students assigned to the reading intervention made significant gains on a standardized measure of reading comprehension ($g = 0.43$). This data was then disaggregated to determine the impact of the intervention for students with disabilities (SWDs), and the research team found similar results. SWDs who received the reading intervention significantly outperformed SWDs in the BAU group ($g = 0.44$) on measures of reading comprehension (Vaughn, Roberts, Schnakenberg, et al., 2015).

The Overall Study: RIA with ELs

Most recently, the efficacy of the RIA has been evaluated for ELs with reading comprehension deficits (Vaughn, Martinez, Williams et al., 2017). In this blocked, randomized controlled trial examining the efficacy of the RIA and a dropout prevention program, participants were recruited from three high schools in a large urban city. All eighth-grade students who were projected to attend the three selected high schools were screened for participation. To be eligible for participation in the overall study, participants had to meet 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 Texas, LEP is the official

term for students who are identified as ELs, so for the purpose of the current research study, these two terms are synonymous. The high-stakes assessment used was the State of Texas Assessments of Academic Readiness, which assesses students' understanding and analysis of literary and informational texts with 44 multiple choice text-based questions (Texas Education Agency, 2016). While the STAAR assessment is a new assessment for the state, the previously version of the state reading test, the Texas Assessment of Knowledge and Skills (TAKS), has been used as a reliable and valid tool for screening for reading comprehension difficulties. It was used in studies with struggling readers in middle and high school to identify participants who have difficulty with reading comprehension (Solis et al., 2014; Vaughn & Fletcher, 2012; Vaughn, Roberts, Wexler, et al., 2015; Vaughn, Roberts, Schnackenberg, et al., 2015). The sample of participants for the overall study did not include newcomer ELs who have been in the U.S. for less than a year, as these students often have very limited English proficiency and RIA is not designed to address all of the needs of these students.

Following screening, eligible ninth-participants were 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. Participants were assigned to receive intervention for two years in grades 9 and 10, and follow-up data will be collected in grades 11 and 12. This study is currently ongoing, but data have been collected after the first year of intervention for ninth grade participants. Preliminary analyses (Martinez et al., 2017) show that while

there were not statistically significant main effects of the reading intervention on reading outcomes, that students with a current LEP designation who received the RIA (RIA only or RIA+DO) outperformed current LEP students in the comparison condition (DO and BAU) on the *Test of Silent Reading Efficiency and Comprehension* (Wagner et al., 2010). There were also significant treatment effects for students in the reading treatment on the proximal vocabulary measure for both current (ES = .38) and former (ES = .58) LEPs, and students who were former LEPs who received reading treatment had higher course grades in English/Language Arts courses than students in the comparison condition (ES = 0.36). The current study sought to extend the findings of Martinez and colleagues (2017) and determine the efficacy of the RIA after one year of instruction for ninth grade students who are identified as ELSWDs. Due to the differential effects of treatment for current versus former LEP students in the overall study after one year of intervention, the current study examined the data to see if differential treatment effects exist for ELSWDs.

Theoretical Framework of the RIA

The Reading Intervention for Adolescents (RIA) was derived from several was derived from several different theories of reading development including 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). Several studies pertaining to adolescent literacy support this theory. In a

series of studies on reading interventions at the middle school level, Calhoon and Petscher (2013) systematically manipulated the order of the intervention components (i.e., decoding, fluency, spelling, and comprehension) to determine if order impacted reading achievement. Students who had lower comprehension skills at the beginning of the studies made larger gains in comprehension when provided with interventions that focused on basic word reading and decoding first, before providing comprehension instruction. Solis and colleagues (2015) conducted an intensive reading intervention with ninth-grade students and found that students with higher decoding skills made statistically higher gains on reading outcomes than students with lower decoding skills. Results from these studies suggest that if interventions front-load on lower-level reading skills such as decoding, spelling, and/or fluency, then this will allow students to develop automaticity which will allow them to then focus on comprehension in later phases of the intervention (Calhoon & Petscher, 2013). The RIA addresses this through its two phases, with Phase I having a strong emphasis on advanced word study and decoding skills.

The RIA was developed using the literature on cognitive-behavioral theory which 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). In a synthesis of the impact of cognitive-strategy instruction for improving expository text comprehension of students with LD, Jtiendra, Burgess, and Gajria (2011) found that group design studies that employed cognitive strategy instruction had an impact of 1.46 on reading outcomes. The RIA provides a set of cognitive strategies through Collaborative Strategic Reading. The interventionists model the strategy while explaining how, when, and where to use it, guide students through the steps of the strategy and provide corrective feedback, and gradually release responsibility to the students.

Summary of Literature

The literature summarized in the previous sections describes the research on reading interventions for struggling readers and SWDs, ELs, and ELSWDs. It provides a framework for understanding how the RIA was developed for adolescent struggling readers and SWDS, as well as how it was enhanced to meet the needs of ELs. Adolescent struggling readers need intensive interventions that incorporate word study, fluency, vocabulary, comprehension strategy instruction, and motivational support (Biancarosa & Snow, 2006; Boardman et al., 2008; Connor, Alberto, Compton, & O'Connor, 2014; Edmonds et al., 2009; Gajria, Jtiendra, Sood, & Sacks, 2007; Herrera, Ruckenmiller, & Foorman, 2016; Joseph & Schisler, 2009; Kamil et al., 2008; Kim, Linan-Thompson, & Misquitta, 2012; Scammacca et al., 2007; Scammacca et al., 2015; Scammacca et al., 2016; Solis et al., 2012; Swanson et al., 2014; Torgesen et al., 2007; Wanzek et al., 2013;

Wexler et al., 2008). These intensive reading interventions can be enhanced by using content area materials (e.g., science, social studies) (Biancarosa & Snow, 2006; Torgesen et al., 2007), as well as by adding explicit opportunities for ELs to learn academic vocabulary and to practice using oral and written language (Baker et al., 2014). Considerably less is known about how to improve reading for adolescent ELSWDs, and relatively few studies have addressed the unique needs of this population. The current study aimed to address this gap in the research, and investigated the effects of the RIA on reading outcomes for ELSWDs with comprehension deficits.

Chapter III: Method

This quasi-experimental study examined the effects of a year-long intensive reading intervention on reading outcomes for ninth-grade ELSWDs who have deficits in reading comprehension. The primary research question was (1) What are the effects of a year-long intensive reading intervention on the reading achievement of ninth grade ELSWDs compared to ELSWDs who did not receive treatment? The secondary research question was (2) Does Limited English Proficiency (LEP) status (current versus former LEP designation) moderate the effects of the intervention for ELSWDs? I hypothesized that ELSWDs receiving the RIA treatment would outperform students not receiving the intervention on measures of word reading, vocabulary, and comprehension. Previous studies of RIA with monolingual adolescent struggling readers and SWDs found large significant effect on a standardized measure of comprehension (Vaughn, Roberts, Schnakenberg et al., 2015; Vaughn, Roberts, Wexler et al., 2015), and similar effects are hypothesized for this study. I also hypothesized that there would be differential effects on reading outcomes for current versus former LEPs, based upon the preliminary analyses conducted by Martinez and colleagues (2017).

Research Design

This study used data from a blocked, randomized control trial examining the impact of the RIA on reading outcomes for adolescent struggling readers who were also identified as ELs (Vaughn et al., 2017). In the overall study, participants were blocked on schools and randomly assigned to one of four conditions: intensive reading intervention

for adolescents (RIA) only, a dropout prevention intervention (DO) only, both RIA and DO, or to a business as usual (BaU) comparison condition. The current study analyzed the treatment effects for a subset of the sample from the overall study, the participants who were ELSWDs. Because the overall study did not stratify the sample based on disability status of the participants, the current study is best-described as a high-quality quasi-experimental design. Two distinct groups (i.e., treatment and comparison) were created from the four originally randomized groups to analyze the treatment effects in the current study. The treatment group consisted of ELSWDs in RIA only and RIA+DO, while the ELSWDs in DO only and BaU comprised the comparison group. Collapsing groups across treatment conditions is reasonable to the extent that the DO prevention intervention does not affect reading outcomes. The assumption of no DO-related reading effects was tested by comparing students in DO prevention to the BaU group on reading outcomes. There were no significant differences, indicating that it was reasonable to collapse groups. See Appendix B for these post-test comparisons, including F and p-values.

Participants

School Sites. Participants in the current study were recruited from three, large high schools in a diverse urban Southwestern U.S. school district. The three schools were selected due to the large number of students who were currently and previously identified within the past five years as ELs at each of the respective schools. School demographic data was acquired from the state educational agency website for the 2015-2016 school

year. School 1 had a state accountability rating of "Improvement Required" due to low student achievement and lack of student progress indices. At this school, 43.4% of students were African American, 54.9% Hispanic, 0.7% White, 0.5% American Indian, 0.3% Asian, 0.1% Pacific Islander, and 0.2% were two or more races. Most of the students were economically disadvantaged based on free and reduced lunch status (75%), 13.4% were ELs, and 13.1% received special education services. Both School 2 and School 3 met state accountability standards. The majority of students enrolled at School 2 were Hispanic (90.5%), 7.5% were African American, 1.5% White, 0.1% American Indian, 0.2% Asian, and 0.2% were two or more races. Over 90% of the students were economically disadvantaged, 21.6% were ELs, and 12.1% were receiving special education services. At School 3, most of the students were Hispanic (76.5%), 13.9% were African American, 4% White, 0.6% American Indian, 3.9% Asian, 1% Pacific Islander and 0.1% were two or more races. Most students were economically disadvantaged (90.2%), 49.4% were ELs, and 8.7% received special education services.

Students. The ninth-grade participants in the current study were part of the aforementioned large-scale, multi-year reading intervention and dropout prevention study for high school English Learners with comprehension difficulties (Vaughn, Martinez, Williams et al., 2017). At the beginning of the intervention, the full sample of participants in the overall study included 622 participants. Demographic data was obtained from the district records after the first year of the intervention; however, there is some missing data due to participants withdrawing from or transferring to other schools during the

study. Table 1 provides the demographics for the overall study of RIA with ELs. Economic disadvantage was determined using district data. Participants were considered economically disadvantaged if they received free or reduced lunch, or if they were classified as "other economic disadvantage" through the district, which was defined as students whose families had annual income at or below the poverty level or were eligible for public assistance and/or food stamps.

Table 3.1

Overall Participant Demographics

	Overall	
	n	%
Gender		
Male	335	53%
Female	250	40%
Race		
American Indian or Alaska Native	290	50%
Asian	2	0.34%
Black or African American	5	0.85%
Native Hawaiian or Other Pacific Islander	0	0%

Table 3.1, Cont.

White	324	55%
Ethnicity		
Hispanic or Latino	577	93%
Home Language		
English	3	<1%
Spanish	576	99%
Other	6	<1%
Limited English Proficient (LEP)		
Status		
Current	364	59%
Former	254	41%
Economically Disadvantaged		
Yes	490	79%
No	128	21%
Receiving SPED Services		
Yes	95	16%
No	522	84%

Note. SPED = special education; percentages for race do not equal 100% as students could identify as more than one race

The current study disaggregated the data from the overall study of RIA with ELs, and examined only the subpopulation of students with disabilities who received special

education services through their schools (n = 95). These ELSWDs all had reading comprehension deficits as determined by their scores on the eighth-grade high-stakes assessment in reading. Due to the inclusion and screening criteria in the overall study, this sample of ELSWDs did not include SWDs with severe or profound disabilities (e.g., severe intellectual disability, severe autism), as these students would have been ineligible for participation in the study due to the nature of their disabilities. Table 2 provides demographic information for the students originally randomized to participate in the study. The majority of the participants were Hispanic, economically disadvantaged, and received special education services for LD. As with the full sample, there was some missing data from the district, so categories do not all add to 95 participants or 100%.

Table 3.2

Participant Demographics for Students with Disabilities

	Intervention (n = 49)		Comparison (n = 46)		Overall (n = 95)	
	n	%	*n*	%	*n*	%
Gender						
Male	36	73%	31	67%	67	71%
Female	13	27%	15	%	28	29%
Race						
American Indian or Alaska Native	26	53%	23	50%	49	52%

Table 3.2, cont.

Asian	0	0%	0	0%	0	0%
Black or African American	0	0%	0	0%	0	0%
Native Hawaiian or Other Pacific Islander	0	0%	0	0%	0	0%
White	21	43%	24	52%	45	47%
Ethnicity						
Hispanic or Latino	46	94%	43	93%	89	94%
Home Language						
English	0	0%	1	2%	1	1%
Spanish	46	94%	43	93%	89	94%
Unknown	3	6%	2	4%	5	5%
Limited English Proficient (LEP) Status						
Current	32	65%	22	48%	54	57%
Former	17	35%	24	52%	41	43%
Economically Disadvantaged						
Yes	42	86%	41	89%	81	85%

Table 3.2, cont.

No	7	14%	7	15%	14	15%
Disability Category						
SLD	40	82%	40	87%	80	84%
OHI	5	10%	1	2%	6	6%
SLI	1	2%	0	0%	1	1%
ID	1	2%	3	7%	4	4%
VI	1	2%	0	0%	1	1%
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, VI = Visual Impairment, OI = Orthopedic Impairment, EBD = Emotional/Behavioral Disorder; AUT=Autism

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 10-15 students. Previous studies with older struggling readers have found that larger groups of 10-15 students are as effective as smaller group of 3-5 students (Vaughn et al., 2010). 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. Due to these different bell-

schedules, students received approximately 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 such as band, chorus, computer, etc.

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. Reading interventionists taught the REWARDS Secondary program three to four days each week (Archer et al., 2014). Students learned to decode multisyllabic words and developed automaticity by reading these words in isolation and in connected text. Students first completed the 12 pre-skill lessons which emphasized the following prerequisite skills: correctly pronouncing common vowel graphemes (i.e., ai, ee, oa), underlining/identifying vowel graphemes in words, reading of isolated word parts, correctly reading affixes in isolation, circling/identifying affixes in words, and blending parts of words together to form real words (Archer, Gleason, & Vachon, 2014). Then, students completed eight strategy lessons, in which the students continued to review the prerequisite skills, but also learned REWARDS strategy for decoding multisyllabic words: (1) looking for prefixes, suffixes, and vowels, (2) saying the parts of a word, (3) saying the whole word, (4) making it a real word. Students then had multiple opportunities to practice orally reading multisyllabic words in sentences and passages.

During this first phase, interventionists also introduced the procedures for *CSR* (Klingner & Vaughn, 1998). Interventionists explicitly taught mini-lessons for each of the CSR components (i.e., preview, click and clunk, get the gist, questioning, and review), and provided students with additional review of the strategies to ensure mastery. These mini-lessons were taught one or two times each week before or after the REWARDS Secondary lessons. After learning the strategies, students were then taught how to collaboratively work in small groups of approximately four students to implement these strategies. Students previewed text, brainstormed, identified and defined clunks, developed gists, asked and answered questions, and reviewed text in their collaborative groups. The interventionists taught students to use the *CSR* role cards (leader, clunk expert, gist expert, question expert) which guided them through the collaborative process and gave them prompts to use to encourage discussion in the groups. Students also were provided with a *CSR* flip-chart that included the following resources: fix-up strategies, prefix, suffix, and root word lists, a Spanish-English cognate list, and question starters.

Phase II. Phase II of the intervention began in the second semester of the school year and lasted from January to May. There were five instructional units in the areas of: cells, India, viruses, Korea, and evolution. Each unit began with a statement of the learning goal and its relevance to the students' lives and other coursework. The interventionists then introduced unit questions to help students focus on key ideas in the unit. Prior knowledge was activated and built in the *CSR Preview* stage by having students brainstorm about the topic and showing short video clips. The interventionist

then had students preview the text by reading headings and sub-headings, completed an anticipation-reaction guide graphic organizer, and set a purpose for reading. Before reading the text, the interventionist 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 each day throughout the unit and students engaged in meaningful deep-processing activities to support their vocabulary learning, which included completing graphic organizers such as word maps, identifying word relatives, and participating in structured question prompts that used the words.

After completing the before reading unit activities, students then used the *CSR* procedures and learning log during and after reading the text. They worked collaboratively in groups to identify unknown words and used fix up strategies to determine their meanings, generate main ideas, ask and answer questions, and create review statements for the whole text. After reading, they completed graphic organizers that helped identify and organize the main ideas from the text and wrote summaries of those main ideas. The summary writing strategy was adapted from the macrorules for summarizing text (Brown & Day, 1983). Students used the main idea statements they had previously developed in *CSR* and then refined them into a polished summary by (1)

deleting unnecessary and/or redundant words, (2) substituting superordinate terms for categories or lists, (3) combining similar main idea statements, and (4) selecting or creating a topic sentence. Once students completed this, they re-read the summary and checked to see if it makes sense, all essential information had been included, and if transitions had been used appropriately. Interventionists then guided students through a discussion of content area text using a protocol. Students completed a discussion organizer and discussed the text with the class as the teacher facilitated. Lastly, the students had free-choice reading and selected high-interest books and magazines to read for 10 minutes each day. Students completed book logs and shared their reading choices with partners and the whole class. Throughout Phase II, students also continued to practice reading multisyllabic words and they also reviewed meanings of common affixes learned in Phase I. This set of procedures was repeated for each of the content area units.

Instructional Enhancements for English Learners. In the current study, the *RIA* was adapted to meet the needs of students who were also ELs. The instructional enhancements were based on several syntheses and meta-analyses of effective instruction for ELs (August & Shanahan, 2006; Baker et al., 2014; Francis et al., 2006). The first instructional enhancement addressed academic language development through the explicit instruction of academic vocabulary words. Academic vocabulary words are those that are frequently used in content areas such as science, history, geography, and mathematics, in formal discussions, essays, and even articles (Baker et al., 2014). High-quality 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 received a graphic organizer with each of the words in the unit. The graphic organizer included student friendly definitions from the Merriam-Webster Learner's Dictionary (2017), 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, in *CSR*, students were taught independent word learning strategies to help them determine the meaning of unknown words. Students had to re-read the sentence with the unknown word, re-read the sentence before/after the unknown word, break the word into meaningful parts (i.e., prefixes, suffixes, roots), and/or use their native language to identify cognates.

In addition to explicit vocabulary instruction, the *RIA* also was enhanced to allow students with many opportunities to use oral and written language across the content areas (Baker et al., 2014). Each unit included a short video, visuals, and graphic organizers which were designed to increase student understanding in each content area unit. 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. Not only did students have many opportunities to use oral language, but they also had daily writing

activities which were designed to increase their written language skills. Students completed learning logs for each text, which organized information from the text. Additionally, they constructed summaries of the text and practiced writing sentences that used the academic vocabulary words for each unit correctly in context.

Reading Interventionists and Training. Five reading interventionists were hired and trained by the research team to implement the RIA for ninth grade students. All of the interventionists were female, 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. Prior to the beginning of the school year, interventionists participated in 40 hours of training on elements of effective instruction (explicit instruction), as well as the implementation of REWARDS Secondary and CSR to be able to deliver phase I of instruction (Archer, Gleason, & Vachon, 2014; Klingner & Vaughn, 1998). An additional 8 to 16 hours of training was provided at the end of the Phase I of the intervention to prepare teachers to implement Phase II. This training introduced teachers to content area units that were taught in Phase II. Teachers learned how to deliver explicit vocabulary instruction, as well as how to build background knowledge, enhance class discussions, and help students work cooperatively in their CSR groups. Additional coaching and support was provided throughout the year in the form of in-person and audio coaching observations. The project coordinator and an instructional coach provided feedback to each of the interventionists 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. Interventionists recorded five to eight audios files per class period during each two-week period. 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 (see Appendix A). 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). Quality was also rated for each fidelity observation in the areas of overall reading intervention quality, RIA quality, and classroom management quality. Quality was assessed using a 5-point Likert scale where scores of 1 indicated the lowest quality and scores of 5 indicated the highest quality. 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. Mean fidelity scores are reported in Table 3.3. Average intervention adherence was 62% and average intervention quality was 72%.

Table 3.3

Mean Fidelity Scores

Component/Area	Mean
Word Study	2.30
Vocabulary	2.15
Comprehension	2.88
Discussion/Interpretation of Text	2.01
Motivation	2.95
Overall Intervention Quality	3.5
Classroom Management Quality	3.69
RIA Quality	3.57

The district also provided data on the number of total absences for each student, and that information is reported in Table 3.4.

Table 3.4

Average Absences as Reported by District

Group	N	Minimum	Maximum	Mean (SD)
Comparison	46	1	53	10.91 (10.31)
Treatment	49	0	81	11.85 (13.11)

Comparison Condition. Students in the comparison condition were not assigned to receive the treatment; however, at two of the schools, the treatment intervention

supplanted a school-provided supplemental reading class and at the third school, students assigned to treatment received intervention in addition to the school-provided supplemental reading class. The supplemental reading classes at all three schools varied in their content, but generally were an extension of students' English I class, where they focused on standardized test preparation and writing. Therefore, the comparison condition students in these two schools where instruction was supplanted were also receiving similar amounts of additional reading instruction. In the school in which the treatment condition was in addition to the school provided reading class, students in the comparison condition participated in elective classes such as band, chorus, or computer during the treatment intervention.

Data Collection and Measures

All participants were assessed on measures of reading achievement prior to the intervention beginning and at the end of intervention. Pre-assessment data were collected in September and post-assessment data were collected in May. 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. Before administering assessments, the test administrators had to have an interrater reliability above .90 for each subtest administered.

Word Reading. Word reading fluency was assessed with two timed subtests of the Test of Word Reading Efficiency-Second Edition (TOWRE-2; Torgesen et al., 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.

Comprehension. Reading comprehension was assessed with two different measures, the *Gates-MacGinitie Reading Test-4 (GMRT-4)* and the *Test of Silent Reading Efficiency and Comprehension (TOSREC)*. 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., 2002). 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., 2002). 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.

Vocabulary. Two vocabulary assessments were administered to all participants. The first vocabulary assessment was the *GMRT-4* vocabulary subtest, 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 (Appendix D). It consisted of 12 items where students had to match the word to the definition.

Chapter IV: Results

This study investigated the effects of the RIA on reading outcomes for ninth grade ELSWDs. ELSWDs who received RIA only and RIA+DO and comprised the treatment group and ELSWDs who received DO only and BAU comprised the comparison group. STATA software was used to conduct all analyses. First, attrition analyses were conducted to determine that there were no systematic biases due to differential attrition. Then, preliminary analyses were conducted to inspect the data for abnormalities and check for the assumptions for ANCOVA, including: linearity of regression, independence, homogeneity of regression, equality of variance, and normality (Stevens, 2007). After preliminary analyses were conducted, the main analyses were completed. 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). 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). Pretest scores on each measure were used as covariates. To determine if LEP status differentially affected the intervention outcomes, an interaction term was added to each ANCOVA model. 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.

Attrition Analysis

Ninety-five ELSWDs were initially randomized to treatment or comparison conditions at the beginning of the ninth-grade school year. Ninety-four of these students consented and completed pre-testing. By post-testing at the end of ninth grade, 85 (89%) ELSWDS remained. Of the 10 ELSWDs 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 BAU group and six students left the treatment group. What Works Clearinghouse criteria were used to calculate overall and differential attrition (Institute of Education Sciences, 2014). 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

Prior to conducting the main analyses, case analyses were conducted to determine if there were any observations that would impact the study results. Scatterplots were inspected for each outcome measure and covariate for both the treatment and comparison groups to determine if outliers existed. There were no apparent outliers for any outcome measure, so a sensitivity analysis was not needed.

Following the case analysis, the assumptions for ANCOVA were checked, and included normality, equality of variance, independence, linearity of regression, and

homogeneity of regression. First, each outcome measure was assessed for normality by conducting a skewness and kurtosis test in STATA. Results indicated that the TOWRE-2 Sight Word Efficiency and TOWRE-2 Phonemic Decoding Efficiency subtests were normally distributed, while the remaining measures (TOSREC, GMRT-4 vocabulary, GMRT-4 comprehension, and proximal vocabulary) were not normally distributed. However, it was not expected that this non-normality impacted study results, because ANCOVA is robust to non-normality (Stevens, 2007). After normality was examined, the data were checked for the homogeneity of variance assumption, which compares the variances for each group. Levene's test of equality of error variances was assessed for each outcome measure, and it was determined that there was no violation of this assumption. Next, the independence assumption was assessed, which states that observations are independent or unrelated within or between groups. Participants were treated within individual schools and classrooms, which may be a sign of dependence; however, in the original study, students were blocked at the school level, and then randomly assigned to condition, minimizing the impact of the classroom effect. To assess the linearity of regression assumption, scatterplots of the outcome and the covariate were created for each group. The relationship between the covariate and the outcome for each measure were linear. The homogeneity of regression slopes assumption compares the covariate and independent regression lines. An interaction term was created for the condition and pre-test score for each outcome measure. The F-test for the interaction was not significant for any of the measures, validating that the assumption of homogeneity of

regression slopes was not violated. For the TOWRE-2 PDE subtest, thee interaction term was not significant ($F(1,79)=0.58$, $p=0.45$). It was also not significant for the TOWRE-2 SWE subtest ($F(1,79)=0.00$, $p=0.95$). The TOSREC was also non-significant ($F(1, 79)=0.23$, $p=0.63$). The interactions for the GMRT-4 subtests were not significant (Vocabulary- $F(1,80)=0.59$, $p=0.45$; Comprehension- $F(1,80)=0.06$, $p=0.81$). The interaction for the proximal vocabulary test was also not significant ($F(1,80)=0.97$, $p=0.55$).

Descriptive statistics were calculated for each outcome measure at pre-test and post-test. Table 4.1 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 reported as a raw score. As the 95% confidence interval for the Hedge's g contained 0 for each outcome, there were not statistically significant difference at pre-test on any measure, indicating baseline equivalence on all measures. Independent samples t-tests were also conducted to compare each measure at pretest, to determine if statistically significant differences existed. On the word reading measures, there were not significant differences for the treatment and comparison groups on the scores of the TOWRE-2 PDE subtest ($t(91)=-1.15$, $p=0.25$) and of the TOWRE-2 SWE subtest ($t(91)=-1.59$, $p=0.11$). Differences between the treatment and comparison groups on the TOSREC were not significant ($t(85) = 0.42$, $p = 0.67$). There were also not significant differences between treatment and comparison groups on the Gates-MacGinitie Vocabulary ($t(91)=-0.99$,

p=0.33) and the Gates-MacGinitie Comprehension subtest (t(91)=-0.04, p=0.97). Lastly, on the proximal vocabulary measure, there were also not significant differences (t(91)=-0.37, p=0.71).

Table 4.1

Descriptive Statistics for Pretest Measures

	Comparison	Treatment		95% Confidence Interval for Hedge's *g*	
Measure	Mean (SD)	Mean (SD)	Hedge's *g*	Lower	Upper
TOWRE PDE	83.84 (15.66)	87.56 (15.42)	0.24	-0.17	0.65
TOWRE SWE	79.38 (12.91)	83.79 (13.74)	0.33	-0.08	0.74
TOSREC	67.03 (11.72)	66 (10.92)	-0.09	-0.51	0.33
GMRT V	72.44 (7.51)	74.14 (8.91)	0.21	-0.20	0.61
GMRT RC	72.82 (6.14)	72.89 (8.24)	0.01	-0.40	0.42
Proximal Vocabulary	4.62 (3.30)	4.88 (3.33)	0.08	-0.33	0.49

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

Table 4.2 displays the unadjusted means and standard deviations for the treatment and comparison groups at posttest. Descriptive statistics for the full sample are reported in Appendix C.

Table 4.2

Unadjusted Means at Posttest

	Comparison		Treatment	
Measure	N	Mean (SD)	N	Mean (SD)
TOWRE PDE	41	83.61 (16.10)	43	88.81 (14.96)
TOWRE SWE	41	80.24 (12.91)	43	84.47 (14.56)
TOSREC	40	71.73 (10.42)	42	73.24 (12.02)
GMRT V	42	72.41 (8.28)	43	72.75 (8.72)
GMRT RC	42	75.14 (7.81)	43	75.29 (8.37)
Proximal Vocabulary	42	5.40 (3.70)	43	7.21 (4.55)

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

Main Analysis: Research Question 1

To answer the first research question on the effects on the reading intervention on reading outcomes for ELSWDs in treatment versus comparison, a one-way ANCOVA analysis was completed for each outcome measure, with pretest scores being used as the covariate. ANCOVA was used to reduce the error variance and thus, increase power (Stevens, 2007). If the p-value was less than 0.05, then the treatment had a significant effect on the outcome measure. Hedge's *g* effect sizes were computed for each outcome measure (Hedges, 1981). 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, 2014). The WWC recommends computing Benjamini-Hochberg corrections for each outcome domain (i.e., alphabetics, fluency, comprehension, and general literacy achievement). 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 4.3 reports the ANCOVA results, including the F-value, adjusted means, standard error, p-value, and Hedge's g value. Hedge's *g* values were calculated using adjusted means and unadjusted standard deviations which is the procedure recommended by the WWC (Institute of Education Sciences, 2014).

Table 4.3

ANCOVA Results and Effect Sizes

Measure	Group	F	Adjusted Mean	Standard Error	p-value	Hedge's *g*
TOWRE	T	1.90	87.74	1.39	0.17	0.18
PDE	C		85.10	1.40		
TOWRE	T	0.40	82.92	1.15	0.40	0.08
SWE	C		81.73	1.16		
TOSREC	T	0.51	73.41	1.55	0.47	0.14
	C		71.82	1.64		
GMRT V	T	0.37	71.97	1.02	0.54	-0.10
	C		72.85	1.01		
GMRT RC	T	0.02	75.13	1.04	0.90	0.02
	C		74.95	1.04		
Proximal	T	4.42	7.07	0.57	0.04*	0.41
Vocabulary	C		5.39	0.57		

Note. * = statistically significant at p <.05

There were no significant effects of the treatment on any outcome except for the proximal vocabulary measure ($F(1, 80) = 4.42$, $p = 0.04$). 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 was calculated by dividing the original p-value (0.04) by 4 (number of outcomes in the comprehension domain). The new critical p-value for the Benjamini-Hochberg correction was 0.01. The original p-value 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 insignificant (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.

Main Analysis: Research Question 2

To answer the second research question about if LEP status (current versus former LEP designation) moderated the effect of the intervention, an interaction term (condition by LEP status) was created for each outcome measure and added to the ANCOVA analysis. Table 4.4 shows the results of the ANCOVA models for each outcome measure with the interaction term. No interactions were statistically significant, suggesting that former versus current LEP status did not moderate the impact of RIA on reading outcomes. On the TOWRE-2 PDE, there was no significant effect of the interaction (F(1,78)=0.16, p=0.69). There was also not a significant effect of the interaction on the TOWRE-2 SWE subtest (F(1,78)=1.42, p=0.24). The interaction was then tested for the TOSREC, and it was also not significant (F(1,71)=1.70, p=0.20). On the Gates-MacGinitie Vocabulary subtest (F(1,79)=1.18, p=0.28) and the Comprehension subtest

(F(1,79)=0.71, p=0.40) the interaction was also non-significant. The proximal vocabulary test also had a non-significant interaction (F(1,79)=0.29, p=0.59).

Table 4.4

Results of ANCOVA Analysis for LEP by Condition Interaction

Measure	F	p-value
TOWRE PDE	0.16	0.69
TOWRE SWE	1.42	0.24
TOSREC	1.70	0.20
GMRT V	1.18	0.28
GMRT RC	0.71	0.40
Proximal Vocabulary	0.29	0.59

Summary of Results

The results of the current study did not confirm the hypotheses that students in RIA treatment would outperform students in the comparison condition. Students who received the RIA treatment did not outperform students in the comparison group on any reading outcome measures (i.e., word reading, vocabulary, or comprehension). There were small effects of the RIA on the reading outcomes for students in the RIA treatment as indicated by Hedge's g values (range g = 0.08 to g = 0.41), despite the lack of significance. There were not significant differential effects of the intervention for students currently identified as LEP versus students formerly identified as LEP.

Chapter V: Discussion

The purpose of this study was to examine the effects of RIA on reading outcomes (i.e., word reading, vocabulary, and comprehension) for ninth grade ELSWDs after one year of intervention. The RIA did not significantly impact any reading outcomes for students who received treatment versus students in the comparison condition. While results were not significant, the RIA did have small effects on measures of word reading (Hedge's g = 0.08 to 0.18), proximal vocabulary (Hedge's g = 0.41) and comprehension as measured by the TOSREC (Hedge's g = 0.14). The study also examined differential effects to determine if RIA was moderated by LEP status (current versus former). LEP status did not moderate the effects of the intervention and current and former LEPs performed similarly across conditions. The What Works Clearinghouse (IES, 2014) recommends reporting effect sizes for all outcome measures regardless of significance, so these effects are reported by domain in the following sections.

Word Reading

The RIA had a small impact on word reading outcomes for students in treatment, as indicated by both the TOWRE-2 SWE (g=0.08) and PDE (g=0.18) subtests. Previous research on interventions for adolescents has suggested that word study instruction can impact word reading outcomes (Joseph & Schisler, 2009; Scammacca et al., 2007; Wanzek et al, 2013). 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).

Phase I of the RIA targeted multisyllabic word reading and provided students with multiple opportunities to decode words in isolation and connected text. Additionally, in Phase II of the intervention, students continued practicing those skills and were able to apply their decoding skills to content area texts and passages. This exposure to text may have caused this increase for ELSWDS in treatment. 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 = 87.74) on the PDE subtest and the below average on the SWE subtest (M = 82.90). This suggests that many ELSWDS 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 in line with Solis and colleagues' study (2015) of a reading intervention for ninth struggling readers, where students with higher decoding skills made significantly higher gains on reading comprehension outcomes than students with lower decoding skills. It is possible that the ELSWDs in this study, may have benefited from a stronger emphasis on decoding, spelling, and/or fluency in order to develop automaticity in order to be able to benefit more from the comprehension instruction.

Vocabulary

Two vocabulary tests were administered to examine the effect of the RIA on vocabulary outcomes. On the standardized measure, the Gates-MacGinitie vocabulary

subtest, students in the treatment condition performed worse than students in the comparison condition (g=-0.10). While the RIA focused on academic vocabulary words and explicitly taught those words, it appears that this instruction did not help improve vocabulary knowledge on a standardized measure. When examining pretest and posttest standard scores of both groups, students did not make any gains from the beginning of the year (M= 73.32) to the end of the year (M=72.58). Conversely, on the proximal vocabulary measure, students in treatment outperformed students in the comparison condition with a small to moderate effect (0.41). These differences were initially significant, however after controlling for the false discovery rate and multiple comparisons with the Benjamini-Hochberg correction, the effect was no longer significant. Interventions that target vocabulary typically have large effects on vocabulary outcomes (Scammacca et al., 2015; 2016). Students in treatment learned words that were explicitly taught in the intervention; however, the differences in growth were not practically important. At pretest, students knew an average of 4.88 words, and at posttest they knew 7.07 words, suggesting they were only able to correctly identify two more words on average from pretest to posttest. Students were assessed on 16 words that were explicitly taught during the intervention, however it appears that they only were able to identify seven words on average after the intervention. While the RIA incorporated explicit vocabulary instruction, as well as multiple opportunities to practice using taught words, it appears that ELSWDs in the treatment condition had difficulty learning the meaning of these words. Students who are ELSWDS may need more intensive

vocabulary instruction and support in order to improve both vocabulary and comprehension outcomes.

Comprehension

On the first measure of reading comprehension, the TOSREC, students in treatment scored higher than students in the comparison condition at posttest, with a Hedge's g of 0.14. On the Gates-MacGinitie 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). One reason for the lack of effect on comprehension measures, may be due to the comparison condition. The intervention was supplemental for some participants (i.e. in addition to core ELA and reading classes), while it supplanted a school-provided reading course for other participants. Because of this variation in instruction in the comparison condition, it is difficult to discern what the effect of the intervention may have been if the intervention was supplemental for all participants, as it was originally intended. Scammacca and colleagues (2016) found that over the years, the counterfactual comparison conditions have changed across studies in grades 4-12, and it seems to be more difficult to obtain larger effect sizes.

Furthermore, in the 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 Gates-MacGinities reading comprehension subtest (ES = 0.44) for SWDs who received two years of intervention. This effect was not observed in the current study; however, the current study examined performance after only one year of intervention. It is possible that ELSWDS need continued, sustained intervention over two or more years in order to show gains on standardized measures of reading comprehension. Hill, Bloom, Black, and Lipsey (2008) suggest using empirical benchmarks to compare outcomes from intervention studies. Using that approach, students in grades 9 and 10 would be expected to demonstrate an average gain of 0.19 on standardized reading assessments. While the participants in this study improved on the TOSREC (g=0.14) after one year of intervention, these gains were not obtained on the Gates-MacGinitie reading comprehension subtest. It is important to note that the TOSREC is a short, 3-minute timed measure of sentence reading, while the Gates-MacGinities reading comprehension subtest requires students to read longer passages and answer multiple-choice questions about what they have read. Because students in both the treatment and comparison condition had low- and below-average word reading skills, as well as below-average vocabulary skills, they may not have been able to read and interpret the passages on the Gates-MacGinitie comprehension subtest. The SVR theory suggests that reading involves both decoding and linguistic comprehension (Gough & Tunmer, 1986), and that monolingual adolescents may struggle in both of these areas (Brasseur-Hock et al., 2011;

Catts et al., 2005; Hock et al., 2009). Similarly, adolescent ELs also have heterogeneous deficits, and may struggle with decoding, fluency, vocabulary, comprehension, or a combination of these skills which may impact their reading outcomes (Lesaux & Kieffer, 2010). The participants in the current study, mostly resembled the globally impaired readers from Lesaux and Kieffer's (2010) study, as they had deficits word recognition/decoding, vocabulary, and comprehension. Moreover, adolescent ELs seem to struggle with text-comprehension, which may be due to low vocabulary knowledge (Carlisle, Beeman, Davis, & Spharim, 1999; Lesaux & Geva, 2006; Lesaux & Harris, 2017; Lesaux & Kieffer, 2010; Proctor, Carlo, August, & Snow; 2005; Swanson, Rosston, Gerber, & Solari, 2008). Because the participants in both the treatment and comparison groups had below average vocabulary skills as measured by the Gates-MacGinitie vocabulary subtest (M = 72.58), their text comprehension may have been affected.

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., 2016; Richards-Tutor et al., 2016; Shanahan & Beck, 2006), in which it is difficult to improve reading comprehension for adolescent ELs. Shannahan and Beck (2006) concluded that reading interventions for ELs often had negligible effects on comprehension outcomes. Richards-Tutor et al. (2016) found that reading interventions that assessed text comprehension often had a negative effect. Similarly, Hall and colleagues (2016) conducted a meta-analysis of reading instruction for ELs in

grades 4-8, and determined that reading instruction had no effect on standardized measures of reading comprehension. Additionally, in the randomized controlled trail of a multicomponent reading intervention for ELs with reading difficulties and disabilities (Denton et al., 2008), it was determined that students who received the reading intervention did not outperform students in the comparison condition on measures of comprehension. This lack of effect of reading interventions on comprehension outcomes was confirmed in the current study for ELSWDs.

LEP Status of Students

The preliminary analysis of the full-sample in the overall study after one-year of intervention (Martinez et al., 2017) suggested that students with a current LEP designation who received treatment, significantly outperformed current LEP students in the comparison condition on the TOSREC, and that both current and former LEPs in treatment, outperformed comparison students on the proximal vocabulary measure. Results from this analysis were used to inform the current study, and the second research question examined whether there would be differential effects by LEP status for ELSWDs on reading outcomes. This interaction was added to the ANCOVA models for each outcome measure in the current study; however, there were no significant differential effects of the treatment for current or former LEPs who were ELSWDs. Both current and former LEPs in treatment performed similarly to current and former LEPs in the comparison condition on all outcome measures.

Implications

Results from this study demonstrate that ELSWDs continue to have deficits in word reading, vocabulary, and comprehension, 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 not statistically significant. Furthermore, there were minimal effects on the standardized Gates-MacGinitie subtests of vocabulary and comprehension. While the RIA is a phased, multicomponent reading intervention that targets word reading, vocabulary, and comprehension, it had limited impact on reading outcomes for ELSWDs. Findings from the current study are aligned with previous research, which suggest that it is difficult to improve reading outcomes for adolescent ELs (Denton et al., 2008; Hall et al., 2016; Richards-Tutor et al., 2016). The findings are also aligned with 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, ELSWDs had below average vocabulary skills, which also may have impacted their ability to comprehend text. In previous studies of ELs, comprehension was significantly impacted by oral language proficiency and vocabulary (Carlisle et al., 1999; Lesaux & Geva, 2006; Lesaux & Harris, 2017; Proctor et al., 2005; Swanson et al., 2008), and ELs may require extensive instruction both of these areas to supplement word- and text level skills (Lesaux & Geva, 2006; Lesaux & Harris, 2017). 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. Students who are ELSWDs, 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 = 95), 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, students with disabilities who were also ELs, which have been historically under-studied with regards to reading intervention research. Future research, should aim to target this population of students, adolescent ELSWDs, in order to determine if similar effects occur for similar, multicomponent reading interventions.

Second, this study was conducted with Hispanic ELs who live in a large, urban city, many of whom have been educated in U.S. schools for many years. The majority of the participants in the study were identified with LD and also were economically disadvantaged. The results of this study may not generalize to ELs who speak other languages, are from different racial/ethnic backgrounds, are newcomers, or who live in suburban or rural areas. While the demographics of the sample in the current study are representative of adolescent ELs and ELSWDs across the country (Batlova et al., 2007; Trainor et al., 2017), there are still many ELs with different demographic characteristics, and these characteristics may impact response to intervention. Future research may

benefit from examining if native language, length of time in the U.S., socio-economic status, or other demographic characteristics are related to treatment response.

Implementation fidelity was also low with respect to both adherence and intervention quality. Average intervention adherence was 62% and average intervention quality was 72%. Research in implementation fidelity suggests that higher levels of fidelity may lead to increased outcomes (Hulleman & Cordray, 2009). Although the reading interventionists in this study were trained by the research team and received coaching from project staff, they were placed in the schools full-time and the settings in which the interventionists taught were challenging. There were school-level issues related to discipline, attendance, school policies, etc., and these issues may have impacted the implementation fidelity scores.

Lastly, the RIA did not formally assess or provide intervention in oral language skills. Research suggests that ELs may struggle with language production and understanding (Geva & Massey-Garrison, 2012), and their text comprehension may be impacted by both oral language proficiency and vocabulary (Carlisle, Beeman, Davis, & Spharim, 1999; Lesaux & Geva, 2006; Lesaux & Harris, 2017; Proctor, Carlo, August, & Snow; 2005; Swanson, Rosston, Gerber, & Solari, 2008). Future research for adolescent ELSWDs may benefit from incorporating additional instruction in oral language skills, and a stronger emphasis on vocabulary acquisition, to facilitate text-comprehension (Lesaux & Geva, 2006; Lesaux & Harris, 2017).

Summary

In conclusion, the purpose of this study was to examine the impact of the RIA on reading outcomes for ninth grade ELSWDs with reading comprehension deficits. 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, but students in treatment did perform better on measures of word reading, proximal vocabulary, 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. Adolescent ELSWDs may need more intensive reading interventions to support their heterogeneous deficits in order to improve reading outcomes.

Appendices

Appendix A. Implementation Fidelity Protocol

Reading Intervention for Adolescents Fidelity Protocol

Lesson Date: Content:	Teacher:
School:	Period:
Coder:	Observation Length:

For each instructional component (i.e. word study, vocabulary, etc.), teachers will be rated on adherence to the intervention. The rubric below provides guidelines on how to score each component.

Intervention Adherence Indicators and Descriptors

Rate the extent to which the teacher implements the required elements and procedures, for each expected component, during the recording of the instructional period.

4 **High**	**3** **Mid**	**2** **Low**	**1** **Not Observed**	**0** **NA**
Completes *all* of the expected elements and procedures of the component	Completes *a majority* of the required elements and procedures of the component	Completes *few* of the expected elements and procedures of the component	The teacher *does not complete* the expected, required elements and procedures of the component (component not observed)	Component not required or expected for the day

Word Study	INTERVENTION ADHERENCE				
	4	3	2	1	0
Components					
• Teacher explicitly teaches structural analysis of multisyllabic words (identification and pronunciation of syllables/word parts, affixes, vowel sounds). • Students have multiple opportunities to practice reading multisyllabic words and their parts (syllables, vowels sounds, affixes) in isolation, sentences, and connected text. • Teacher explicitly teaches meanings of common prefixes, suffixes inflectional endings, and roots, as well as how words relate to each other (e.g. trans: transfer, translate, transform). • Students have opportunities to practice spelling affixes and/or multisyllabic words (including vocabulary words), with immediate corrective feedback. • Teacher provides immediate, corrective feedback on incorrectly pronounced vowel sounds, vowel combinations, word parts, affixes, and multisyllabic words.	**Notes:**				

Vocabulary	INTERVENTION ADHERENCE				
	4	3	2	1	0
Components					

• Teacher uses explicit vocabulary instruction routine to introduce unit vocab (say word, student friendly definition, visuals, student discussion, examples/nonexamples, synonyms, antonyms etc.)
• Teacher uses direct instruction in vocabulary strategies (fix-up strategies) while reading:
  o Context clues (reread sentences)
  o Word parts (prefix, suffix, root words)
  o Cognates
• Teacher provides students with opportunities to practice finding clunks and to use fix-up strategies.
• Teacher embeds multiple exposures to vocabulary and students have multiple opportunities to practice vocabulary.
	Notes:				

Comprehension	INTERVENTION ADHERENCE				
	4	3	2	1	0
Components					
• Teacher provides instruction in comprehension strategies: o Main idea/Get the Gist o Previewing/Brainstorming o Summarization o Paraphrasing o Drawing inferences o Asking and answering questions at different points in the text o CSR Review o Using graphic organizers • Teacher gives students multiple opportunities to use aforementioned comprehension strategies. • Teacher activates prior knowledge (background videos, graphic organizers, etc.) and has students discuss and make connections to what they already know.	**Notes:**				

Discussion and Interpretation of Text	INTERVENTION ADHERENCE				
	4	3	2	1	0
Components					
• Teacher guides discussion/interpretation of text (possibly using a discussion protocol). • Teacher has students discuss/interpret text in whole class, small group, or pair format. • Teacher has students elaborate, defend, or explain answers to discussion questions.	**Notes:**				

Motivation and Engagement	INTERVENTION ADHERENCE				
	4	3	2	1	0
Components					
• Teacher fosters a positive learning environment, which promotes students' autonomy (i.e. student choice in reading or writing materials). • Teacher reviews goals (i.e. unit objective, focus questions, purpose) with students. • Teacher explicitly states how goals are connected with other content area classes or current events. • Teacher provides explicit feedback to individuals, not just groups. • Teacher emphasizes learning goals over performance goals.	**Notes:**				

Each teacher will receive an overall, global observation for each lesson.

Global Observation					
	5 Highest Quality	**4 Above Average Quality**	**3 Average Quality**	**2 Below Average Quality**	**1 Lowest Quality**
1. Overall, I consider this teacher's instruction to be:	**5**	**4**	**3**	**2**	**1**
2. Overall, I consider this teacher's group/classroom management to be	**5**	**4**	**3**	**2**	**1**
3. Overall, I consider this teacher's implementation of the RIA to be	**5**	**4**	**3**	**2**	**1**

Teacher Instruction

Quality Indicators:

- Begins and ends class on time
- Allocates majority of classroom time to instruction
- Prepared for lesson and activities
- Clearly sets purpose for instruction
- Makes connections to prior/background knowledge
- Asks clear questions and gives clear directions
- Clearly explains concepts
- Responds to student questions
- Uses appropriate pacing, including wait time
- Shows enthusiasm for content and teaching
- Facilitates active engagement of students during instruction including frequent student responses (oral, written, partner, individual)
- Monitors student & group performance during activities to ensure they are performing correctly
- Challenges students to extend thinking
- Provides frequent, positive feedback to students
- Summarizes/highlights essential material

5 Highest Quality	**4 Above Average Quality**	**3 Average Quality**	**2 Below Average Quality**	**1 Lowest Quality**
Consistently demonstrates *all or almost all* of the quality indicators	Demonstrates *most* of the quality indicators	Demonstrates *some* of (or inconsistently demonstrates) the quality indicators	Demonstrates *few* of the quality indicators	*Rarely* demonstrates the quality indicators

<table>
<tr><td>Classroom Management</td><td colspan="5">Quality Indicators:
Implements clear behavioral expectations
Reinforces appropriate student behavior
Redirects off-task behavior quickly and efficiently
Engages all students in the lesson
Demonstrates continuous and active supervision of students across activities
Transitions between activities without wasted time</td></tr>
<tr><td></td><td>5
Highest Quality</td><td>4
Above Average Quality</td><td>3
Average Quality</td><td>2
Below Average Quality</td><td>1
Lowest Quality</td></tr>
<tr><td></td><td>Consistently demonstrates all or almost all of the quality indicators</td><td>Demonstrates most of the quality indicators</td><td>Demonstrates some of (or inconsistently demonstrates) the quality indicators</td><td>Demonstrates few of the quality indicators</td><td>Rarely demonstrates the quality indicators</td></tr>
<tr><td>Reading Intervention for Adolescents (RIA) Quality</td><td colspan="5">Quality Indicators:
Begins and ends lesson component(s) in a timely manner (i.e., uses appropriate pacing)
Allocates majority of time to instructional activities and components listed in script(s)
Prepared for lesson components and activities (has appropriate materials, etc.)
Clearly sets purpose for lesson components, where appropriate
Makes connections to prior/background knowledge
Asks clear questions and gives clear directions
Clearly explains concepts related to component
Responds to student questions
Shows enthusiasm for content and teaching
Facilitates active engagement of students during instruction including frequent student responses (oral, written, partner, individual)
Monitors student & group performance during component activities to ensure they are performing correctly
Challenges students to extend thinking
Provides frequent, positive feedback to students during component
Summarizes/highlights essential material
Provides modeling of component activities, where appropriate</td></tr>
<tr><td></td><td>5
Highest Quality</td><td>4
Above Average Quality</td><td>3
Average Quality</td><td>2
Below Average Quality</td><td>1
Lowest Quality</td></tr>
<tr><td></td><td>Consistently demonstrates all or nearly all of the quality indicators for RIA component(s)</td><td>Demonstrates most of the quality indicators for RIA component(s)</td><td>Demonstrates some of (or inconsistently demonstrates) the quality indicators for RIA component(s)</td><td>Demonstrates few of the quality indicators for RIA component(s)</td><td>Rarely demonstrates the quality indicators for RIA component(s)</td></tr>
</table>

Appendix B. Adjusted Posttest Comparison of DO and BaU

	DO	BaU			
Measure	Mean (SD)	Mean (SD)	F	p-value	Hedge's *g*
TOWRE PDE	84.84 (17.54)	81.91 (13.88)	0.87	0.36	-0.18
	n = 22	*n* = 19			
TOWRE SWE	80.67 (13.72)	79.24 (11.57)	0.39	0.54	-0.11
	n = 21	*n* = 20			
TOSREC	72.67 (11.84)	71.37 (8.72)	0.18	0.68	-0.12
	n = 22	*n* = 18			
GMRT V	72.28 (7.62)	72.23 (9.11)	0.00	0.98	-0.01
	n = 22	*n* = 20			
GMRT RC	74.00 (7.66)	75.92 (7.92)	0.81	0.37	0.25
	n = 22	*n* = 20			
Proximal	5.56 (4.01)	5.06 (3.39)	0.23	0.63	-0.13
Vocabulary	*n* = 22	*n* = 20			

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

Appendix C. Descriptive Statistics for the Full Sample

Means and Standard Deviations at Pretest

Measure	Students without Disabilities Mean (SD) n	Students with Disabilities Mean (SD) n	t	p	95% CI	Hedge's g
TOWRE PDE	94.68 (11.97) n=507	85.76 (15.56) n=93	5.25	p =.000*	92.26, 94.34	-0.71
TOWRE SWE	89.88 (11.06) n=509	81.66 (13.46) n=93	5.56	p =.000*	87.67, 89.56	-0.72
TOSREC	75.94 (13.01) n=502	66.47 (11.24) n=87	6.39	p =.000*	73.48, 75.61	-0.74
GMRT V	80.02 (8.01) n=510	73.32 (8.26) n=93	7.38	p =.000*	78.31, 79.65	-0.83
GMRT RC	79.02 (9.73) n=510	72.86 (7.26) n=93	7.10	p =.000*	77.30, 78.84	-0.65
Proximal Vocabulary	6.90 (3.92) n=511	4.75 (3.30) n=93	5.6	p =.000*	6.26, 6.88	-0.56

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

Adjusted Means and Standard Deviations at Posttest

Measure	Students without Disabilities Mean (SD) n	Students with Disabilities Mean (SD) n	F	p	Hedge's g
TOWRE PDE	95.43 (12.03) n=470	92.07 (15.65) n=84	11.01	p=0.001*	-0.27
TOWRE SWE	91.22 (11.26) n=470	88.12 (13.86) n=84	13.54	p=0.000*	-0.27
TOSREC	79.54 (10.68) n=462	75.85 (11.22) n=82	9.28	p=0.002*	-0.34
GMRT V	78.81 (9.20) n=470	76.02 (8.46) n=85	9.14	p=0.003*	-0.31

GMRT RC	81.89 (9.88) n=470	77.72 (8.05) n=85	16.96	p=0.000*	-0.43
Proximal Vocabulary	9.37 (5.53) n=470	7.33 (4.23) n=85	12.44	p=0.001*	-0.38

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

Appendix D. Proximal Vocabulary Measure

Name: Teacher:
Date: School:

RIA Vocabulary

Section 1

Select the letter for the definition of each word and write your answer in the blank next to the word.

_____1. Protein	A. To change or develop slowly; often into a better or more advanced state
_____2. Determine	B. Part of a cell that controls the appearance and growth of a living thing
_____3. Compound	C. In an important way; to a large degree
_____4. Gene	D. Something made up of two or more parts, elements, or ingredients
_____5. Variation	E. A difference between things that should be similar
_____6. Significantly	F. A molecule that the body needs for repair and growth
_____7. Stable	G. To decide firmly; to be the cause of
_____8. Evolve	H. Resistant to change of condition
	I. Continuing to exist or happen for a long time
	J. Being enslaved to a drug or activity

Section 2

Select the letter for the definition of each word and write your answer in the blank next to the word

_____9. Favorable	A. Continuing to exist or happen for a long time

_____10. Calibrate	B. Something that is beneficial or useful
_____11. Classification	C. To check, adjust, or determine by comparison with a standard
_____12. Molecule	D. To give off or let out
_____13. Digest	E. Systematic arrangement in groups or categories according to established criteria
_____14. Equilibrium	F. To change food into a simple form that can be used by the body
_____15. Persistent	G. The smallest part of a substance that is made up of atoms
_____16. Emit	H. Return to its original or usable/functioning condition
	I. A state of rest or balance due to the equal action of opposing forces
	J. Made softer or less loud or clear

Section 3

Select the letter for the definition of each word and write your answer in the blank next to the word.

_____17. Paranoia	A. To rank people in order based upon their perceived importance
_____18. Burgeoning	B. To become part of a different society, country, or culture
_____19. Progressive	C. Unrestrained ruling by absolute authority depending on individual discretion as opposed to fixed by law
_____20. Fester	

_____21. Monastery

_____22. Arbitrary

_____23. Assimilate

_____24. Agrarian

D. Growing up or developing quickly

E. An unreasonable feeling that people are trying to harm you or do not like you

F. To refuse to have dealings with or refuse to buy a product as a form of protest

G. Moving forward in a regular way

H. Relating to agriculture or farming

I. A residence that houses a community of monks or nuns living under religious vows

J. To become worse as time passes

Section 4

Select the letter for the definition of each word and write your answer in the blank next to the word.

_____25. Idealistic

_____26. Ritual

_____27. Inevitable

_____28. Legislation

_____29. Instill

A. Gradually and firmly establish (usually positive) beliefs or attitudes

B. In a way that is important or of consequence

C. Not easily changed or shaped

D. The belief in very high standards of behavior and honesty (a "perfect world")

E. A ceremony or action performed in a customary way

F. Incapable of being avoided or prevented

G. A law made by a body of government

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