An Analysis of Response to Early Literacy Intervention for Students with Intellectual and Developmental Disabilities

By

Guy Martin

Dissertation

Submitted to the Faculty of the

Graduate School of Vanderbilt University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in

Special Education

May 13, 2022

Nashville, Tennessee

Approved:

Marcia A. Barnes, Ph.D.

Christopher J. Lemons, Ph.D.

Joseph M. Lambert, Ph.D.

Johanna L. Staubitz, Ph.D.

ACKNOWLEDGMENTS

This research was supported in part by Grant H325D170005 from the Office of Special Education Programs, U.S. Department of Education. Nothing in this article necessarily reflects the positions or policies of the federal government, and no official endorsement by it should be inferred.

TABLE OF CONTENTS

Page

Appendices

CHAPTER I

INTRODUCTION

The development of early literacy skills is a central aim for educators supporting students in school settings. Students who read below grade level during grades K-3 are at increased risk for failing to attain average levels of reading proficiency by the end of elementary school (Al Otaiba, 2000; Francis et al., 1996; Juel, 1988). For students in grades K-3, proficiency in early literacy skills, which include phonemic awareness, phonics, and decoding, is necessary for acquisition of more complex skills, such as fluency, comprehension, and vocabulary development (Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, 2008; Wanzek et al., 2013).

Prior research suggests that the failure to demonstrate proficiency in early literacy skills by the end of third grade is predictive of long-term reading difficulties. According to U.S. Department of Education data from 2009, 33% of fourth grade students did not achieve grade-level reading proficiency, and 26% of twelfth grade students did not attain fourth grade level reading proficiency (U.S. Department of Education, 2011). Relative to their general education peers, students with disabilities are at greater risk for failing to develop basic reading skills. In 2015, the U.S. Department of Education reported that 67% of fourth grade students with disabilities and 63% of eighth grade students with disabilities did not demonstrate proficiency in basic reading skills (U.S. Department of Education, 2015). Students' difficulty with reading skill development is associated with lower postsecondary school enrollment, decreased independent living opportunities, and reduced wages (Lemons et al., 2018; Sanford et al., 2011).

Fortunately, researchers have determined that most students can develop basic reading skills if they receive appropriate instruction that uses explicit instruction and is delivered with

sufficient instructional intensity (Allor, Gifford, Al Otaiba, Miller, & Cheatham, 2013; Al Otaiba, 2000; Al Otaiba & Torgesen, 2007; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Mathes et al., 2005; Wanzek, 2005). Nevertheless, there are students who do not demonstrate adequate progress to generally effective literacy instruction that is delivered at a sufficient intensity. According to Torgesen (2000), between 2-6% of students fail to respond to even the most effective literacy instruction. In a literature review of early literacy treatment non-response, Al Otaiba and Fuchs (2002) reported that the rate of student non-response across 23 reviewed studies ranged from 8-80% (Al Otaiba & Fuchs, 2002; Wanzek, 2005). The problem of inadequate treatment response is more acute for students with disabilities; up to 25-50% of students with disabilities may demonstrate treatment non-response (Al Otaiba, 2000; Fuchs, Fuchs, & Compton, 2012; Lemons et al., 2018; O'Connor & Fuchs, 2013), even in the context of generally effective instruction. These findings suggest that researchers should consider early literacy interventions that embed supports to address the needs of hypothesized non-responders.

Reviews on Predictors of Early Literacy Treatment Response

To increase the likelihood that students receive effective early literacy instruction, researchers have conducted empirical studies to identify predictors of treatment response. According to Lam and McMaster (2014), a predictor of treatment response is a pre-treatment characteristic that may differentiate intervention responders from non-responders. The identification of student characteristics that are correlated with positive post-treatment outcomes may help researchers design more effective screening measures and instructional protocols. For school-based professionals, the analysis of student pre-treatment profiles may help determine which children would benefit from early and intensive instruction, including the most effective instruction for student groups with a common characteristic or set of pre-treatment features, and

inform decisions about staff allocation for providing early literacy services (Al Otaiba, 2000; Al Otaiba & Fuchs, 2002; Lam & McMaster, 2014; Nelson, Benner, & Gonzalez, 2003). These steps may reduce the number of students who require intensive intervention that uses an increased level of school resources (Lemons et al., 2018).

In 2002, Al Otaiba and Fuchs published a review of 23 studies that addressed predictors of response to early literacy treatment for students between preschool and third grade. They determined that poor phonological awareness was the pre-treatment characteristic most often associated with treatment non-response. Researchers in 21 of 23 studies analyzed whether phonological awareness was correlated with treatment non-response, and it was found to be predictive of non-response in 16 of 21 studies. Al Otaiba and Fuchs (2002) determined that phonological encoding deficits predicted poor treatment response in 6 of 9 studies, and that rapid letter naming difficulties were correlated with treatment non-response in 6 of 7 studies. There was mixed evidence that IQ deficits predicted early literacy treatment non-response; 5 studies reported a significant relationship between low IQ and non-response, whereas 7 studies did not report a significant relationship. Other identified predictors of treatment non-response included attention or behavior problems (n = 7 studies), orthographic processing (n = 3 studies), and certain student demographic characteristics (n = 4 studies).

In 2003, Nelson, Benner, and Gonzalez conducted a meta-analysis of 30 studies that examined predictors of early literacy treatment response. Nelson and colleagues (2003) analyzed 19 of the studies that were also included in Al Otaiba and Fuchs' (2002) review, and they estimated that deficits related to rapid naming (Zr = 0.51), problem behavior (Zr = 0.46), phonological awareness (Zr = 0.42), alphabetic principle (Zr = 0.35), memory (Zr = 0.31), IQ (Zr = 0.26), and demographic characteristics (Zr = 0.07) all had small-to-moderate associations with

treatment non-response. These findings largely converged with the work of Al Otaiba and Fuchs (2002), who had identified phonological awareness, phonological encoding, and behavior-related deficits as pre-treatment predictors of non-response.

In 2014, Lam and McMaster conducted a review to update the findings of Al Otaiba and Fuchs (2002) and Nelson and colleagues (2003). They analyzed 14 studies published in peer-reviewed journals between 2000-2014. Lam and McMaster (2014) determined that pre-treatment deficits in phonemic awareness (6 out of 8 studies), alphabetic principle (6 out of 7 studies), and fluency (8 out of 10 studies) were found to correlate most highly with non-response. In their reviewed studies, Lam and McMaster (2014) identified weak and mixed evidence that IQ, memory, language, vocabulary, and demographic characteristics were predictive of treatment non-response.

There were several limitations across the reviews. All authors noted that operational definitions and indices for non-response varied across studies. Furthermore, they reported that only a paucity of reviewed studies had reported treatment fidelity data, which reduced confidence that the interventions exerted a causal influence in the observed changes in students' early literacy performance. They also circumscribed their literature search to studies published in peer-reviewed journals, which may have omitted relevant gray literature. Across all three reviews, no authors disaggregated their findings by student disability status.

Literacy Development for Students with Intellectual and Developmental Disabilities

Although literacy skill development is important for all students, previous research has found that students with intellectual and developmental disabilities (IDD) may experience more acute literacy acquisition difficulties (Katims, 2001; Wei, Blackorby, & Schiller, 2011). Students with IDD have frequently lacked access to comprehensive literacy instruction, and have

historically only received exposure to literacy instruction that addressed sight words and isolated subskills, such as letter-sound correspondences and phonemic awareness activities (Browder et al., 2006; Browder & Xin, 1998; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006; Katims, 2000). In the past, this form of literacy instruction did not program sufficient opportunities to practice new skills, which may include blending sounds to rapidly decode words (i.e., unitizing words), or opportunities to transfer skills to novel texts (Allor, Gifford, Al Otaiba, Miller, & Cheatham, 2013; Browder, Wakeman, Spooner, Ahlgrim-Delzell & Algozzine, 2006; Browder & Xin, 1998). Specifically, this restricted form of instructional exposure did not embed evidence-validated components of literacy instruction, such as fluency, vocabulary, or comprehension. Prior empirical research has demonstrated that the inclusion of these components in instructional protocols is necessary for successful reading acquisition (National Reading Panel, 2000; Snow, Burns, & Griffin, 1998).

However, changes to federal education policy have increased opportunities for students with IDD to receive comprehensive literacy instruction that incorporates evidence-validated components. Developments in federal law, such as the 2004 reauthorization of the IDEA (IDEA; 2004) and the 2015 Every Student Succeeds Act (ESSA; 2015), have required schools to provide access to literacy instruction and the general education curriculum for students with IDD. In addition, recent experimental studies have determined that participation in comprehensive literacy programs with sufficient dosage and instructional intensity is associated with literacy skill development for students with IDD (Allor, Mathes, Roberts, Cheatham, & Champlin, 2010a; Allor, Mathes, Roberts, Jones, & Champlin, 2010b; Browder, Ahlgrim-Delzell, Flowers, & Baker, 2012; Lemons et al., 2018). Researchers have demonstrated that instructional techniques, such as feedback, modeling, repetition, language supports, cumulative review, and

explicit instruction on when to apply new skills are associated with effective literacy skill acquisition for students with IDD (Allor, Yovanoff, Al Otaiba, Ortiz, & Conner, 2020).

In a longitudinal study, Allor and colleagues (2010a) found that students with IQ scores between 40-69 were able to demonstrate statistically significant growth on dependent measures of phonemic decoding, phonemic awareness, oral language, sight word reading, and reading comprehension. They also reported that over half of the students in their treatment condition met the end-of-year benchmark of reading 40 words correct per minute on a first-grade level oral reading fluency probe, which other researchers suggested is predictive of fluent reading (Al Otaiba, 2000). Allor et al. (2010a) determined that students with intellectual disabilities (ID) were able to meet end of first grade benchmarks, but they required approximately three years of intensive literacy intervention to attain this level of literacy proficiency. Furthermore, Allor and colleagues (2010a) detected little student progress during the first year of intervention using standardized measures, which suggests that students with ID may require longer-term intensive instruction to develop literacy skills. They also reported that there was substantial variability in their sample's performance.

In 2015, Lemons and colleagues evaluated a reading intervention that was adapted to address characteristics of the Down syndrome (DS) behavioral phenotype, using a multiple baseline across participants design to infer treatment effects. Lemons and colleagues (2015) recruited five children with DS between the ages of 6-8 years, and students participated in 24-45 sessions across 15 weeks. In the study's baseline condition, students were exposed to the *Road to the Code* intervention (Blachman, Ball, Black, & Tangel, 2000), which was designed to promote phonological awareness development. In the treatment condition, students received an intervention that was informed by *Road to the Code* (Blachman & Tangel, 2008), but embedded

specific supports that were aligned for students with the DS behavioral phenotype, which included instructional scaffolds designed to address language, cognition, and working memory deficits. The treatment resulted in functional relations between the intervention and target words, as well as for first sound identification; they did not detect a functional relation between the intervention and letter sound acquisition.

The findings of Allor et al. (2010a) and Lemons et al. (2015) suggest that students with ID are able to acquire early literacy skills with appropriate instructional programming and supports. However, additional empirical studies may provide insight into longitudinal literacy skill development for students with IDD. These studies may facilitate the identification of predictors of treatment response, which may inform the instructional protocols and methods used to engender desired early literacy outcomes for students with IDD (Lemons et al., 2018).

Paraeducators as Intervention Implementers

To support students with IDD in literacy development, more schools are using paraeducators to deliver early literacy instruction. Paraeducators are classroom-based staff members who are not certified to independently deliver instructional services, and they typically serve under the supervision of a credentialed special education teacher. According to Carter, O'Rourke, Sisco and Pelsue (2009), paraeducators are increasingly tasked with delivering academic instruction to students with disabilities. There is a growing body of evidence from empirical studies that suggests paraeducators can provide effective instruction for students with disabilities when provided with sufficient training, feedback, and support. Brock and Carter (2013) and Walker and colleagues (2020) conducted systematic reviews that addressed the training methods used to support paraeducators to deliver instructional services to students with disabilities. Both reviews determined that, with the appropriate didactic training and ongoing

supports, paraeducators were able to deliver academic instruction that resulted in positive effects for students with disabilities, including students with IDD.

Three previous reviews (Jones, Erchul, & Geraghty, 2021; Samson, Hines, & Li, 2015; Slavin et al., 2011) addressed the effects of paraeducator-implemented early literacy instruction. These reviews determined that paraeducators were able to deliver effective instruction when provided with scripted lesson protocols and ongoing training and supervision. As increasing numbers of students with IDD receive early literacy services from paraeducators, there is a heightened focus on establishing evidence-based training models to support paraeducators to deliver early literacy services.

Description of Randomized Control Trial

In an ongoing multi-year randomized control trial (RCT) that began in fall 2018, elementary and middle school students with IDD participated in a one-on-one intensive intervention with a classroom paraeducator. This study primarily examined the effects of a coaching and professional development model on dependent measures of paraeducator knowledge and skill. The study received approval from the University's Institutional Review Board and through research-approval procedures requested in participating school districts. Participants had agreed to participate in two years of intervention, with a minimum of 40 weeks of instruction across that period. Participating paraeducators had consented to deliver at least four 40-min. intervention sessions per week, as well as participate in a weekly coaching session that may last up to 30 min. In the study's two treatment conditions, university research assistants supported paraeducators with the implementation of the early literacy intervention that was used by Lemons and colleagues (2015). Students in the control condition received access to an early

numeracy intervention that targeted number identification, quantity discrimination, and computation (Clarke et al., 2014; Clarke et al., 2016).

In this current study, I will use data from the RCT to inform my research questions. For all student participants in the RCT, at the pretest measurement point, project staff administered measures that addressed the constructs of phonological processing, decoding, sight word reading, fluency, comprehension, and spelling. Additional data sources from the RCT include intervention dosage estimates, weekly coaching session data, and intervention fidelity data. These data will facilitate analyses on student characteristics and study features that predicted intervention responsiveness, which will be operationalized as lesson mastery in the context of the early literacy intervention.

Purpose

This exploratory study examined whether there were any predictors of treatment response for students with IDD who participated in the RCT's early literacy intervention. I conducted a correlational analysis and a multiple regression analysis to determine which student and paraeducator characteristics predicted early literacy intervention responsiveness. Specifically, I used student lesson mastery (described below) as the criterion variable to determine treatment responsiveness. An empirical analysis of treatment responsiveness may help researchers identify student pre-treatment abilities, coaching supports, and intervention features that were associated with literacy skill acquisition for students with IDD, as well as inform the design of more effective literacy programs. This study will address the following research questions:

1. Are there any student pretest measures that predict intervention lesson completion?
2. Is intervention dosage a significant predictor of intervention lesson completion?

3. Is paraeducator intervention fidelity performance a significant predictor of intervention lesson completion?
4. Are instructional coaching session supports (i.e., individualized performance goals and professional development module completion status) associated with intervention lesson completion?

CHAPTER II

METHOD

Participants and Setting

All eligible students participated in a multi-year RCT in which paraeducators delivered an intensive intervention to students with IDD in elementary or middle school settings. The RCT occurred in elementary and middle schools across 4 states in the Southern portion of the United States, and most paraeducator participants worked in school districts that were in urban areas, or in districts that were close to urban areas. Appendix A contains demographic data for this study's sample.

Inclusion Criteria

In this analysis, all student and paraeducator participants satisfied the RCT's inclusion criteria. To be eligible for the RCT, students were required to: (a) have a documented intellectual or developmental disability, (b) attend an elementary or middle school, (c) use speech as their primary communication method, (d) hear and see well enough to benefit from typical classroom instruction, (e) complete the study eligibility screener, (f) repeat a model of at least one letter name, letter sound, or word during the study eligibility screener, and (g) have access to a paraeducator who was willing to deliver intervention to the student for at least four sessions per week for 40 min. per session. The RCT excluded students who were: (a) able to read more than 17 words correct per minute (WCPM) with greater than 90% accuracy, or more than 60 WCPM with at least 80% accuracy, on a 1 min. timed AIMSweb (Shinn & Shinn, 2002a) first grade oral reading fluency passage, (b) able to correctly answer at least two double-digit addition problems without regrouping and at least two double-digit subtraction problems without regrouping on

untimed computation problems, and (c) not require intensive behavior supports prior to intervention.

Prior to study enrollment, the RCT's implementer participants were employed as paraeducators in school districts that had granted approval for study involvement. They were required to commit to two years of study participation, and they agreed to deliver at least four intervention sessions per week that lasted at least 40 min. per session. All paraeducator participants were required to accept random assignment to a treatment condition and comply with the requirements associated with their allocation. Furthermore, all paraeducators were required to work in school buildings with sufficient Internet access to facilitate their ability to upload intervention session videos to a secure server and participate in weekly remote coaching sessions. Lastly, all paraeducator participants were fluent English speakers.

Screening Assessment

Upon receiving a student consent form, project staff conducted a student screener to determine the child's eligibility for RCT participation. The RCT's screener was designed to identify students who would likely benefit from random assignation to either an early literacy or early numeracy intervention. The RCT's project staff created a screener using PowerPoint slides and administered it using a secure videoconferencing program (i.e., Zoom). All of the screener's activities were untimed, with the exception of two 1 min. timed oral reading fluency (ORF) passages, which were administered contingent on the student scoring a sufficient number of correct items on a word reading probe. The screener started with warm-up activities which asked students to identify colors and animals. Next, the screener assessed students' knowledge of letter names and letter sounds. It also included a word reading activity comprised of decodable and non-decodable words, and up to two ORF probes (i.e., students who demonstrated limited letter

and word reading ability were not required to read the ORF passages). The numeracy activities assessed the ability to identify single and double-digit numbers, and a set of increasingly difficult computation problems. The computation activity assessed the ability to complete single-digit addition and subtraction problems, as well as double-digit addition and subtraction problems without regrouping. During screener administrations, prospective paraeducator participants supervised their student and reported whether the student's screener performance was representative of typical classroom performance. All students who qualified for inclusion in this analysis had met the specific inclusion criteria for participation in the RCT.

Assignment to Condition

After the screener, in the event that the student was determined to be eligible for the study, the RCT randomly assigned paraeducator-student pairs to a treatment or control condition using a block stratified random assignment procedure (Shadish, Cook, & Campbell, 2002). The project coordinator blocked based on paraeducator knowledge and skill pretest performance. After the pretest, participants across sites were rank ordered based on their pretest raw scores, and there were three blocks based on total possible score tertiles. Upon assigning participants to condition, the RCT's data analysis plan reported that it would determine pre-treatment group equivalence by examining differences across latent pretest composite variables, as well as testing for significant differences on paraeducator and student characteristics.

Included Students

In this analysis of predictors of early literacy treatment response for students with IDD, I examined students who were participants in the RCT. Between 2018-2020, there were 52 student participants who were allocated to the RCT's two treatment conditions (i.e., traditional professional development "T-PD" and enhanced professional development "E-PD") that used the

early literacy intervention. I included data from 37 of 52 students (71%) in my analysis. I excluded 15 students from analysis due to insufficient intervention dosage (i.e., their participation in the RCT's full intervention implementation phase was less than 10 weeks).

In this analysis, I confirmed that 27 of 37 participants had a documented primary disability classification of intellectual disability, developmental delay, or autism. I was not able to access Individualized Educational Program (IEP) or educational evaluation copies to confirm the primary disability classification for 5 of 10 students. However, I confirmed that 5 students had a primary disability classification that was not an intellectual or developmental disability. For these 5 students, although their IEPs listed a primary disability classification other than intellectual disability, developmental delay, or autism, RCT staff determined that they satisfied the study's inclusionary criteria after reviewing assessment reports, screener data, and conducting eligibility discussions with their teachers.

Document Review

I reviewed copies of student participants' IEPs and educational evaluations to determine their ages at the time of pretest, their primary disability classifications, sex, and any applicable data on race and ethnicity; I reported these descriptive data in Appendix A. I tested whether there were differences on final early literacy intervention lesson completed across demographic variables, and I did not detect any statistically significant differences.

Survey of Standard Classroom Reading Instruction

The RCT collected data from participants' special education teachers on the included students' standard classroom reading instruction. This instrument addressed the providers of reading instruction, its frequency and duration, the instructional targets, and the methods used to support the student. Data were available for 28 of 37 (76%) students of students, and 25 of 28

(89%) respondents reported that the student received reading instruction beyond what was provided in the context of the RCT. Most respondents reported that the special education teacher was the primary provider of reading instruction, and that small group and one-on-one instruction were the most common formats used. Special education teachers delivered instruction 5 days per week for a mean duration of approximately 60 min. (*SD* = 32.60 min.). The instructional targets that were high or very high focus areas for over half of respondents were functional sight word reading, initial phonological awareness, letter sound knowledge, decoding, listening comprehension, and reading comprehension. Survey data suggested that explicit methods, strategies to increase motivation and on-task behavior, visual supports, strategies to support working memory, speech articulation, and comprehension ability were incorporated at high or very high levels for a majority of participants. Appendix B contains more detailed information on participants' standard classroom reading instruction.

RCT Measures

I examined data from multiple measures from the RCT, including student pretest performance, intervention dosage, intervention fidelity ratings, and data on instructional coaching sessions. I conducted analyses to estimate the extent to which these measures were associated with intervention lesson completion, and to determine the extent to which each measure explained the variance on the criterion variable. The RCT's student participants completed a pre-test assessment battery prior to the onset of intervention, and I examined the extent to which the number of correct items on each student pretest measure predicted intervention lesson completion.

Paraeducator Knowledge and Skill Pretest. All participating paraeducators completed a 35-item knowledge and skill measure that was adapted from a publicly available version of the

ParaPro Assessment (Educational Testing Service, 2016). This measure addressed paraeducators' general aptitude; this instrument has a repeated measures reliability of 0.92 and its content was deemed valid by 34 experts. Other items on the Paraeducator Knowledge and Skill Pretest were selected from the Teaching Reading: Elementary Education (5203) and Special Education: Core Knowledge and Applications (5304) measures. The RCT's project coordinator used data from this measure to inform participants' random assignment to a treatment condition.

TOWRE-2 (Test of Word Reading Efficiency Second Edition). Project staff administered the sight word efficiency and phonemic decoding efficiency subtests of the *Test of Word Reading Efficiency- Second Edition* (TOWRE-2; Torgesen, Wagner & Rashotte, 2012) to assess students' word reading and decoding ability. For the sight word efficiency subtest, students read as many non-decodable sight words as possible in 45 s; for the phonemic decoding efficiency subtest, students read as many phonemically regular non-words as possible in 45 s. Test-retest reliability coefficients ranged from .89 to .93 (Tarar, Meisinger, & Dickens, 2015).

TOPEL (Test of Preschool Early Literacy). The RCT's tester then administered the Test of Preschool Early Literacy's (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007) print knowledge and phonological awareness subtests. The print knowledge subtest includes 36 items on concepts of print, letter and word discrimination, letter-name identification, and letter-sound identification. The phonological awareness subtest includes 27 items that address blending, segmenting, and phonemic awareness. The internal consistency reliability for these TOPEL subtests ranges from .86 to .96 for students between the ages of 3-5, and the TOPEL's examiner manual reported strong evidence of convergent validity (Wilson & Lonigan, 2010). These subtests were untimed.

R-CBM (Reading CBM). Project staff administered several AIMSweb reading curriculum-based measurement (R-CBM) probes to the students (Shinn & Shinn, 2002a; Shinn & Shinn 2002b). All R-CBM probes were timed for 1 min. The AIMSweb letter naming fluency (LNF) measure addressed students' ability to name as many randomly ordered uppercase and lowercase letters as possible, and the test-retest reliability was greater than .81 (Clemens, Lai, Burke & Jiun-Yu, 2017).

For the AIMSweb letter sound fluency (LSF) measure, students produced as many letter sounds as possible without prompting. Letters were presented in lowercase format, and they were randomly ordered on the student's page. The RCT's tester only accepted short vowel sounds and the most common sounds for consonants as correct. Test-retest reliability exceeded .80 for the LSF (Elliott et al., 2001), and the 4-month alternate form reliability was .82 (NCS Pearson, 2012b).

The AIMSweb phoneme segmentation fluency (PSF) measure required students to segment words into their smallest component phonemes. To score the PSF measure, the tester marked the total number of phonemes produced and determined the student's accuracy percentage. For example, if the tester says, "hug," the student must state "/h/ /u/ /g/" to receive credit for identifying all 3 phonemes in that word. For the AIMSweb PSF, the test-retest reliability is .85 (O'Hearn, 2013).

The AIMSweb nonsense word fluency (NWF) measure addressed students' ability to decode phonemically regular non-words. The tester scored the student's number of correct letter sequences. The alternate form reliability was .83. The RCT's tester also administered a word identification fluency (Fuchs, Fuchs & Compton, 2004) measure that presented high-frequency

words that were randomly sampled from a 100-word Dolch list. The alternate test form reliability is .97.

Testers administered 3 first-grade level AIMSweb oral reading fluency passages to measure students' ability to accurately and fluently read connected text. The tester recorded the number of words correct per minute and their accuracy percentage. Alternate form reliability was greater than .93 (NCS Pearson, 2012b). In this analysis, I used the median number of words correct per minute on the oral reading fluency probes.

WJ-IV (Woodcock-Johnson Tests of Achievement Fourth Edition). Project staff administered the WJ-IV Letter-Word Identification, Spelling, and Passage Comprehension subtests. These subtests were all untimed. The Letter-Word Identification subtest required students to identify letters and words, as well as read letter names and words. The Spelling subtest measured students' ability to print letters and spell words; the Passage Comprehension subtest required students to identify pictures that represent a word or set of words, and it also used a modified cloze procedure that that addressed a student's ability to read a sentence and determine what word would be most appropriate to place in the blank space. Across W-J IV Tests of Achievement subtests, split-half reliability estimates ranged from .84-.94, test-retest reliability estimates were .83-.95, and the W-J IV technical manual indicates that all subtests have adequate content validity (Villarreal, 2015).

Interventionist Training

The RCT employed research assistants to serve as instructional coaches for the study's paraeducator implementers. The project's instructional coaches used multiple training phases to prepare paraeducator participants to deliver intervention to their assigned student. First, the instructional coach dropped off an intervention kit at the paraeducator's school campus that

contained the study procedures manual, all relevant intervention materials, and a laptop computer to facilitate the paraeducator's ability to record intervention sessions and attend weekly coaching sessions (referred to as "Helper Sessions" or "HS"). During the initial in-person training session, the instructional coach taught the paraeducator implementer to use the project-issued laptop computer to fulfill study responsibilities. Instructional coaches also modeled how to use the project-issued computer to access a set of researcher-created training modules with embedded intervention implementation support videos.

After delivering the kit to the paraeducator's classroom, the instructional coach encouraged the paraeducator to review the study procedures manual and the training modules. The instructional coach then confirmed the date and time of the participant's first remote coaching session, in which she answered clarifying questions about instructional practices and study expectations prior to the onset of intervention implementation. Instructional coaches who supported participants that were assigned to one of the two treatment conditions that used the early literacy intervention (i.e., T-PD and E-PD) encouraged paraeducators to deliver a limited number of intervention steps during their initial intervention sessions. RCT staff encouraged T-PD and E-PD participants to progressively increase the number of intervention steps that they attempted; after five weeks, T-PD and E-PD participants were expected to implement all six steps of the early literacy intervention in 40-minute intervention sessions.

All paraeducator participants agreed to attend a weekly coaching and feedback session with their instructional coach. This coaching support occurred over a secure videoconferencing program. Prior to each week's coaching session, project staff coded one intervention session video per paraeducator per week for intervention fidelity to individualize their feedback. For T-PD and E-PD members, the instructional coaches provided more targeted feedback on

intervention implementation performance relative to the support protocol used for the control condition. Specifically, this feedback addressed implementation performance for each discrete lesson activity. Participants in the treatment condition also received 1-3 weekly goals to support their implementation, whereas the control condition did not receive individualized goals. The coaching goals pertained to lesson implementation, rapport with student, study compliance, paraeducator progress, or student progress. Lastly, E-PD members received access to up to 30 training modules that were designed to support their knowledge and skill growth; these modules addressed the domains of explicit instruction, behavior support, and reading instruction (i.e., 10 modules per strand). Other than providing access to the professional development modules, there were no coaching support differences between paraeducators who were assigned to the E-PD and T-PD treatment conditions.

Intervention Procedures and Materials

In the RCT, all paraeducators deliver a targeted early literacy or early numeracy intervention that embedded explicit instruction practices. Paraeducators who were randomly assigned to the T-PD or E-PD treatment conditions delivered an early literacy intervention. This intervention was adapted from *Road to the Code* and *Road to Reading* (Blachman, Ball, Black, & Tangel, 2000; Blachman & Tangel, 2008). The study's early literacy intervention taught decodable words with a consonant-vowel-consonant pattern, letter sounds, and included other phonics activities. Additional lesson components addressed non-decodable words, vocabulary acquisition, reading in context, and writing. Lemons et al. (2018) offers a more thorough description of the intervention's procedures, instructional components and materials, and a sample lesson plan is included in Appendix C.

This intervention program contains 8 lessons, and all RCT students that were assigned to the T-PD or E-PD conditions began instruction with the intervention's first lesson. Prior to the onset of intervention, the RCT did not ask paraeducators to conduct an assessment to determine which intervention lesson would be most appropriate for participating students. RCT students were required to demonstrate mastery (i.e., meet the criterion for 7 out of 8 correct responses in a formative assessment that addressed reading decodable key words, letter sounds, and non-decodable sight words) for 3 consecutive instructional sessions to qualify for the next lesson. In the event of a student's protracted difficulty with attaining the mastery criterion, the paraeducator was advised to deliver a new lesson after 6 weeks.

Intervention Fidelity

University research assistants rated one intervention session video per paraeducator per week for intervention fidelity, and they used those intervention fidelity ratings to inform their instructional coaching feedback. In the RCT, it was hypothesized that participation in weekly coaching sessions would exert a significant effect on paraeducators' knowledge and skill. Between December 2018 and May 2020, paraeducator participants included in this analysis delivered 1357 intervention sessions. The project's instructional coaches rated 386 intervention sessions for intervention fidelity (28%), and 212 of those sessions were sampled for reliability scoring (55%) by members of the project's data team. All project staff members who rated sessions for intervention fidelity had checked out on the early literacy intervention's fidelity scoring protocol.

In the current study, I analyzed the relation between paraeducator intervention fidelity performance and lesson completion. Specifically, I tested whether overall intervention fidelity ratings for implementation, quality, engagement, and behavior management predicted lesson

completion; all intervention scores were set to a scale from 0-3. The inclusion of these variables facilitated inferences regarding whether student non-response to treatment was associated with paraeducators' inadequate intervention implementation, rather than treatment ineffectiveness. The intervention fidelity form is included in Appendix D.

Instructional Coaching Session Data

I collected procedural fidelity data on the RCT instructional coaches' adherence to the coaching and professional development support protocol (see sample form in Appendix E). For the 37 participants in this analysis, I was the primary procedural fidelity coder for 235 of 482 (49%) eligible instructional coaching sessions; a reliability coder rated 138 of the 235 sessions (59%). The included variables in my analysis were the total number of instructional coaching sessions attended, specifically the sessions in which fidelity feedback was provided or was not expected to be provided due to the paraeducator delivering the early literacy intervention with a sufficiently high implementation score to qualify for faded support, which entailed receiving fidelity feedback every other week, the cumulative duration of instructional coaching sessions attended, and the number of priority goals that their instructional coach had assigned. I also estimated the E-PD condition paraeducators' count of professional development modules completed.

Interrater Agreement (IRA)

Student-level pretest measures were first scored by the RCT's tester, and then re-scored by another member of the RCT's project staff who had been trained to criterion on the measures' scoring procedures. In the event of a scoring disagreement, a third member of the project staff, who had also checked out on the assessment scoring protocol, reviewed the measure in question

and determined what the appropriate scoring decision should be. All student assessment data were entered and re-entered on databases by separate project staff members.

Intervention dosage and E-PD module completion status were estimated using data entered on a researcher-created participant tracking document (i.e., Helper Log) by project staff. Beginning in the 2020-2021 school year, project staff estimated Helper Log data entry accuracy, and interrater agreement (IRA) estimates exceeded 90%. IRA levels for intervention fidelity domains of overall implementation, quality, engagement, and behavior management all exceeded 83%.

Data Analysis Plan

I used SPSS (Version 28.0) to analyze my data set, specifically to estimate the extent to which student pretest scores, intervention dosage, intervention fidelity ratings, and data from instructional coaching sessions predicted the criterion variable of final intervention lesson completed. First, I examined descriptive statistics for my sample (n = 37; see Appendix F). Then, I examined correlations between all measures and final lesson status, as well as the associations between the student pretest measures. I conducted a standard multiple regression procedure that simultaneously examined the effects of all predictor variables to estimate the extent to which each predictor variable explained the variance in final lesson completion. Specifically, these variables included each measure in the student pretest battery, intervention dosage variables that measured total intervention weeks, minutes, and sessions, mean overall scores for intervention fidelity ratings on implementation, quality, engagement, and behavior management, and instructional coaching session data on dosage, priority goals assigned, and E-PD modules completed. These statistical procedure facilitated inferences on which study-related variables were most closely associated with intervention lesson mastery.

CHAPTER III.

RESULTS

In this analysis, there were no statistically significant correlations between any student pretest measure and final lesson completion (see Appendix G). However, there were several significant and moderately strong correlations between specific predictor variables in the intervention dosage, intervention fidelity, and instructional coaching session domains and the dependent measure. For intervention dosage, there were significant associations between the number of total intervention sessions (r = .458, p = .004), total intervention minutes (r = .416, p = .010) and final lesson completed. In the intervention fidelity domain, there was a significant correlation between the mean overall quality score and final lesson status (r = .400, p = .014). Of the instructional coaching session-related variables included in this analysis, there were significant associations between the total number of instructional coaching sessions (r = .424, p = .009) and their total duration of those instructional coaching sessions (r = .440, p = .006) and the criterion variable.

There were numerous statistically significant associations across measures in the student pretest battery (see Appendix H). However, due to floor effects and substantial variability in my sample's performance on each measure, it may not be appropriate to interpret these correlations. I will address the difficulty in meaningfully interpreting these data in my Limitations section.

After conducting the multiple regression analysis, I determined that the predictor variables explained 89.1% of the variance (65.5% adjusted r^2; see Appendix I) on final lesson completion. The only statistically significant predictor variable from the student pretest was the WJ-IV Tests of Achievement Passage Comprehension subtest, $\beta = -.808$, $t(36) = -2.532$, $p = .028$. The total number of intervention weeks, $\beta = -.730$, $t(36) = -2.803$, $p = .017$, and the total number of intervention sessions, $\beta = 2.468$, $t(36) = 3.578$, $p = .004$, also explained a significant amount of variance on the criterion variable

I determined that, for the 37 students included in this analysis, the mean number of instructional weeks required to complete a lesson in the early literacy protocol was 3.24 (*SD* = 2.99; see Intervention Procedures and Materials in Method section for information on mastery criterion). Students required a mean of 5.57 instructional sessions (*SD* = 3.29) to demonstrate mastery, which constituted a mean of 178.15 minutes of instruction (*SD* = 109.32). These data suggest that students required substantial instructional time to attain mastery, and that performance was highly variable across the sample.

CHAPTER IV

DISCUSSION

The primary aim of this exploratory study was to examine the pre-treatment attributes of elementary and middle school students with IDD, as well as the study-related supports, that were associated with positive response to the early literacy intervention. Over multiple years of the RCT, paraeducators implemented an intervention that targeted decodable key words, initial phonological awareness, non-decodable sight words, vocabulary, reading connected text, and writing using explicit and systematic instructional methods. To determine the factors associated with intervention lesson completion, I analyzed performance on student pretest measures that addressed the constructs of rapid automatic naming, phonemic awareness, phonological awareness, decoding, non-decodable sight word reading, and fluency. I also estimated the associations between intervention dosage, intervention fidelity performance, and instructional coaching session-related variables on student lesson completion outcomes. This analysis facilitated inferences on which student pre-treatment attributes and intervention-related supports might be most effective to foster early literacy skill development for students with IDD.

Results indicate that variables related to intervention dosage (i.e., total intervention sessions and total intervention minutes), intervention implementation (i.e., mean overall quality score), and instructional coaching session supports (i.e., total instructional coaching sessions attended and total minutes of instructional coaching sessions) were moderately correlated with final lesson completion. Unfortunately, I did not detect any significant correlations between any student pretest variable and performance on the criterion variable. It is likely that the lack of statistical power and insufficiently sensitive measurement hindered my ability to detect any significant associations between any pre-treatment student early literacy skill and intervention

lesson completion. Specifically, the lack of any significant correlations on student pre-treatment attributes limits the contextualization of these findings within the literature base on early literacy treatment response predictors (see Al Otaiba and Fuchs (2002), Lam and McMaster (2014), and Nelson, Benner, and Gonzalez (2003)).

Results from the multiple regression procedure suggest that the three predictor variables that explained a statistically significant amount of the variance in lesson completion were the WJ-IV Tests of Achievement Passage Comprehension subtest, total intervention weeks, and total intervention sessions. This finding converged with Allor, Yovanoff, Al Otaiba, Ortiz, & Conner (2020), who suggested that students with IDD require early literacy intervention with sufficient intensity and duration to facilitate the desired skill gains. The predictive role of reading comprehension was not identified in previous reviews of early literacy treatment response, which may suggest that this is a sample-specific finding.

Implications

In this study, mean overall ratings for the intervention fidelity indicators of implementation, quality, engagement, and behavior management (see Appendix F) suggested that most paraeducators were able to deliver early literacy intervention with sufficiently high intervention fidelity ratings. As schools increasingly use paraeducators to deliver instructional services to students with identified disabilities, it is important to consider strategies to support paraeducators and other non-certified personnel to implement instruction to meet students' targeted needs (Biggs, Gilson, & Carter, 2019; Carter, O'Rourke, Sisco, & Pelsue, 2009). In this study, RCT staff used explicit training methods, provided individualized feedback, and presented models of desired instructional behaviors to paraeducator implementers, which aligned with recommendations from other researchers (e.g., Brock and Carter, 2013; Walker, Douglas,

Douglas, & D'Agostino, 2020). The results of this study converged with the findings of Jones, Erchul, and Geraghty (2021), Samson, Hines, and Li (2015), and Slavin, Lake, Davis, and Madden (2011), who had suggested that paraeducators can be effectively used as early literacy instructional providers.

This study's findings aligned with previous empirical research on literacy development for students with IDD. Specifically, this study produced evidence that supported the finding of Allor and colleagues (2018) that students with ID may require increased intervention duration and intensity to attain desired literacy outcomes. Furthermore, the intervention incorporated explicit instruction methods to teach initial phonological awareness and phonics skills, which aligned with recommendations from Allor and colleagues (2014) and Browder and colleagues (2008).

Limitations

There were several limitations that may affect the interpretation of study results. Due to the RCT's small sample size, there was limited statistical power in my analysis (n = 37). Furthermore, my decision to exclude 15 participants due to insufficient intervention dosage exerted a suppressive effect on this analysis's statistical power. In this analysis, I did not detect any significant correlations between any student pretest measure and the final intervention lesson completed, which may be a result of a lack of statistical power. Future investigations of early literacy skill development for students with IDD should consider using larger samples to detect statistically significant growth in their samples.

Limited intervention dosage may have also impeded certain students' early literacy skill acquisition. In this study, feasibility concerns adversely affected paraeducator implementers' ability to fulfill the RCT study's obligation of delivering 4 instructional sessions per week. The

37 student participants received a mean of 36.68 sessions (*SD* = 21.77) over 17.05 weeks (*SD* = 8.66) across the intervention (i.e., a mean of 2.15 intervention sessions per week). In a study of early literacy skill development for students with IDD that used both teacher and paraeducator implementers, Allor and colleagues (2018) determined that teachers delivered a mean of 3.0 intervention sessions per week (*SD* = .33), whereas paraeducator implementers delivered a mean of 1.95 early literacy intervention sessions per week (*SD* = .86). This feasibility challenge suggests that researchers should consider strategies to address intervention implementation barriers for paraeducators in applied settings.

Furthermore, students with IDD may require more intensive early literacy instructional support relative to their peers with and without disabilities. Allor, Yovanoff, Al Otaiba, Ortiz, & Conner (2020) determined that students with IDD benefit from early literacy instruction with sufficient intensity and practice opportunities to master basic skills. Specifically, they estimated that that students with IDD may require 1.5 to 3.5 academic years of evidence-based reading instruction to make the same oral reading fluency gains that typically developing students demonstrate in half an academic year. In this analysis' sample, some students may have been exposed to an insufficient number of instructional sessions to exhibit desired skill growth.

High variability, in conjunction with floor effects, limited the interpretability of correlational findings on student pretest performance (see Appendix H). Jones and colleagues (2018) suggested that students with IDD may have access skill deficits, which they operationalized as difficulty understanding the testing contingency, attending to auditory and visual stimuli that may be different than what is used in their standard classroom instruction, and exhibiting on-task behaviors during a timed measure. Lemons, Mrachko, Kostewicz and Paterra,

(2012) suggested that more research is needed to determine which measures of reading skill development may be most appropriate to estimate growth over time for students with IDD.

In the RCT, instructional coaches advised paraeducators to begin implementing a new lesson in the early literacy intervention after 6 weeks, irrespective of whether the student attained the mastery criterion (see Intervention and Procedures in Method section). Unfortunately, RCT staff did not collect and record formative data from intervention sessions, which makes it difficult to infer how many students may have progressed to a new lesson without having demonstrated mastery. The availability of these formative data would facilitate analyses on student non-response, and future researchers may consider reporting formative data in their findings.

Finally, the RCT did not ask paraeducator implementers to conduct a placement test to determine what lesson might have been most appropriate for participating students. All paraeducators began implementation with the early literacy intervention's first lesson to develop proficiency in delivering a structured protocol. This decision was made because the RCT's primary research question addressed coaching and professional development supports for paraeducators, most of whom had no prior experience delivering a scripted instructional program to a student. Based on the screener assessment and the student eligibility criteria, RCT staff members determined that participation in the early literacy intervention likely would have benefitted all students who were randomly assigned to the study's treatment conditions. Nevertheless, the absence of a placement test for the early literacy intervention likely affected the dosage-related variables that pertain to early literacy content mastery.

Future Directions for Practice

For students with IDD, there is a growing body of empirical studies that suggest students are able to meet desired early literacy outcomes with the appropriate supports and targeted code-focused reading instruction (Allor et al., 2010a; Allor et al., 2010b; Browder et al., 2012; Lemons et al., 2018). However, practitioners need to consider intensification frameworks to address the possible non-response of students with IDD who participate in generally effective early literacy programs. To address the skill deficits of non-responders, school-based practitioners would benefit from incorporating relevant data about predictors of treatment response into their instructional planning decisions. Practitioners may consider how a given student's pre-treatment profile, including diagnostic assessment data, may affect the individualization of instructional content addressed in code-focused reading instruction (Denton, Tolar, Fletcher, Barth, Vaughn, & Francis, 2013). Furthermore, the analysis of student diagnostic assessment data and pre-treatment attributes may inform instructional grouping decisions and the intensity of supports required in a Response-to-Intervention (RtI) or multi-tiered support system (MTSS; Lam & McMaster, 2014). These intensification strategies may be necessary to remediate persistent skill deficits that are not ameliorated in the context of generally effective instruction that is delivered with sufficient intensity and fidelity.

However, practitioners should consider the available resources in their school context, and employ less resource-intensive instructional approaches before intensifying their interventions or curricular programs. According to Reilly (2012), the use of curricula that is designed to support students with a common disability classification or set of academic skill deficits may be best used after a student demonstrates non-response to effective instruction in the context of a RtI or MTSS framework. Furthermore, King and colleagues (2020) recommended that the decision to individualize instruction based on common student pre-treatment

characteristics, such as behavioral phenotype or other disability characteristic, should not necessarily supplant existing strategies for intensification. The consideration of intensification methods, in conjunction with ensuring that students with IDD are exposed to evidenced-based early reading protocols that stress phonemic awareness and phonics, would likely benefit practitioners (Lemons et al., 2018).

Future Directions for Research

More research is required to determine which measure or combination of measures best predict treatment responsiveness and literacy skill acquisition for students with IDD (Lam & McMaster, 2014; Lemons et al., 2012). Upon determining which measures are appropriately reliable and sensitive for assessing students with IDD, researchers will be better equipped to design more effective screeners and instructional protocols. In addition, researchers should consider which proximal and distal measures may be most appropriate for progress monitoring purposes and estimating acquisition of relevant early literacy skills.

Researchers should examine hypothesized predictors of early literacy treatment response for students with IDD. Additional studies with sufficient statistical power would facilitate the identification of student pre-treatment attributes are most closely associated with student skill acquisition. By reporting samples' descriptive characteristics, researchers may be better positioned to consider which pre-treatment attributes may exert a role in intervention responsiveness. Upon identifying student pre-treatment characteristics that correlate with early literacy skill acquisition, researchers would be better equipped to design intensification strategies for instructional protocols for students with IDD on both the student- and small group-levels. The development of early literacy programs that are aligned with empirically-validated predictors of treatment response for students with IDD may be a promising strategy to reduce the

number of student non-responders to generally effective early literacy instruction that is delivered with sufficient intensity and fidelity.

Furthermore, researchers should examine which intervention-related variables are possible predictors of treatment response for students with IDD in the context of early literacy instruction. These variables may include intervention dosage and associated coaching supports. More researchers should empirically determine the dosage and coaching supports that are correlated with positive student effects, which may allow researchers to provide more specific guidance to practitioners for implementing code-focused early literacy protocols. Lastly, future research on predictors of early literacy treatment response should continue to address intervention fidelity performance to confirm whether student non-response may be due to poor intervention implementation.

APPENDIX A

STUDENT DEMOGRAPHIC DATA

Student Demographic Characteristics

Measure	*n*	%	M	SD
Age in Years[a]			9.26	2.52
Sex[b]				
Male	25	73.5		
Female	9	26.5		
Primary Disability[c]				
ID	9	28.1		
DD	11	34.4		
Autism	7	21.9		
FD	1	3.1		
OHI	2	6.3		
TBI	1	3.1		
LI	1	3.1		
Race[d]				
White	25	80.6		
African-American	5	16.1		
White and African-American	1	5.4		
Hispanic Ethnicity[e]	2	8.3		

Note. T-PD = Traditional Professional Development Condition; E-PD = Enhanced Professional Development Condition; ID = Intellectual Disability, DD = Developmental Delay, FD = Functional Delay; OHI = Other Health Impairment; TBI = Traumatic Brain Injury; LI = Language Impairment. Age determined by student's age at time of pretest. [a] = Data available for 32 participants. [b] = Data available for 34 participants. [c] = Data available for 32 participants. [d] = Data available for 31 participants. [e] = Data available for 24 participants.

APPENDIX B

SURVEY RESULTS OF CLASSROOM READING INSTRUCTION

Provider, Dosage, and Grouping Format of Participants' Business-as-Usual Reading Instruction

Reading Instruction Provider	Mean days of instruction per week (SD)	Mean minutes per day of instruction (SD)	Whole class format	Small group format	One-on-one format	Independent work
General education teacher[a]	4.89 (0.33)	58.33 (38.73)	7	6	2	4
Special education teacher[b]	5(0)	63.13(32.60)	9	18	20	8
Paraprofessional[c]	5(0)	33.13(25.06)	0	6	4	1

Note. [a] = 9 participants; [b] = 24 participants; [c] = 8 participants.

Instructional Targets of Participants' Business-as-Usual Reading Instruction (N = 25)

Instructional Target	Very High Focus Area	High Focus Area	Moderate Focus Area	Low Focus Area	Not a Focus Area
Functional sight word reading	10	9	3	3	0
Reading non-decodable HFWs	5	6	9	3	2
Initial phonological awareness	6	9	4	2	4
Advanced phonological awareness	4	7	6	3	5
Letter name knowledge	6	4	1	6	8
Letter sound knowledge	7	6	1	5	6
Decoding	10	4	7	2	2
Spelling	2	2	6	11	4
Reading connected text	2	5	6	7	5
Listening comprehension	5	12	7	1	0
Reading comprehension	5	9	6	2	3
Vocabulary	2	8	7	6	2
Handwriting	2	7	8	4	4
Writing composition	0	5	5	5	10

Instructional Strategies and Supports of Participants' Business-as-Usual Reading Instruction (N = 25)

Instructional Strategy	Very High Level of Incorporation	High Level of Incorporation	Moderate Level of Incorporation	Low Level of Incorporation	Not Incorporated at This Time
Explicit systematic instruction	9	9	4	3	0
Strategies to increase motivation, on-task behavior	12	9	3	1	0
Visual supports	14	6	2	2	1
Strategies to support working memory	14	9	2	0	0
Strategies to improve speech articulation, comprehension ability	11	6	5	1	2

APPENDIX C

SAMPLE LESSON PLAN FROM EARLY LITERACY INTERVENTION

Lessons 1-8

SPARK: An Early Literacy Intervention
Interventionist Manual

2019 Revised Edition

Christopher J. Lemons, Cynthia Puranik, Stephanie Al Otaiba, Deborah Fidler, & Deborah Fulmer

Support for the development of this manual provided by Grants # R324A110162 and # R324A180004 from the Institute of Education Sciences in the U.S. Department of Education. Contributors to the 2018 Revised Edition include Samantha Gesel, Anne Sinclair, and Lauren LeJeune.

SPARK LESSON ONE

Outline

First Block – 20 min

- Review lesson rules. Provide student choice for break item or activity. Set up visual schedule.
- **Step 1.** Key words (5 min.)
- **Step 2.** Letter sounds (5 min.)
- **Step 3A/3B.** Phonological awareness/Word building [Alternate days] (6 min.)
- **Step 4.** High frequency words (2 min.)

Please take a small break here if you plan to do the intervention in one block, or complete steps 5 and 6 later in the day.

Second Block – 17 min

- Provide student choice for break item or activity. Set up visual schedule.
- **Step 5.** Vocabulary (5 min.)

  /Optional 2-minute break/
- **Step 6A and 6B.** Writing / Reading in Context [Alternate days] (10 min.)

Daily Checks

Information about Daily Checks

- After each step in the lesson, you are going to do a quick 'daily check' to evaluate student learning.
  - You will assess the target skill (e.g., letter sounds, key words) for the current lesson each day.
- Make the check engaging, fast, and fun. Your format can change to capture your student's best performance.
- After the check, record student behavior for the step.

General Procedure

- Show student each targeted word, letter, or picture (for up to 3 seconds)
- No corrective feedback or praise is given for individual student responses.
- You can give praise for completing the daily check, regardless of correct/incorrect answers (e.g., "Thanks for answering!").
- Score as correct (1) or incorrect (0) and then continue with lesson.

Step 1: Key Words (5 min)

Objective: Student will memorize key words by sight, match key word to picture, and read the word.

Materials: Key/partner word cards, key/partner word pictures, data sheet.

Procedure

Rules and Visual Schedule

- Review lesson rules.
- **"Rule #1 is listen to the teacher. Rule #2 is work hard. Rule #3 is be respectful."** (Give examples and model as needed. Spend extra time on rules that the student is not typically following).
- Give student choice of break items. Place chosen item on visual schedule. Place first four items on visual schedule. **"We are going to do key words, letter sounds, word games, and red words. Then you can take a break with (student choice)."**

Warm Up

- Review known words from word cards in a quick manner (i.e., flash cards). Provide immediate corrective feedback for errors. (**"'[Word]'. What word?"**). Goal is to 'warm up' student with success. *[Appr. 30 seconds.]*
  - *Note: In Lesson 1, there are no previously mastered words. Skip this warm-up. For all other Lessons, select from key words in previous lessons.*

Review/Introduce New Key Word Pictures (All picture cards)

Introduce/review each key word picture card. Discuss meaning, use gestures or actions if needed; have student say word. [Complete one word at a time.]

"This is a picture of 'ant'. What is this?" *(Briefly discuss meaning if necessary.)*	**"This is a picture of 'mat'. What is this?"** *(Briefly discuss meaning if necessary.)*	**"This is a picture of 'top'. What is this?"** *(Briefly discuss meaning if necessary.)*
• +: **"You are right. That is 'ant'."** • -: *(touch correct picture)* **"This is 'ant'. Show me 'ant'."** *(Have student repeat. Briefly review meaning if needed.)*	• +: **"You are right. That is 'mat'."** • -: *(touch correct picture)* **"This is 'mat'. Show me 'mat'."** *(Have student repeat. Briefly review meaning if needed.)*	• +: **"You are right. That is 'top'."** • -: *(touch correct picture)* **"This is 'top'. Show me 'top'."** *(Have student repeat. Briefly review meaning if needed.)*

Have student identify pictures from an array. Place all 3 pictures in front of student.

- **"Here are our pictures. I will say the name, then you touch the picture."**

"Show me 'ant'."	**"Show me 'mat'."**	**"Show me 'top'."**
• +: **"You are right. That is 'ant'."** • -: *(touch correct picture)* **"This is 'ant'. Show me 'ant'."** *(Have student repeat.*	• +: **"You are right. That is 'mat'."** • -: *(touch correct picture)* **"This is 'mat'. Show me 'mat'."** *(Have student repeat.*	• +: **"You are right. That is 'top'."** • -: *(touch correct picture)* **"This is 'top'. Show me 'top'."** *(Have student repeat.*

Briefly review meaning if needed.)	*Briefly review meaning if needed.)*	*Briefly review meaning if needed.)*

- **"Now, I'm going to touch a picture and I want you to say the word.**

"What is this?" *(point to 'ant' picture)*	**"What is this?"** *(point to 'mat' picture)*	**"What is this?"** *(point to 'top' picture)*
• +: **"You are right. That is 'ant'."** • -: *(touch correct picture)* **"This is 'ant'. Show me 'ant'."** *(Have student repeat. Briefly review meaning if needed.)*	• +: **"You are right. That is 'mat'."** • -: *(touch correct picture)* **"This is 'mat'. Show me 'mat'."** *(Have student repeat. Briefly review meaning if needed.)*	• +: **"You are right. That is 'top'."** • -: *(touch correct picture)* **"This is 'top'. Show me 'top'."** *(Have student repeat. Briefly review meaning if needed.)*

  - *NOTE: No picture steps can be skipped unless the student has mastered all 3 key words without picture supports. If the student has mastered all three key words without picture supports but does not yet have 7/8 on the daily assessment, do a brief review of known key word cards and introduce partner cards.*

Review/Introduce New Key Word Cards (All key word cards)

Select one key word picture.

"This is 'ant'. What is this?"	**"This is 'mat'. What is this?"**	**"This is 'top'. What is this?"**
• +: **"You are right. That is 'ant'."** • -: *(touch correct picture)* **"This is 'ant'. Show me 'ant'."** *(Have student repeat. Briefly review meaning if needed.)*	• +: **"You are right. That is 'mat'."** • -: *(touch correct picture)* **"This is 'mat'. Show me 'mat'."** *(Have student repeat. Briefly review meaning if needed.)*	• +: **"You are right. That is 'top'."** • -: *(touch correct picture)* **"This is 'top'. Show me 'top'."** *(Have student repeat. Briefly review meaning if needed.)*

Show student key word card.

"This is the word 'ant'. What word?"	**"This is the word 'mat'. What word?"**	**"This is the word 'top'. What word?"**
• +: **"You are right. This is the word 'ant'."** • -: **"Good try. This is the word 'ant'. Say it with me. 'ant'. Now you try. What word?"** *(Repeat if needed).*	• +: **"You are right. This is the word 'mat'."** • -: **"Good try. This is the word 'mat'. Say it with me. 'mat'. Now you try. What word?"** *(Repeat if needed).*	• +: **"You are right. This is the word 'top'."** • -: **"Good try. This is the word 'top'. Say it with me. 'top'. Now you try. What word?"** *(Repeat if needed).*

Place picture and word card together. Reiterate:

"This is a picture of 'ant' and this is the word 'ant'."	**"This is a picture of 'mat' and this is the word 'mat'."**	**"This is a picture of 'top' and this is the word 'top'."**

Take away picture. Show word card.

"What word?" *(point to 'ant')*	**"What word?"** *(point to 'mat')*	**"What word?"** *(point to 'top')*
• +: **"You are right. This is 'ant'!"** • -: **"Good try. This is the word 'ant'. Say it with me. 'ant'. Now you try. What word?"** *(Repeat if needed).*	• +: **"You are right. This is 'mat'!"** • -: **"Good try. This is the word 'mat'. Say it with me. 'mat'. Now you try. What word?"** *(Repeat if needed).*	• +: **"You are right. This is 'top'!"** • -: **"Good try. This is the word 'top'. Say it with me. 'top'. Now you try. What word?"** *(Repeat if needed).*

Practice Games

Spend remaining time doing a practice game. This is your choice, but rotate so student has exposure to multiple games across week. May give student choice (e.g., Should we play matching or speedy reading?) once student is familiar with games.

- *Matching*: Place key words and associated pictures from current and previous lessons (up to three words at a time) on table. Have student match word to picture and then read word. Replace words as they are matched. Give immediate corrective feedback if students are unable to read the words independently. Only include partner words if they have been introduced in other parts of the lesson (i.e., the student has mastered all key words in this lesson but does not yet have the score to move on to the next lesson.
- *Speedy Reading*: Have student read word cards as quickly as possible. Try to 'get faster' on second/third time. Include key words from current and previous lessons. Include partner words from current and previous lessons only if partner words have been introduced and key words from the current lesson have been mastered. If your student has stayed in the same lesson for 4 weeks, a discussion needs to happen with your coach to decide whether to move to the next lesson or not.
  If student makes an error, say "**That word is '[Word]'. What word?"** And continue. If the student misses a word, provide immediate corrective feedback. Before reading cards a second time, review missed words with picture cards.

Daily Check

- Key words from current lesson.
- "**Now we are going to do a check to see which of today's words you can read on your own.** *(Show student key word cards one at a time. You can have student speak into recording device as motivation.)* **"What word?"** *(Score responses on data sheet [1=Correct, 0=Incorrect.]*

Step 2: Letter Sounds (5 min)

Objective: Student will say sound for target letters. Student will practice saying the first sound in key words and partner words.

Materials: Letter cards, picture cards for target and partner words, alliterative phrase cards, data sheet

Procedure

Warm Up

- ***Note: refer to visual schedule before beginning step***
- Review known sounds in a quick manner. Provide immediate corrective feedback for errors. (**"/[sound]/. What sound?"**). [Approximately 30 seconds.]
- *Note: In Lesson 1, there are no previously mastered words. Skip this warm-up. For all other Lessons, select from key words in previous lessons.*

Review/Introduce New Letter Sounds (All letter cards)

Show alliterative phrase card for the letter 'a'. Point to letter. Goal is for student to say sound – not name. Use specific praise or error correction for each question. "**This is the letter 'a'. It says/a/. Listen /a/. What sound?"** **"/a/ as in 'ant'.** *(Point to word 'ant'.)* **Listen…/a/ - /a/… 'ant'. What sound?"** **"/a/ as in 'apple'.** *(Point to word 'apple'.)* **Listen…/a/ - /a/… 'apple'. What sound?"**
• +: **"Nice job! That is /a/."** • -: **"This sound is /a/. What sound? Nice job. This is /a/ like in ['ant' or 'apple', depending on word]."**
Hand 'a' letter card to student. [Scaffold by repeating the words listed on the alliterative phrase card and stressing the first sound.] • "**This is the letter 'a' all by itself. What sound?"**
• +: **"Nice job! That is /a/."** • -: **"This sound is /a/. What sound? Nice job. This is /a/ like in 'ant' and 'apple'."** *(Stressing the first sound.)*

- *Repeat Review/Intro script above for:*
  - *The letter **'m'**, which says **/m/**, like in the words **'mat'** (Key Word) and **'man'** (Partner Word)*
  - *The letter **'t'**, which says **/t/**, like in the words **'top'** (Key Word) and **'tub'** (Partner Word)*

Alliterative Phrase Review/Introduction (All target sounds)

Review alliterative phrase with student in a 'sing-song' manner. Focus on the various words/sounds that are pictures. Goal is repetition of sounds and awareness of first sound in words. Student does NOT have to repeat full phrase. This should be fun and game/song like. (Assist student as needed to touch the target letter in the phrase or on the alliterative phrase card when the first sound is heard.)

*Al, the active **ant**, can ask for an **apple**.* *I do:* "**Now I will sing a funny little song. Listen for words that start with /a/."** *We do:* **"Now we will sing it again. You can sing with me and listen for words that start with /a/."** *You do:* **"This time when we sing it, hold up your /a/ card when you hear a word that starts with /a/!"**	*Mike, the magic **man**, makes a **mat** for the monkey.* *I do:* "**Now I will sing a funny little song. Listen for words that start with /m/."** *We do:* **"Now we will sing it again. You can sing with me and listen for words that start with /m/."** *You do:* **"This time when we sing it, hold up your /m/ card when you hear a word that starts with /m/!"**	*Ted, the turtle, is turning his **top** in the **tub**.* *I do:* "**Now I will sing a funny little song. Listen for words that start with /t/."** *We do:* **"Now we will sing it again. You can sing with me and listen for words that start with /t/."** *You do:* **"This time when we sing it, hold up your /t/ card when you hear a word that starts with /t/!"**

Sing and review after each letter. Focus on having student hear the target sound in words. Have the student touch the letter as you say the sound. For variety, you may allow the student to raise the letter card when he or she hears the target sound in the alliterative phrase.

Practice Games

Spend remaining time doing a practice game. This is your choice, but rotate so student has exposure to multiple games across week. May give student choice (e.g., Should we play matching or speedy reading?) once student is familiar with games.

- *Matching*: Place combinations of known and target sounds with their pictures (up to three sounds at a time) on table. Have student match first sound to picture and then say the sound. Replace sounds as they are matched. Model and have student repeat if student makes an error.
- *Speedy Sounds* [letter strip]: Have student say letter sounds on the letter strip as quickly as possible. Try to 'get faster' and/or 'more accurate on second or third attempt. If a student makes an error, say **"That sound is /[sound]/. What sound?"** If student continues to make an error, model matching the picture and saying the sound before repeating the game.

Daily Check

- Key words cards from current lesson.
- "**Now we are going to do a check to see which of today's letter sounds you can say on your own.** (Show student letter cards one at a time. You can have student speak into recording device as motivation.) **"What sound?"** (Score responses on data sheet [1=Correct, 0=Incorrect.]

Step 3: Phonological Awareness/Word Building [*Alternate each day*] **(6 min.)**

Step 3A: Phonological Awareness

Objective: Student will gain proficiency in (a) isolating the first sound in a word and (b) segmenting and blending first sounds + rest of words.
Materials: SIMI card, first sound-rest of word cards, picture cards

3A Procedure

First Sound

- ***Note: refer to visual schedule before beginning step***

First sound

Place picture card of 'ant' above Say-It-Move-It (SIMI) card. "**This is a picture of 'ant'. What is this?"**
• +: "**'Ant' You are right! This is 'ant.'"** • -: "**'Ant.' Say it with me. 'Ant.' Now you try. What is this?"** *Repeat if needed.*
"**The first sound in 'ant' is /a/. What sound?**
• +: "**/a/ You are right! The first sound in 'ant' is /a/."** • -: **"/a/ Say it with me. '/a/' Now you try. What sound?"** *Repeat if needed.*
Place first sound-rest of word card for 'ant' in SIMI circle. "**This word is 'ant'. What word?**
• +: "**'Ant'. You are right! This is 'ant'!"** • -: **"'Ant.' Say it with me. 'Ant.' Now you try. What word?** *Repeat if needed.*
"Watch me." *(Provide support as needed.)* • *I Do:* "**I can say the first sound in 'ant'. Listen /a/."** *(Place finger on the dot under the sound.)* **"Now I can say it and move it. Watch me. /a/"** *(Say sound as you move letter down to the bottom of the SIMI card.)* **"What sound? /a/"** *Lift finger and repeat sound as you touch dot one time.)* • *We Do:* **"Now we can do it together. Say the first sound in 'ant'. Say it and move it!** *(Touch dot.)* **What sound?"** • *You Do:* **"Now it is your turn. Say the first sound in 'ant'?** *(Student answers).* **Say it and move it!** *(Student says and moves).* **What sound?"***(Student answers).*
• +: "**/a/ You are right! The first sound in 'ant' is /a/."** • -: **"/a/ Say it with me. '/a/' Now you try. What sound?"** *Repeat if needed.*

"Now we are going to practice saying the first sound in our words."

- *Repeat First sound PA script above for:*
  - *Partner word for the letter 'a' –* ***'apple'****.*
  - *The letter* ***'m'****, which says* ***/m/****, like in the words* ***'mat'*** *(Key Word) and* ***'man'*** *(Partner Word)*
  - *The letter* ***'t'****, which says* ***/t/****, like in the words* ***'top'*** *(Key Word) and* ***'tub'*** *(Partner Word)*
- *Repeat activity with key and partner words from previous lessons. If your student gets all of the first sounds correct but doesn't have the 7/8 to move on to the next lesson, you can make this more challenging by moving and saying both parts of the word or by replacing the letter cards with chips.*

First sound-rest of word

- *Note. Only do this section of the lesson AFTER students have consistently and accurately identified the first-sound of all three target words.*
- *Complete first sound – rest of word with current key and partner words.*
- *Repeat activity with chips instead of letter cards.*
- *When the student successfully identifies the first sound and rest of word sounds with chips, remove the picture card support.*

"Now we are going to practice saying the first sound and the other sounds in our words." *(Place picture card of key or partner word above SIMI card. Place first sound-rest of word cards for first word in the SIMI circle.)*

"**This word is 'ant'. What word?**
• +: "**'Ant'. You are right! This is 'ant!"** • -: **"'Ant.' Say it with me. 'Ant.' Now you try. What word?** *Repeat if needed.*
"Watch me." *(Provide support as needed.)* • *I Do:* **I can say the first sound in 'ant'. Listen /a/ /nt/.** *(Place finger on the dot under the sound.)* **"Now I can say it and move it. Watch me."***(Say sounds as you move first sound then rest of word cards down to the bottom of the SIMI card. After both are bottom of card, say each sound; then slide finger from left to right and say whole word. "/**a**/…./**nt**/…./**ant**/"* • *We Do:* **"Now we can do it together."** *(Repeat with student Say sound; say it move it, touch dot and say sound.)* • *You Do***: "Now it is your turn. Say it and move it!"** *(Have student repeat. Prompt with "say it", "move it", "what word" for the three times student is to say sounds/read word. Provide support as needed.)*
• +: ""/**a**/…./**nt**/…./**ant**/. **You are right! This is** "/**a**/…./**nt**/…./**ant**/. • -: **"/a/…./nt/…./ant/. Say it with me. /a/…./nt/…./ant/. Now you try. Say and move it** *Repeat if needed.*

- *Repeat First Sound-Rest of Word script above for:*
  - *Partner word for the letter 'a' –* ***'apple'. (/a/ /ple/ → /apple/)***
  - *The letter* ***'m'****, which says* ***/m/****, like it the words* ***'mat'*** *(Key Word)* ***[/m/ /at/ → /mat/]*** *and* ***'man'*** *(Partner Word)* ***[/m/ /an/ → /man/]****.*
  - *The letter* ***'t'****, which says* ***/t/****, like it the words* ***'top'*** *(Key Word)* ***[/t/ /op/ → /top/]*** *and* ***'tub'*** *(Partner Word)* ***[/t/ /ub/ → /tub/]***
- *As student gains skill, you can use the back side of the cards which do not have the letters. When students demonstrate knowledge of the first sound of all three key words, attempt the task without picture cues.*

Daily Check

- Key word picture cards from current lesson.
- "**Now we are going to do a check to see if you can say the first sound of today's pictures on your own.** (Show student key word picture cards one at a time. You can have student speak into recording device as motivation.) **"This picture is [Word.] What is the first sound of [Word]?"** (Score responses on data sheet [1=Correct, 0=Incorrect.]

Step 3: Phonological Awareness/Word Building [*Alternate each day*] **(6 min.)**

Step 3B: Word Building

Objective: Student will gain proficiency in (a) selecting the correct first letter to 'build' a word; and (b) building decodable key and target words.
Materials: white board, letter/rest of word cards, key word/partner picture cards

3B Procedure

First Sound Word Building

- ***Note: refer to visual schedule before beginning step***

"Now we are going to practice building the first sound words."

Place picture card of 'ant' at top of white board. "**This is a picture of 'ant'. What is this?"**
• +: "**'Ant' You are right! This is 'ant.'"** • -: "**'Ant.' Say it with me. 'Ant.' Now you try. What is this?"** *Repeat if needed.*
"**The first sound in 'ant' is /a/. What sound?**
• +: "**/a/ You are right! The first sound in 'ant' is /a/."** • -: **"/a/ Say it with me. '/a/' Now you try. What sound?"** *Repeat if needed.*
Draw a dot (for the initial sound) and a line (for first sound) at the bottom of the dry erase board. Place 'rest of word' card for the rest of word (/nt/) on the line. Place 3 key letter cards to the side. ***Watch me.*** • *I Do:* ***"I can build the word 'Ant'.*** **Let's see. Ant... /a/../a/… ant. I hear the /a/ sound. This letter makes /a/ like in 'Ant'."** *Emphasize and exaggerate the first sound in 'ant'. Move the correct letter card into position.* ▪ *We Do:* **"Do it with me. Let's build the word 'Ant'."** *(Repeat steps with student. Scaffold as needed.)* ▪ *You Do:* **"Your turn. Build the word 'Ant'."** ▪ *Repeat with other key and partner words.*
• +: "**/a/ You are right! The first sound in 'ant' is /a/."** • -: **"/a/ Say it with me. '/a/' Now you try. What sound?"** *Repeat if needed.*

- *Repeat First sound Word Building script above for:*
  - *Partner word for the letter 'a' –* ***'apple'****.*
  - *The letter* ***'m'****, which says* ***/m/****, like in the words* ***'mat'*** *(Key Word) and* ***'man'*** *(Partner Word)*
  - *The letter* ***'t'****, which says* ***/t/****, like in the words* ***'top'*** *(Key Word) and* ***'tub'*** *(Partner Word)*

- *If the student consistently builds all three key words accurately, use multiple rest of words or extra letter cards as distractors. You may also remove the picture.*

First Sound – Rest of Word Building.

"Now we are going to practice saying the first sound and the other sounds in our words."

*Place picture card of 'ant' at top of white board. "***This word is 'ant'. What word?**
• +: "**'Ant'. You are right! This is 'ant!"** • -: **"'Ant.' Say it with me. 'Ant.' Now you try. What word?** *Repeat if needed.*
Draw a dot (for the initial sound) and a line (for first sound) at the bottom of the dry erase board. Place 3 key letter cards and 'rest of word' card to the side. **"Watch me."** *(Provide support as needed.)* • *I Do:* ***"I can build the word 'Ant'.*** **Let's see. Ant... /a/ /nt/… ant. I hear the /a/ sound. This letter makes /a/ like in 'Ant'."** *Emphasize and exaggerate the first sound in 'ant'. Move the correct letter card into position. "***/a/ /nt/… /ant/. I hear the /nt/ for the rest of the word. This is the /nt/ like in 'ant.'"** ▪ *We Do:* **"Do it with me. Let's build the word 'Ant'.** *(Repeat steps with student. Scaffold as needed.)* ▪ *You Do:* **"Your turn. Build the word 'Ant'.**
• +: ""***/a/***….***/nt/***….***/ant/***. **You are right! This is** "***/a/***….***/nt/***….***/ant/***. • -: **"***/a/***….***/nt/***….***/ant/***. Say it with me.** ***/a/***….***/nt/***….***/ant/***. **Now you try. Say and move it** *Repeat if needed.*

- *Repeat First Sound-Rest of Word script above for:*
  - *Partner word for the letter 'a' –* ***'apple'****.* ***(/a/ /pple/ → /apple/)***
  - *The letter* ***'m'****, which says* ***/m/****, like in the words* ***'mat'*** *(Key Word)* ***[/m/ /at/ → /mat/]*** *and* ***'man'*** *(Partner Word)* ***[/m/ /an/ → /man/]****.*
  - *The letter* ***'t'****, which says* ***/t/****, like in the words* ***'top'*** *(Key Word)* ***[/t/ /op/ → /top/]*** *and* ***'tub'*** *(Partner Word)* ***[/t/ /ub/ → /tub/].***

Daily Check

- Key word picture cards from current lesson.
- "**Now we are going to do a check to see if you can say the first sound of today's pictures on your own.** (Show student key word picture cards one at a time. You can have student speak into recording device as motivation.) **"This picture is [Word.] What is the first sound of [Word]?"** (Score responses on data sheet [1=Correct, 0=Incorrect.]

Step 4: High Frequency Words (2 min)

Objective: Student will read high frequency words.
Materials: HFW sheets/cards

Procedure

Warm Up

- Review past mastered words
- Review previously learned high frequency words for the lesson (30 seconds)
- *Note: In Lesson 1, there are no previously mastered words. Skip this warm-up. For all other Lessons, select from key words in previously lessons.*

Introduce New High Frequency Words

- **Now, we're going to learn our red words.**

"This is a red word, say it in my head word—the, the, the! Say it with me—This is a red word, say it in my head word—the, the, the!" *Briefly discuss meaning if relevant to the word. Read sentences to student, pointing to words and emphasizing HFW:* **"Who is the ant? The ant is Al!"** ***"This time, you read the red word when I point to it!"*** *Read sentence to student again pointing to words. Pause when you get to the word 'the' without reading and have student read it.* **"Who is the ant? The ant is Al!"** *Repeat as needed.* *Include opportunities to practice using the HFW with objects around the room and gestures. Really emphasize the target word. For example:* • "**The door is [open/closed].**" • "**Who is the student?**"	**"This is a red word, say it in my head word—a, a, a! Say it with me—This is a red word, say it in my head word—a, a a!"** *Briefly discuss meaning if relevant to the word. Read sentences to student, pointing to words and emphasizing HFW:* **"What is Mike? Mike is a man!"** ***"This time, you read the red word when I point to it!"*** *Read sentence to student again pointing to words. Pause when you get to the word 'a' without reading and have student read it.* **"What is Mike? Mike is a man!"** *Repeat as needed.* *Include opportunities to practice using the HFW with objects around the room and gestures. Really emphasize the target word. For example:* • "**I have a [pen/pencil].**" • "**This is a word?**"
• +: "**'The'. You are right! This is 'the.'**" • -: "**'The.' Say it with me. 'The.' Now you try. What is this?**" *Repeat if needed.*	• +: "**'A'. You are right! This is 'a.'**" • -: "**'A.' Say it with me. 'A.' Now you try. What is this?**" *Repeat if needed.*

Daily Check

- High Frequency Words from current lesson.
- "**Now we are going to do a check to see which of today's words you can read on your own.** (Show student HFW cards one at a time.) **"What word?"** (Score responses on data sheet [1=Correct, 0=Incorrect.]

Optional 2 minute or longer break.

Step 5: Vocabulary (5 min)

Objective: Student will read chosen vocabulary as sight words/demonstrate understanding concepts/use in expressive oral language.
Materials: Vocabulary Word Cards with Definitions; Manipulatives, 2 cups

Procedure

Introduce Concept

- ***Note: you will need to choose new break activity and switch symbols on visual schedule before beginning step***

"Look at my picture."

"<u>What</u> is this? *(point to ant)*. **<u>What</u> is this?** *(point to monkey)*. **<u>What</u> is this?** (*point to top).*"	**"<u>Where</u> is the ant?** *(point to apple)*. **<u>Where</u> is the monkey?** *(point to mat)*. **<u>Where</u> is the top?** (*point to tub).*"
• +: **You are right! This is a(n) ['ant', 'monkey', or 'top']."** • -: "**This is a(n) ['ant', 'monkey', or 'top']. Now you try. <u>What</u> is this?"** *Repeat if needed.*	• +: **You are right! It is ['on the apple', 'on the mat', or 'in the tub']."** • -: "**It is ['on the apple', 'on the mat', or 'in the tub']. Now you try. <u>Where</u> is the ['ant', 'monkey', or 'top'?"** *Repeat if needed.*

Introduce Word (repeat for both vocabulary words)

- *Point to printed word on word card. Read definition on back of card.*

"This says <u>what</u>. <u>What</u> is a question word about a thing." *Rephrase in student friendly way.* "**<u>What</u> is a question word that names or describes something. You told me <u>what</u> this is – an ant!** (*point to ant*)." **"Say it with me, '<u>What</u>'."** (*Student says word with you).* **Your turn. Read the word.** *(Point to word. Student responds)*	**"This says <u>where</u>. <u>Where</u> is a question word about a place."** *Rephrase in student friendly way.* **<u>Where</u> is a question word that tells is the spot something is in. You told me <u>where</u> the ant is – on the apple!** (*point to apple*). **"Say it with me, '<u>Where</u>'."** (*Student says word with you).* **Your turn. Read the word.** *(Point to word. Student responds)*
• +: "**Great Job! The word is '<u>what</u>'."** • -: "**Nice try. The word is '<u>what</u>'. Read the word."** *Repeat if needed.*	• +: "**Great Job! The word is '<u>where</u>'."** • -: "**Nice try. The word is '<u>where</u>'. Read the word."** *Repeat if needed.*

Demonstrate Concept with Manipulatives

Demonstrate the concept with manipulatives. Content will change depending on words. Goal is to model appropriate use of the vocabulary words with manipulatives and to support student's expressive use of words. You will move from 'I do' to 'we do' to 'you do' to scaffold the student's use of the word. Frequently direct student's attention to the printed word.

- **"Let's use our new words!**

• *I Do:* "**I can use our new words."** *Model appropriate use of word with manipulatives. For example:*
  o *A lion figurine.* **"'What' is this?** *(Point to the printed 'what' word card for emphasis).* **I know what this is. It is a lion.** *(Give multiple examples.)"*
• *We Do*: **"Let's use our new words together."** *Repeat similar language used in 'I do' but encourage student to say words with you.*
• *You Do:* **"Your turn. Now you use our new words.** *Prompt student to interact with manipulatives and repeat language from previous steps. Provide corrective feedback as needed.*
	• *I Do:* "**I can use our new words."** *Model appropriate use of word with manipulatives. For example:*
	  o *Put lion under the cup.* **"'Where' is the lion?** *(Point to the printed 'where' word card for emphasis).* **I know where the lion is. He is under the cup.** *(Give multiple examples.)*
	• *We Do*: **"Let's use our new words together."** *Repeat similar language used in 'I do' but encourage student to say words with you.*
	• *You Do:* **"Your turn. Now you use our new words.** *Prompt student to interact with manipulatives and repeat language from previous steps. Provide corrective feedback as needed.*

• *Provide corrective feedback as needed.*	• *Provide corrective feedback as needed.*

Practice Games (repeat for both vocabulary words)

- Moving beyond manipulatives and vocabulary word card: Use games to check student's understanding and generalization using vocabulary words. If students have mastered all current vocabulary words or appear bored with current vocabulary lessons, add vocabulary from previous lessons.
- Play games using combinations of manipulatives, objects in the room, and physical actions or gestures to further explore the concepts. Take turns with student asking questions and demonstrating. Mix in non-examples.

Daily Check

- Vocabulary word cards from current lesson.
- "**Now we are going to do a check to see which of today's words you can read on your own.** (Show student vocabulary word cards one at a time. You can have student speak into recording device as motivation.) **"What word?"** (Score responses on data sheet [1=Correct, 0=Incorrect.]

Optional 2 minute break.

Step 6: Writing/Reading in Connected Texts [*Alternate each day*] **(10 min.)**

Step 6A: Writing

Objective: Student will write new and mastered sounds, key and partner words, and practice decodable words, and phrases that include the various words.
Materials: Writing sheets, alliterative phrase cards, letter/word cards

6A Procedure

- ***Note: refer to visual schedule before beginning step***
- The purpose of this activity is to give the student practice time writing the key components of the intervention (i.e., sounds and words).
- Students' abilities vary greatly in writing. For this activity, you will select an appropriate activity based on your student's needs. You should spend about 5 minutes on activities you know your student can complete correctly and 5 minutes on activities that are slightly more complex. You will likely need to provide immediate corrective feedback and modeling when students work on these skills.
- On the provided writing sheets, have student write their name. You can provide a model or dots for tracing if needed. Have the student complete at least two of the four writing activities, depending on their level of skill. This will be a permanent product of their writing. In addition, you can provide additional practice using the white board and the guidelines below.
- Alliterative phrase cards and/or picture/word cards can be used for support.
- Note. For 'decodable words' and 'phrases/sentences' use only decodable words.
- Note. The tasks increase in complexity in two ways:
- First, the 'chunk' that is required for the student to interact increases from ***letter sounds*** to ***first sounds*** to ***decodable/PD words*** to ***phrases/sentences***.
- Second, the level of student outcome increases from ***tracing*** to ***copying*** to ***writing with model covered and checking*** *to* ***independent writing***.
- Additionally, the alliterative phrase card and/or picture/word cards can be used for support.

Step 6: Writing/Reading in Connected Texts [*Alternate each day*] (10 min.)

Step 6B: Reading in Connected Texts

Objective: Increase oral reading fluency.
Materials: Lesson story, stopwatch, graph.
Three versions of the story are provided for each lesson with varying levels of support. The fully supported story has pictures above the Key and Partner words, the HFWs are in red ink and the Vocab words are in blue ink. The medium level of support only has the pictures for Key and Partner words, red ink for HFWs and blue ink for Vocab words from the current lesson. The version with the least support is all in black ink and does not include pictures. Use the version that best matches your student's skill level and work toward gradually removing support.

6B Procedure

Model/Read Aloud I Do-We Do-You Do

- ***Note: refer to visual schedule before beginning step***
- *Lesson Text:* **Mike is a MAN. His pal is Al, the ANT. They like to play. Where do they play? They play on the MAT. What do they play? They spin a TOP in a TUB. Mike shares an APPLE with the ANT after they play.**
- *Read the lesson story to the student aloud. Have the student follow along.*
    - **"I am going to read a story. Listen and follow along."** *(Briefly discuss content. You may add comprehension questions or ask student to retell portions of the text if appropriate.)*
    - "**Now let's read the story together."** *(Repeat, scaffolding student to read with you.)*
    - **"Now it is your turn. Let's see how many words you can read."** *(Have student read. Count total words correct.)*
- *Review any incorrect words and discuss.*
    - "**Great job reading! Let's look at a few tricky words. This word is <word>. What word?"** *Have student repeat, define if needed.*
- *Have student practice reading 1-2 times, providing support as needed.*
- *Optional: If your student reads the non-supported text with errors, talk to your coach about attempting the following activity. You may want to challenge your student by having them re-read the passage and try to 'beat their score' by reading more words correctly. To do this, first read a 'Cold Read' and count total words read correctly. Review errors. Provide time for student to practice reading with your support. Then, encourage student to try to 'beat' their score in a 'Hot Read'. You can graph the 'Cold' and 'Hot' read as a motivation component.*

Additional Practice

- *Remaining time should be spent reading other texts (downloaded and printed from Reading A to Z (www.readinga-z.com), so that students have a full 10 minutes to practice reading connected texts.*
- *As student skills develop, use Guided Reading Guides for* ***Reading A to Z texts*** *to select 1-2 comprehension questions to ask your students and begin to develop their awareness of text meaning.*

APPENDIX D

EARLY LITERACY INTERVENTION FIDELITY FORM

Date:			**OVERALL SCORES**		
Pair ID:			**Implementation (Avg.)**	#DIV/0!	
Full or Partial:			**Quality**	#DIV/0!	
Phase:			**Engagement**		
Lesson #:			**Behavior Management**	#DIV/0!	
Researcher ID:					
Start Time:					
End Time:					
Total Time:					

Directions: Rate all components for each of three categories - *implementation*, *quality*, and *behavior management* (1= observed; 0 = not observed; na = scoring is not applicable; 999 = scoring is not possible due to missing data). See codebook 'Definitions' for *quality* and *behavior management* scoring indicators.

Start Time: **End Time:**

STEP 1: Key Words	**Score**	**Score**	**Quality**
Approximately 5 min (4 - 6)			Individualization
At start of Step 1, instructor reviews lesson rules.			Language
Instructor reviews previously mastered words			Rapport
Instructor introduces or reviews all 3 target words for lesson.			Explicit, specific feedback
Instructor provides 3 opportunities to identify each of the key words either via picture or written word			Time Management
Instructor plays a practice game (matching or speedy words).			
Instructor performs current lesson's daily check without corrective feedback.		**Score**	**Behavior Management**
Instructor uses appropriate materials for step (e.g., key word picture cards, key word cards; materials TBD by student performance).			Visual schedule
STEP 1 Implementation Score	**NA**		Pre-correction
Quality Points	**NA**		Behavior-specific praise
Behavior Points	**NA**		

Start Time: **End Time:**

STEP 2: Letter Sounds	**Score**	**Score**	**Quality**
Approximately 5 min (4 - 6)			Individualization
Instructor reviews known sounds/letters.			Language
Instructor introduces or reviews at least one letter sound with alliterative phrase for the current lesson.			Rapport
Instructor introduces or reviews at least one letter with letter sound (i.e., with letter card).			Explicit, specific feedback
Instructor has student identify words that start with letter sound for at least at least one alliterative phrase.			Time Management
Instructor plays a practice game (matching or speedy sounds).			
Instructor performs current lesson's daily check without corrective feedback.		**Score**	**Behavior Management**
Instructor uses appropriate materials for step (i.e., sound card w/ pics, letter card, alliterative phrase on back of sound card).			Visual schedule
STEP 2 Implementation Score	**NA**		Pre-correction
Quality Points	**NA**		Behavior-specific praise
Behavior Points	**NA**		

Start Time: **End Time:**

STEP 3: Phonological Awareness / Word Building				
'A' DAY	**'B' Day**	**Score**	**Score**	**Quality**
Appoximately 6 min (5-7)				Individualization
Instructor models say it, move it step for*at least 1 of 3* target key words.	Instructor models word building step for at least 1 of 3 target key words.			Language
Instructor and student complete say it and move it step together for at least 1 of 3 target key words.	Instructor and student build words together for at least 1 of 3 target key words.			Rapport
Instructor has student attempt say it and move it independently (with scaffolding as needed) for all 3 target key words.	Instructor has student attempt word building independently (with scaffolding as needed) for all 3 target key words.			Explicit, specific feedback
Instructor uses appropriate materials for step (i.e., picture cards, SIMI card, first sound/rest of word cards)	Instructor uses appropriate materials for step (i.e., picture cards, white board or SIMI card, word building cards)			Time Management
Instructor performs current lesson's daily check without corrective feedback.				
	STEP 3 Implementation Score	**NA**	**Score**	**Behavior Management**
	Quality Points	**NA**		Visual schedule
	Behavior Points	**NA**		Pre-correction
				Behavior-specific praise

Start Time: **End Time:**

STEP 4: High Frequency Words (HFW)	**Score**	**Score**	**Quality**
Approximately 2 min (1 - 3)			Individualization
Instructor reviews previously learned HFWs.			Language
Instructor introduces or reviews two HFWs for lesson using jingle.			Rapport
Instructor reads phrases and has student say HFWs.			Explicit, specific feedback
Instructor performs current lesson's daily check without corrective feedback.			Time Management
Instructor uses appropriate materials for step (i.e., red high frequency word cards, sentence cards)			
STEP 4 Implementation Score	**NA**	**Score**	**Behavior Management**
Quality Points	**NA**		Visual schedule
Behavior Points	**NA**		Pre-correction
			Behavior-specific praise

Start Time: **End Time:**

STEP 5: Vocabulary	**Score**	**Score**	**Quality**
Approximately 5 min (4 - 6)			Individualization
Instructor reviews previously learned vocabulary words.			Language
Instructor introduces or reviews (definition required in corrective feedback) two concepts for lesson with concept card.			Rapport
Instructor provides opportunity to apply vocabulary words (e.g., with animal manipulatives or objects around the room).			Explicit, specific feedback
Instructor performs current lesson's daily check without corrective feedback.			Time Management
Instructor uses appropriate materials for step (i.e., concept cards, word cards, animal manipulatives or other objects)			
STEP 5: Implementation Score	**NA**	**Score**	**Behavior**
Quality Points	**NA**		Visual schedule
Behavior Points	**NA**		Pre-correction
			Behavior-specific praise

Start Time:	End Time:				
STEP 6: Writing/Reading Connected Text					
'A' Day - Writing	**'B' Day - Reading**	**Score**		**Score**	**Quality**
Appoximately 10 min. (8 - 12)					Individualization
Instructor supports student as he/she writes his/her name.	Instructor models story.				Language
Instructor has the student complete activities from at least two cells on the writing grid.	Instructor supports student as they read story together.				Rapport
	Instructor supports student as he/she reads story independently.				Explicit, specific feedback
Instructor uses appropriate materials for step (i.e.,writing sheet).	Instructor uses appropriate materials for step (i.e., text).				Time Management
Instructor fills remaining time with appropriate activities, either writing tasks or Reading A-Z texts.					
	STEP 6 Implementation Score	**NA**		**Score**	**Behavior**
	Quality Points	**NA**			Visual schedule
	Behavior Points	**NA**			Pre-correction
					Behavior-specific praise

	STUDENT ENGAGEMENT	**SCORE**
3 = *Excellent*	The student was on-task and actively engaged (frequent student responses) for all or nearly all of the time devoted to the component.	
2 = *Adequate*	The students was on-task and actively engaged (frequent student responses) for some of the time devoted to the component.	
1 = *Weak*	The student was on-task and actively engaged for less than half of the time devoted to the component.	

APPENDIX E

INSTRUCTIONAL COACHING SESSION PROCEDURAL FIDELITY FORM

Study Info	
Helper ID	
Para ID	
Condition	
Scoring Info	
Fidelity Scorer ID	
Score Type	
Date of Fidelity Check	

Helper Session Info		
Helper Session Date		
Helper Session Duration (min.)		
Para Support		
Helper Session Form		
Helper Session Follow-up Email		
EDP Tip Sheet Strand		Module
Helper Session Fidelity Scores		
Implementation Score	0	
Points Earned	0	
Points Possible	23	
% Fidelity	0.0%	
Quality Score	0	
Points Earned	0	

FREQUENCY AND DESCRIPTIVE DATA

Frequency of Praise Statements by Type During Intro.

	Lesson Implementation
	Para Progress
	Student Progress
	Para Rapport
	Para Compliance

SPARK Critical Aspects	*RTR Critical Aspects*
Step 1 - Key Words	Step 0 - SIMI
Step 2- Letter Sounds	Step 1 - Letter Sounds
Step 3 - Word Building/SIMI	Step 2 - Word Bldg./SIMI
Step 4 - High Frequency (Red words)	Step 3 - PRWs/HFWs
Step 5 - Vocabulary (Blue words)	Step 4 - Reading
Step 6 - Writing or Reading	Step 5 - Dictation/Writing
Overall Quality	
Overall Engagement	
Overall Behavior Management	

Math Critical Aspects

	Overall implementation
	Quality
	Engagement
	Behavior Management

Frequency of Goals by Goal Type

	Study procedures
	Implementation
	Quality
	Behavior
	Academics (Student data-related)

Helper Session Quality	
	Individualization: Helper personalizes feedback session to align with para need (asks questions, supports more closely, checks in on, scaffolds, provides on-the-spot adaptations).
	Language: Helper uses brief, precise, consistent language.
	Rapport: Helper demonstrates positive, encouraging, warm, supportive interactions with para (e.g., fequent eye contact, positive tone).
	Explicit, specific feedback:Helper provides specific, corrective feedback. Also provides positive feedback throughout lesson.
	Time Management: Helper spends majority of time giving feedback and an appropriate amount of time per session step.

HELPER SESSION FIDELITY COMPONENTS		SCORING NOTES
General Fidelty Components		
Addressed para concents/questions		
Feedback session lasted 18 min. or less		
Session Intro		
Brief Intro Started bulk of feedback (e.g. praise , fidelity review, within 3 minutes of session start.		
Praise Helper provided 1+ praise statements		
Praise statements were positive and specific		
SPARK Connection - E-PD ONLY *Using tip sheet, did helper provide...*		
Module Review Helper reviewed module content by including each critical talking point in discussion.		
SPARK Intervention Connection Helper connected module content to intervention by including each critical talking point in discussion.		
Homework Review Helper reviewed assigned tasks by including each citical talking point in discussion.		
Module Make-up If para did not complete all of the SPARK connection requirements, Helper disscussed plan to complete missing task(s).		
Fidelity Checklist Review		
Critical Aspects Helper discussed each critical aspect of intervention during the overall review.		
Helper classified intervention aspects in terms of relative strengths and weaknesses (e.g., *Perfect, Just Right, Room to Grow).*		
Fidelity Review Planning Helper planned fidelity review summary statements on Helper Session Form.		
Implementation Improvement (TPD and EPD)		
Priority Goals and Action Items Helper selected no more than 3 goals for the feedback session.		
Selected goals are appropriate based on relative strengths and weakness identified in the 'Fidelity Checklist Review' section of the helper form , with weak aspects prioritized over comparatively stronger aspects.		
Helper gave para actionable items to improve in priority goals (e.g., watch training videos, read written materials, review modules, watch model).		
Alignment of Discussion with Condition		
Discussion aligned with condition requirements (i.e., only E-PD implementation phase has E-PD content).		
Student Data		
Helper reviewed student data with para.		
Helper discussed whether student is ready to move to next lesson (SPARK), chunk of lessons (WNF), or progress through RTR.		
Wrap Up		
Next Lesson Helper reviewd plan/schedule next lesson.		
Next Helper Session Helper scheduled next helper session.		
Post Session (TPD and EPD)		
Written Follow-up Helper provided para written feedback in email.		
In written feedback, helper discussed priority goals.		
In written feedback, helper reiterated items to review (e.g., watch training videos, read written materials, review modules, recall modeling)		

APPENDIX F

DESCRIPTIVE STATISTICS FOR SAMPLE

Descriptive Statistics for Full Sample (N = 37)

Measure	Mean (SD)	Median	Range
Final Spark Lesson	7.03 (2.61)	8	1-9
TOWRE-2 SWE	9.81(12.01)	5	0-49
TOWRE-2 PDE	1.73 (3.25)	0	0-11
TOPEL PK	26.22 (10.30)	30	1-36
TOPEL PA	13.67 (9.03)	13.5	0-27
LNF	24.86 (17.60)	22	0-66
LSF	17.30 (17.41)	14	0-58
PSF	7.59 (12.29)	0	0-41
NWF	13.86 (19.55)	0	0-80
Word ID	11.78 (17.96)	3	0-62
ORF WCPM Median	11.95 (18.10)	5	0-67
WJ-IV LWID	17.36 (10.03)	14.5	1-38
WJ-IV Spelling	7 (4.14)	7	0-15
WJ-IV PC	8 (5.14)	8	0-19
Intervention Weeks	17.05 (8.66)	13	7-42
Intervention Sessions	36.68 (21.77)	33	6-95
Intervention Minutes	1208.59 (869.86)	1026	214-4010
Overall Imp.	1.99 (.41)	2.08	1.03-2.57
Overall Quality	2.73 (.39)	2.86	1.25-3
Overall Engagement	2.60 (.40)	2.76	1.80-3
Overall Bx.	2.28 (.49)	2.39	1-2.90
Total HS	13.03 (7.23)	12	2-34
Total HS Dosage (min.)	159.54 (92.66)	136	15-421
Total HS Goals	10.97 (7.16)	9	0-31
Total E-PD Modules	3.19 (6.12)	0	0-24

Note. TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV PC = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

Descriptive Statistics Disaggregated by Condition Assignment with Effect Size Estimate

Measure	T-PD			E-PD			T-PD v. E-PD Hedges' *g*	95% CI
	N	Mean	SD	N	Mean	SD		
Final Spark Lesson	20	6.55	3.03	17	7.59	1.94	-0.39	[-1.05, 0.26]
TOWRE-2 SWE	20	11.7	13.81	17	7.59	9.40	0.34	[-0.32, 0.99]
TOWRE-2 PDE	20	2.25	3.92	17	1.12	2.21	0.34	[-0.31, 0.99]
TOPEL PK	20	27.8	9.67	16	24.3	11.04	0.34	[-0.32, 1.00]
TOPEL PA	20	15.4	8.19	16	11.5	9.83	0.43	[-0.24, 1.09]
LNF	20	29.6	18.4	17	19.4	15.3	0.58	[-0.08, 1.25]
LSF	20	21.9	19.8	17	11.9	12.6	0.58	[-0.08, 1.24]
PSF	20	8.85	13.6	17	6.12	10.8	0.22	[-0.43, 0.86]
NWF	20	17.1	23	17	10.1	14.4	0.35	[-0.30, 1.00]
Word ID	20	13.3	18.7	17	10	17.5	0.18	[-0.47, 0.83]
ORF WCPM Median	20	14.1	19.9	17	9.47	15.9	0.25	[-0.40, 0.90]
WJ-IV LWID	20	18.4	10	16	16.1	10.2	0.23	[-0.42, 0.88]
WJ-IV Spelling	20	7.85	4.1	16	5.94	4.07	0.46	[-0.21, 1.12]
WJ-IV PC	20	9.7	5.47	16	5.88	3.88	0.77*	[0.09, 1.45]
Intervention Weeks	20	16.5	9.06	17	17.7	8.38	-0.13	[-0.79, 0.52]
Intervention Sessions	20	33.3	22.6	17	40.6	20.7	-0.33	[-0.98, 0.32]
Intervention Minutes	20	1063	903	17	1380	822	-0.36	[-1.01, 0.29]
Overall Imp.	20	1.93	0.43	17	2.05	0.39	-0.28	[-0.93, 0.37]
Overall Quality	20	2.62	0.48	17	2.85	0.2	-0.59	[-1.25, 0.07]
Overall Engagement	20	2.52	0.45	17	2.71	0.33	-0.46	[-1.12, 0.19]
Overall Bx.	20	2.14	0.56	17	2.45	0.33	-0.66	[-1.33, 0.00]
Total HS	20	12.5	7.3	17	13.7	7.32	-0.15	[-0.80, 0.49]
Total HS Dosage (min.)	20	145	81.6	17	176	104	-0.32	[-0.97, 0.33]
Total HS Goals	20	11.6	8.2	17	10.2	5.86	0.18	[-0.46, 0.83]
Total E-PD Modules	20	0	0	17	6.94	7.53	-1.33*	[-2.05, -0.62]

Note. 95 % CI = 95% confidence interval; T-PD = Traditional PD condition; E-PD = Enhanced PD condition; TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest;

LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV PC = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

Descriptive Statistics Disaggregated by Student Sex with Effect Size Estimate

Measure	Male			Female			
	N	Mean	SD	N	Mean	SD	Male v. Female Hedges' g	95% CI
Final Spark Lesson	25	7.08	2.50	9	7.67	2.29	-0.23	[-1.00, 0.53]
TOWRE-2 SWE	25	10	13.377	9	10.78	9.135	-0.06	[-0.82, 0.70]
TOWRE-2 PDE	25	2.4	3.753	9	.33	1.000	0.61	[-0.16, 1.39]
TOPEL PK	25	25.2	10.869	9	28.00	10.149	-0.26	[-1.02, 0.51]
TOPEL PA	25	12.8	9.419	9	15.44	7.699	-0.29	[-1.06, 0.47]
LNF	25	26.1	19.543	9	19.56	12.991	0.35	[-0.42, 1.12]
LSF	25	18.8	19.401	9	15.22	13.526	0.19	[-0.57, 0.96]
PSF	25	9.36	13.805	9	4.22	8.438	0.40	[-0.37, 1.16]
NWF	25	16.2	21.733	9	11.11	15.037	0.24	[-0.52, 1.01]
Word ID	25	11.3	18.754	9	13.78	18.254	-0.13	[-0.89, 0.63]
ORF WCPM Median	25	12.8	19.934	9	12.67	15.572	0.00	[-0.76, 0.77]
WJ-IV LWID	25	17.3	11.197	9	17.44	7.601	-0.01	[-0.77, 0.75]
WJ-IV Spelling	25	6.88	4.609	9	7.11	3.621	-0.05	[-0.81, 0.71]
WJ-IV PC	25	7.54	5.672	9	8.89	4.343	-0.25	[-1.01, 0.52]
Intervention Weeks	25	19	9.63276	9	13.3333	4.47214	0.65	[-0.13, 1.42]
Intervention Sessions	25	40.1	23.43950	9	33.1111	15.75154	0.31	[-0.45, 1.08]
Intervention Minutes	25	1286	975.06	9	1175.56	532.60	0.12	[-0.64, 0.88]
Overall Imp.	25	1.96	.41391	9	2.2201	.21877	-0.69	[-1.46, 0.09]
Overall Quality	25	2.73	. 32652	9	2.9118	.11283	-0.63	[-1.40, 0.15]
Overall Engagement	25	2.57	.40563	9	2.7123	.40253	-0.34	[-1.10, 0.43]

Overall Bx.	25	2.26	.49376	9	2.4418	.24760	-0.39	[-1.16, 0.38]
Total HS	25	13.92	7.416	9	13.00	6.595	0.12	[-0.64, 0.89]
Total HS Dosage (min.)	25	174	100.307	9	145.67	67.983	0.30	[-0.47, 1.06]
Total HS Goals	25	12.08	7.399	9	8.67	7.263	0.45	[-0.32, 1.22]
Total E-PD Modules	25	3.84	7.198	9	2.11	2.848	0.26	[-0.50, 1.03]

Note. 95 % CI = 95% confidence interval; TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV Passage Comprehension = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

Descriptive Statistics Disaggregated by Student Race with Effect Size Estimate

Measure	White			African-American				
	N	Mean	SD	N	Mean	SD	White v. AA Hedges' *g*	95% CI
Final Spark Lesson	25	7.36	2.43	5	7.6	2.19	-0.10	[-1.06, 0.86]
TOWRE-2 SWE	25	10.4	12.6	5	5.2	3.96	0.43	[-0.53, 1.40]
TOWRE-2 PDE	25	1.84	3.34	5	0.6	1.34	0.38	[-0.58, 1.35]
TOPEL PK	25	25.1	10.9	5	27.4	11.7	-0.20	[-1.16, 0.76]
TOPEL PA	25	12.6	8.97	5	11.8	8.41	0.09	[-0.87, 1.05]
LNF	25	24.3	19.6	5	23.2	8.67	0.06	[-0.90, 1.02]
LSF	25	16	17.5	5	15.8	12.7	0.01	[-0.95, 0.97]
PSF	25	6.84	12.6	5	8.4	11.5	-0.12	[-1.08, 0.84]
NWF	25	13.7	20	5	7.2	9.96	0.33	[-0.63, 1.30]
Word ID	25	11.2	17.2	5	4.2	5.02	0.43	[-0.54, 1.39]
ORF WCPM Median	25	12.4	18	5	4	3.81	0.49	[-0.48, 1.46]
WJ-IV LWID	25	16.9	10.5	5	13.8	3.27	0.31	[-0.65, 1.27]
WJ-IV Spelling	25	6.64	4.48	5	6.4	3.78	0.05	[-0.91, 1.01]
WJ-IV PC	25	7.68	5.5	5	7.2	5.07	0.09	[-0.87, 1.05]
Intervention Weeks	25	17.7	9.37	5	17.8	7.26	-0.01	[-0.97, 0.95]
Intervention Sessions	25	39.9	22.8	5	35.2	19.3	0.21	[-0.76, 1.17]
Intervention Minutes	25	1313	955	5	1094	347	0.24	[-0.72, 1.20]
Overall Imp.	25	1.99	0.36	5	2.25	0.32	-0.70	[-1.68, 0.28]
Overall Quality	25	2.81	0.26	5	2.67	0.29	0.51	[-0.46, 1.48]
Overall Engagement	25	2.57	0.43	5	2.59	0.38	-0.06	[-1.02, 0.90]
Overall Bx.	25	2.3	0.47	5	2.35	0.42	-0.11	[-1.07, 0.85]
Total HS	25	14	7.52	5	14.8	7.19	-0.11	[-1.07, 0.85]
Total HS Dosage (min.)	25	168	88.6	5	154	60.1	0.15	[-0.81, 1.11]
Total HS Goals	25	11	7.08	5	12.8	10.6	-0.22	[-1.18, 0.74]
Total E-PD Modules	25	3.2	5.82	5	1.6	3.58	0.28	[-0.68, 1.24]

Note. 95 % CI = 95% confidence interval; AA = African-American; TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF

= Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV Passage Comprehension = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

Descriptive Statistics Disaggregated by Student Primary Disability Classification

Measure	ID			DD			Autism	
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Final Spark Lesson	9	7.22	2.22	11	6.57	3.31	7	7.55	2.42
TOWRE-2 SWE	9	16.8	17.6	11	8	9.79	7	3.43	4.077
TOWRE-2 PDE	9	4.33	5.220	11	.82	1.940	7	.43	1.134
TOPEL PK	9	26.1	11.439	11	24.82	12.671	6	19.83	7.859
TOPEL PA	9	16.6	8.974	11	13.36	9.574	6	5.33	5.922
LNF	9	29.4	25.749	11	20.45	18.069	7	15.86	8.174
LSF	9	25.6	22.799	11	17.45	17.750	7	4.14	8.513
PSF	9	12.2	18.444	11	7.18	9.141	7	.00	.000
NWF	9	23.7	29.749	11	12.55	14.754	7	.00	.000
Word ID	9	21.8	24.206	11	10.18	18.503	7	2.57	4.721
ORF WCPM Median	9	23.1	27.411	11	9.27	15.120	7	1.86	3.288
WJ-IV LWID	9	22.7	13.124	11	15.00	9.455	6	10.67	4.967
WJ-IV Spelling	9	7.89	5.395	11	6.55	4.108	6	5.33	2.875
WJ-IV PC	9	9.67	6.708	11	8.82	3.710	6	2.67	4.367
Intervention Weeks	9	19.7	11.97915	11	18.0000	9.53939	7	18.1429	6.93851
Intervention Sessions	9	40.8	27.31198	11	41.5455	23.29963	7	38.7143	20.37739
Intervention Minutes	9	1441	1194.24182	11	1383.8182	912.67331	7	1149.0000	759.79778
Overall Imp.	9	1.99	.27996	11	2.0202	.46594	7	2.0552	.51010
Overall Quality	9	2.71	.40242	11	2.7787	.32804	7	2.7691	.25016
Overall Engagement	9	2.52	.46380	11	2.5994	.41746	7	2.4515	.41025
Overall Bx.	9	2.18	.54658	11	2.2624	.37767	7	2.4882	.35039
Total HS	9	13.6	7.715	11	16.36	8.066	7	14.14	6.890

Total HS Dosage (min.)	9	146	73.770	11	200.09	102.743	7	187.00	125.021
Total HS Goals	9	11.3	8.307	11	12.55	7.174	7	13.29	9.178
Total E-PD Modules	9	2.56	4.720	11	3.45	7.285	7	5.00	8.888

Note. E-PD = Enhanced Professional Development treatment condition; T-PD = Traditional Professional Development treatment condition; TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV Passage Comprehension = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

Effect Size Estimate for Differences on Measures Disaggregated by Student Primary Disability Classification

	ID v. DD Hedges' *g*	95% CI	ID v. Autism Hedges' *g*	95% CI	DD v. Autism Hedges' *g*	95% CI
Final Spark Lesson	-0.13	[-1.01, 0.75]	0.22	[-0.77, 1.22]	0.33	[-0.62, 1.29]
TOWRE-2 SWE	0.61	[-0.29, 1.51]	0.93	[-0.11, 1.97]	0.54	[-0.43, 1.50]
TOWRE-2 PDE	0.89	[-0.03, 1.82]	0.92	[-0.12, 1.96]	0.22	[-0.73, 1.17]
TOPEL PK	0.10	[-0.78, 0.98]	0.59	[-0.42, 1.60]	0.43	[-0.53, 1.39]
TOPEL PA	0.33	[-0.56, 1.22]	1.36*	[0.26, 2.45]	0.91	[-0.08, 1.90]
LNF	0.39	[-0.49, 1.28]	0.64	[-0.38, 1.65]	0.29	[-0.66, 1.24]
LSF	0.39	[-0.50, 1.27]	1.12*	[0.06, 2.18]	0.85	[-0.14, 1.83]
PSF	0.34	[-0.54, 1.23]	0.83	[-0.20, 1.86]	0.95	[-0.05, 1.94]
NWF	0.47	[-0.42, 1.36]	0.99	[-0.05, 2.04]	1.02*	[0.02, 2.03]
Word ID	0.52	[-0.37, 1.42]	0.98	[-0.07, 2.02]	0.49	[-0.47, 1.45]
ORF WCPM Median	0.62	[-0.28, 1.52]	0.96	[-0.08, 2.01]	0.58	[-0.38, 1.55]
WJ-IV LWID	0.65	[-0.25, 1.56]	1.09*	[0.03, 2.14]	0.51	[-0.45, 1.47]
WJ-IV Spelling	0.27	[-0.61, 1.16]	0.54	[-0.47, 1.54]	0.31	[-0.64, 1.27]
WJ-IV PC	0.15	[-0.73, 1.04]	1.14*	[0.07, 2.20]	1.48*	[0.41, 2.54]
Intervention Weeks	0.15	[-0.73, 1.03]	0.14	[-0.85, 1.13]	-0.02	[-0.96, 0.93]
Intervention Sessions	-0.03	[-0.91, 0.85]	0.08	[-0.91, 1.07]	0.12	[-0.83, 1.07]
Intervention Minutes	0.05	[-0.83, 0.93]	0.27	[-0.72, 1.26]	0.26	[-0.69, 1.21]
Overall Imp.	-0.06	[-0.94, 0.82]	-0.15	[-1.13, 0.84]	-0.07	[-1.02, 0.88]
Overall Quality	-0.19	[-1.07, 0.70]	-0.17	[-1.16, 0.82]	0.03	[-0.92, 0.98]
Overall Engagement	-0.17	[-1.05, 0.72]	0.15	[-0.84, 1.14]	0.34	[-0.61, 1.29]
Overall Bx.	-0.18	[-1.06, 0.71]	-0.62	[-1.63, 0.39]	-0.58	[-1.55, 0.38]
Total HS	-0.34	[-1.23, 0.55]	-0.07	[-1.06, 0.91]	0.28	[-0.68, 1.23]
Total HS Dosage (min.)	-0.57	[-1.47, 0.33]	-0.39	[-1.39, 0.60]	0.11	[-0.84, 1.06]
Total HS Goals	-0.15	[-1.03, 0.73]	-0.21	[-1.20, 0.78]	-0.09	[-1.04, 0.86]
Total E-PD Modules	-0.14	[-1.02, 0.75]	-0.34	[-1.33, 0.66]	-0.19	[-1.14, 0.76]

Note. 95 % CI = 95% confidence interval; ID = Intellectual Disability; DD = Developmental Disability; TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth

Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV Passage Comprehension = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

APPENDIX G

CORRELATIONS BETWEEN ALL MEASURES AND FINAL LESSON

Correlations Between All Measures and Final Lesson Status

Measure	Correlation with Final Lesson	*p*-Value
TOWRE-2 SWE	.273	.102
TOWRE-2 PDE	.217	.197
TOPEL PK	.035	.838
TOPEL PA	-0.124	.472
LNF	.015	.929
LSF	.078	.648
PSF	.178	.292
NWF	.177	.296
Word ID	.183	.279
ORF WCPM Median	.229	.172
WJ-IV LWID	.275	.105
WJ-IV Spelling	.026	.880
WJ-IV PC	.095	.582
Intervention Weeks	.031	.857
Intervention Sessions	.458*	.004
Intervention Minutes	.416*	.010
Overall Imp.	.295	.076
Overall Quality	.400*	.014
Overall Engagement	.064	.707
Overall Bx.	.129	.447
Total HS	.424*	.009
Total HS Dosage (min.)	.440*	.006
Total HS Goals	.250	.136
Total E-PD Modules	.116	.505

Note. TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV Passage Comprehension = Woodcock-Johnson Fourth Edition Passage Comprehension subtest; Overall Imp. = Mean overall intervention implementation rating; Overall Bx. = Mean overall intervention behavior management rating; Total HS = Total HS attended in which fidelity feedback was provided, or no feedback was provided due to the paraeducator delivering the intervention with a sufficiently high intervention fidelity rating; Total HS Goals = the total number of priority goals assigned by the instructional coach.

APPENDIX H

CORRELATIONS BETWEEN STUDENT PRETEST MEASURES

Correlations Between Student Pretest Measures (Pearson r Coefficient)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1.TOWRE-2 SWE	1	.854*	.349*	.416*	.349*	.696*	.603*	.814*	.940	.953*	.876*	.638*	.739*
2.TOWRE-2 PDE	.854*	1	.283	.476*	.459*	.744*	.735*	.813*	.810*	.872*	.745*	.632*	.651*
3.TOPEL PK	.349*	.283	1	.703*	.609*	.612*	.426*	.380*	.201	.267*	.501*	.451*	.572*
4.TOPEL PA	.416*	.476*	.703*	1	.559*	.769*	.636*	.622*	.338*	.434*	.444*	.633*	.694*
5.LNF Correct	.349*	.459*	.609*	.559*	1	.586*	.340*	.347*	.287	.326*	.532*	.528*	.475
6.LSF Correct	.696*	.744*	.612*	.769*	.586*	1	.726*	.801*	.600*	.658*	.646*	.751*	737*
7.PSF Correct	.603*	.735*	.426*	.636*	.340*	.726*	1	.837*	.525*	.624*	.501*	.676*	.576*
8.NWF Correct	.814*	.813*	.380*	.622*	.347*	.801*	.837*	1	.775*	.858*	.715*	.639*	.661*
9.Word ID	.940	.810*	.201	.338*	.287	.600*	.525*	.775*	1	.958*	.846*	.579*	.655*
10.ORF	.953*	.872*	.267*	.434*	.326*	.658*	.624*	.858*	.958*	1	.843*	.585*	.705*
11.WJ-IV LWID	.876*	.745*	.501*	.444*	.532*	.646*	.501*	.715*	.846*	.843*	1	.521*	.683*)
12.WJ-IV Spelling	.638*	.632*	.451*	.633*	.528*	.751*	.676*	.639*	.579*	.585*	.521*	1	.676*
13.WJ-IV PC	.739*	.651*	.572*	.694*	.475	737*	.576*	.661*	.655*	.705*	.683*	.676*	1

Note. * = *p*-value is less than .05. TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; TOPEL PK = Test of Preschool Early Literacy Print Knowledge subtest; TOPEL PA = Test of Preschool Early Literacy Phonological Awareness subtest; LNF = Letter Naming Fluency measure; LSF = Letter Sound Fluency measure; PSF = Phoneme Segmentation Fluency measure; NWF = Nonsense Word Fluency measure; Word ID = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct per Minute; WJ-IV LW ID = Woodcock-Johnson Fourth Edition Letter-Word Identification subtest; WJ-IV Spelling = Woodcock-Johnson Fourth Edition Spelling subtest; WJ-IV Passage Comprehension = Woodcock-Johnson Fourth Edition Passage Comprehension subtest.

APPENDIX I

SUMMARY OF MULTIPLE REGRESSION ANALYSIS FOR VARIABLES PREDICTING FINAL LESSON (N = 37)

Summary of Multiple Regression Analysis for Variables Predicting Final Intervention Lesson (N = 37)

Predictor	*B*	β	*SE*	*t*	*p*	95% CI	sr^2
TOWRE-2 SWE	.047	.216	.141	.333	.745	[-.263, .356]	.033
TOWRE-2 PDE	-.488	-.609	.367	-1.332	.210	[-1.295, .319]	-.132
TOPEL PK	.134	.530	.125	1.075	.305	[-.141, .409]	.107
TOPEL PA	-.046	-.158	.071	-.640	.535	[-.203, .111]	-.064
LNF Correct	.038	.255	.032	1.171	.266	[-.033, .109]	.116
LSF Correct	.016	.108	.064	.254	.804	[-.124, .156]	.025
PSF Correct	.071	.337	.088	.813	.433	[-.122, .265]	.081
NWF Correct	.031	.229	.085	.362	.724	[-.155, .217]	.036
Word ID Correct	.084	.578	.099	.844	.416	[-.135, .303]	.084
ORF WCPM	-.020	-.141	.116	-.175	.864	[-.275, .234]	-.017
WJ-IV LW ID	.083	.321	.120	.692	.503	[-.182, .349]	.069
WJ-IV Spelling	-.175	-.278	.170	-1.030	.325	[-.548, .199]	-.102
WJ-IV PC	-.410	-.808	.162	-2.532	.028	[-.767, -.054]	-.252
Implementation Weeks	-.220	-.730	.078	-2.803	.017	[-.393, -.047]	-.278
Implementation Sessions	.296	2.468	.083	3.578	.004	[.114, .478]	.355
Implementation Minutes	-.003	-1.140	.002	-1.922	.081	[-.007, .000]	-.191
Mean Overall Implementation	3.420	.539	1.576	2.170	.053	[-.048, 6.887]	.216
Mean Overall Quality	-1.626	-.244	1.657	-.981	.348	[-5.273, 2.021]	-.097
Mean Overall Engagement	-.723	-.112	1.399	-.517	.615	[-3.802, 2.355]	-.051
Mean Overall Behavior Management	-1.283	-.241	1.376	-.932	.371	[-4.312, 1.747]	-.093
Total HS	.058	.160	.122	.472	.646	[-.211, .326]	0.47
Total HS Minutes	.005	.162	.012	.390	.704	[-.021, .030]	0.39
Total HS Goals	-.053	-.144	.088	-.599	.561	[-.246, .140]	-.060
Total EPD Modules	-.102	-.238	.104	-.980	.348	[-.330, .126]	-.097

Note. 95% CI = 95% confidence interval; TOWRE-2 SWE = Test of Word Reading Efficiency Second Edition Sight Word Efficiency subtest; TOWRE-2 PDE = Test of Word Reading Efficiency Second Edition Phonemic Decoding Efficiency subtest; LNF Correct = Letter Naming Fluency correct items; LSF Correct = Letter Sound Fluency correct items; PSF Correct = Phoneme Segmentation Fluency correct items; NWF Correct = Nonsense Word Fluency correct items; Word ID Correct = Word Identification measure; ORF WCPM = Oral Reading Fluency Words Correct Per Minute (median score on 3 probes); WJ-IV LW ID = Woodcock Johnson Fourth Edition Letter Word Identification subtest; WJ-IV Spelling = Woodcock Johnson Fourth Edition Spelling subtest; WJ-IV PC = Woodcock Johnson Fourth Edition Passage Comprehension subtest; Total HS Goals = Total Helper Session Goals; Total EPD Modules = Total Modules for Enhanced Professional Development participants. Final model: R^2 = .891, adjusted R^2 = .655, ΔR^2 = .891, p = .013.

REFERENCES

Allison, C., Robinson, E., Hennington, H., & Bettagere, R. (2011). Performance of low-income african american boys and girls on the PPVT-4: A comparison of receptive vocabulary. *Contemporary Issues in Communication Science and Disorders*, *38*(1), 20-25.

Allor, J. H., Al Otaiba, S., Ortiz, M., & Folsom, J. (2014). Comprehensive beginning reading. In D. M. Browder, & F. Spooner (Eds.). MORE language arts, math, and science for students with severe disabilities (pp. 109–126). Baltimore, MD: Brookes.

Allor, J. H., Mathes, P. G., Roberts, J. K., Cheatham, J. P., & Champlin, T. M. (2010a). Comprehensive reading instruction for students with intellectual disabilities: Findings from the first three years of a longitudinal study. *Psychology in the Schools, 47*(5), 445-466. doi:/10.1002/pits.20482

Allor, J. H., Mathes, P. C., Roberts, J. K., Jones, F., & Champlin, T. (2010b). Teaching students with moderate intellectual disabilities to read: An experimental examination of a comprehensive reading intervention. *Education and Training in Developmental Disabilities*, *45*, 3–22.

Allor, J. H., Gifford, D. B., Al Otaiba, S., Miller, S. J., & Cheatham, J. P. (2013). Teaching students with intellectual disability to integrate reading skills: Effects of text and text-based lessons. *Remedial and Special Education, 34*(6), 346-356. doi:/10.1177/0741932513494020

Allor, J. H., Mathes, P. G., Roberts, J. K., Cheatham, J. P., & Al Otaiba, S. (2014). Is scientifically based reading instruction effective for students with below-average IQs? *Exceptional Children, 80*(3), 287-306. doi:/10.1177/0014402914522208

Allor, J. H., Gifford, D. B., Jones, F. G., Al Otaiba, S., Yovanoff, P., Ortiz, M. B., & Cheatham,

J. P. (2018). The effects of a text-centered literacy curriculum for students with intellectual disability: AJMR. *American Journal on Intellectual and Developmental Disabilities, 123*(5), 474-494,496,498. doi:/10.1352/1944-7558-123.5.474

Allor, J. H., Yovanoff, P., Al Otaiba, S., Ortiz, M. B., & Conner, C. (2020). Evidence for a literacy intervention for students with intellectual and developmental disabilities. *Education and Training in Autism and Developmental Disabilities, 55*(3), 290-302.

Al Otaiba, S. D. (2000). *Children who do not respond to early literacy intervention: A longitudinal study across kindergarten and first grade*. (Doctoral dissertation). Retrieved from Social Science Premium Collection. (85532651; 200107686).

Al Otaiba, S., & Fuchs, D. (2002). Characteristics of children who are unresponsive to early literacy intervention: A review of the literature. *Remedial and Special Education, 23*(5), 300-316. doi:/10.1177/07419325020230050501

Al Otaiba, S. A., & Fuchs, D. (2006). Who are the young children for whom best practices in reading are ineffective? An experimental and longitudinal study. *Journal of Learning Disabilities, 39*(5), 414-31. doi:/10.1177/00222194060390050401

Al Otaiba, S., & Torgesen, J. (2007). Effects from intensive standardized kindergarten and first grade interventions for the prevention of reading difficulties. In S. R. Jimerson, M. K. Burns & A. M. Van der Heyden (Eds.), *The handbook of response to intervention: The science and practice of assessment and intervention* (pp. 212–222). New York, NY: Springer.

Al Otaiba, S. A., Wagner, R. K., & Miller, B. (2014). "Waiting to fail" redux: Understanding inadequate response to intervention. *Learning Disability Quarterly, 37*(3), 129-133. doi:/10.1177/0731948714525622

Biggs, E. E., Gilson, C. B., & Carter, E. W. (2019). "Developing that balance": Preparing and supporting special education teachers to work with paraprofessionals. *Teacher Education and Special Education, 42*(2), 117-131. doi:10.n77/0888406418765611

Blachman, B. A., Ball, E. W., Black, R., & Tangel, D. M. (2000). *Road to the code: A phonological awareness program for young children.* Baltimore, MD: Paul H. Brookes Publishing.

Blachman, B. A., & Tangel, D. M. (2008). *Road to reading: A program for preventing and remediating reading difficulties.* Baltimore, MD: Brookes Publishing.

Brock, M. E., & Carter, E. W. (2013). A systematic review of paraprofessional-delivered educational practices to improve outcomes for students with intellectual and developmental disabilities. Research and Practice for Persons with Severe Disabilities, *38*(4), 211-221. doi:10.1177/154079691303800401

Browder, D. M., Ahlgrim-Delzell, L., Courtade, G., Gibbs, S. L., & Flowers, C. (2008). Evaluation of the effectiveness of an early literacy program for students with significant developmental disabilities. *Exceptional Children, 75*(1), 33-52.

Browder, D., Ahlgrim-Delzell, L., Flowers, C., & Baker, J. (2012). An evaluation of a multicomponent early literacy program for students with severe developmental dis-abilities. *Remedial and Special Education, 33,* 237–246. doi:10.1177/074193251038730

Browder, D. M., Wakeman, S. Y., Spooner, F., Ahlgrim-Delzell, L., & Algozzine, B. (2006). Research on reading instruction for individuals with significant cognitive disabilities. *Exceptional Children, 72*(4), 392-408.

Browder, D. M., & Xin, Y. P. (1998). A meta-analysis and review of sight word research and its

implications for teaching functional reading to individuals with moderate and severe disabilities. *The Journal of Special Education, 32,* 130 – 153.

Carnahan, C. R., Williamson, P., Clarke, L., & Sorensen, R. (2009). A systematic approach for supporting paraeducators in educational settings: A guide for teachers. *Teaching Exceptional Children, 41*(5), 34-43. doi:10.1177/004005990904100504

Carter, E., O'Rourke, L, Sisco, L., & Pelsue, D. (2009). Knowledge, responsibilities, and training needs of paraeducators in elementary and secondary schools. *Remedial and Special Education, 30*(6), 344-359. doi:10.1177/0741932508324399

Cihak, D. F., & Smith, C. C. (2018). Teaching academic skills to elementary-age students with intellectual disability. In R. M. Gargiolo & E. C. Bouck (Eds.), *Instructional strategies for students with mild, moderate, and severe intellectual disability* (pp. 231– 265). Sage.

Clarke, B., Doabler, C. T., Cary, M. S., Kosty, D., Baker, S., Fien, H., & Smolkowski, K. (2014). Preliminary evaluation of a tier 2 mathematics intervention for first-grade students: Using a theory of change to guide formative evaluation activities. *School Psychology Review, 43*(2), 160-178.

Clarke, B., Doabler, C., Smolkowski, K., Nelson, E. K., Fien, H., Baker, S. K., & Kosty, D. (2016). Testing the immediate and long-term efficacy of a tier 2 kindergarten mathematics intervention. *Journal of Research on Educational Effectiveness, 9*(4), 607.

Clemens, N. H., Lai, M. H., C., Burke, M., & Jiun-Yu, W. (2017). Interrelations of growth in letter naming and sound fluency in kindergarten and implications for subsequent reading fluency. *School Psychology Review, 46*(3), 272-287. doi:/10.17105/SPR-2017-0032.V46-3

Cohen, J. (I960). A coefficient of agreement for nominal scales. *Education Psychology*

Measurement, 20. 37-46.

Conners, F. A. (2003). Reading skills and cognitive abilities of individuals with ID. In L. Abbeduto. (Ed.). *International review of research in mental retardation* (Vol. 27, pp. 191–229). Academic Press.

Conners, F. A., Rosenquist, C. J., Sligh, A. C., Atwell, J. A., & Kiser, T. (2006). Phonological reading skills acquisition by children with mental retardation. *Research in Developmental Disabilities, 27,* 121–137. doi:10.1016/j.ridd. 2004.11.015

Denton, C. A., Tolar, T. D., Fletcher, J. M., Barth, A. E., Vaughn, S., & Francis, D. J. (2013). Effects of tier 3 intervention for students with persistent reading difficulties and characteristics of inadequate responders. *Journal of Educational Psychology, 105*(3), 633-648. doi:/10.1037/a0032581

Dunn, L. M., & Dunn, D. M. (2007). *Peabody Picture Vocabulary Test, Fourth Edition.* Minneapolis, MN: NCS Pearson.

Educational Testing Service. (2016). *ParaPro Assessment*. Princeton, NJ: Author.

Elliott, J., Lee, S. W., & Tollefson, N. (2001). A reliability and validity study of the dynamic indicators of basic early literacy skills—modified. School Psychology Review, 30, 33–49.

Every Student Succeeds Act, Pub. L. No. 114-95 § 114 Stat. 1177 (2015-16).

Fletcher, J. M., Francis, D. J., Rourke, B. P., Shaywitz, B., & Shaywitz, S. E. (1992). The validity of the discrepancy-based definitions of learning disabilities. *Journal of Learning Disabilities, 25,* 555-561, 573.

Fletcher, J. M., Stuebing, K. K., Barth, A. E., Denton, C. A., Cirino, P. T., Francis, D. J., & Vaughn, S. (2011). Cognitive correlates of inadequate response to reading intervention. *School Psychology Review, 40*(1), 3-22.

Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology, 90,* 37-55.

Francis, D. J., Shaywitz, S. E., Stuebing, K. K., Shaywitz, B. A., & Fletcher, J. M. (1996). Developmental lag versus deficit models of reading disability: A longitudinal, individual growth curves analysis. *Journal of Educational Psychology, 88,* 3–17.

Frijters, J. C., Lovett, M. W., Steinbach, K. A., Wolf, M., Sevcik, R. A., & Morris, R. D. (2011). Neurocognitive predictors of reading outcomes for children with reading disabilities. *Journal of Learning Disabilities, 44*(2), 150-166. doi:/10.1177/0022219410391185

Fuchs, L. S., Compton, D., & Fuchs, D. (n.d.). *Curriculum-based measurement (CBM): Word identification fluency technical manual*. Vanderbilt University.

Fuchs, D., Fuchs, L. S., & Compton, D. L. (2012). Smart RTI: A next-generation approach to multilevel prevention. Exceptional Children, 78(3), 263–279.

Fuchs, L. S., Fuchs, D., Compton, D. L., Bryant, J. D., Hamlett, C. L., & Seethaler, P. M. (2007). Mathematics screening and progress monitoring at first grade: Implications for responsiveness to intervention. *Exceptional Children, 73*(3), 311-330. doi:/10.1177/001440290707300303

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Stecker, P. M. (2021). Bringing data-based individualization to scale: A call for the next-generation technology of teacher supports. *Journal of Learning Disabilities, 54*(5), 319-333. doi:/10.1177/0022219420950654

Fuchs, L. S., Hamlett, C.L., & Fuchs, D. (2009). Math cbm packet: Grade 1 monitoring basic skills progress (MBSP). Available from PRO-ED Publishing: www.proedinc.com

Hill, D. R., & Lemons, C. J. (2015). Early grade curriculum-based reading measures for students with intellectual disability. *Journal of Intellectual Disabilities, 19*(4), 311-325. doi:/10.1177/1744629515574812

Huberty, C. J. (1994). Applied discriminant analysis. New York: Wiley.

Individuals with Disabilities Education Improvement Act, 20 U.S.C. § 1400 et seq. (2004).

Jones, B. T., Erchul, W. P., & Geraghty, C. A. (2021). Supplemental reading interventions implemented by paraprofessionals: A meta-analysis. *Psychology in the Schools, 58*(4), 723-741. doi:10.1002/pits.22427

Jones, F., Gifford, D., Yovanoff, P., Al Otaiba, S., Levy, D., & Allor, J. (2018). Alternate assessment formats for progress monitoring students with intellectual disabilities and below average IQ: An exploratory study. *Focus on Autism and Other Developmental Disabilities*, *34*(1), 41-51. doi: 10.1177/ 1088357618762749.

Joseph, L.M. & Seery, M.E. (2004). Where is the phonics? A review of the literature on the use of phonetic analysis with students with mental retardation. *Remedial and Special Education*, 25(2): 88–94.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*, *80*(4), 437-447.

Katims, D. S. (2000). Literacy instruction for people with mental retardation: Historical highlights and contemporary analysis. Education and Training in Mental Retardation and Developmental Disabilities, 35, 3 – 15.

Katims, D. S. (2001). Literacy assessment of students with mental retardation: An exploratory

investigation. *Education and Training in Mental Retardation and Developmental Disabilities, 36,* 363 – 371.

Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman Brief Intelligence Test - Second Edition*. Minneapolis, MN: NCS Pearson, Inc.

King, S. A., Lemons, C. J., Davidson, K. A., Fulmer, D. & Mrachko, A.A. (2020). Reading instruction for children with down syndrome: extending research on behavioral phenotype aligned interventions. *Exceptionality*. doi: 10.1080/09362835.2020.1749631

Lam, E. A., & McMaster, K. L. (2014). Predictors of responsiveness to early literacy intervention: A 10-year update. *Learning Disability Quarterly, 37*(3), 134-147. doi:/10.1177/0731948714529772

LeJeune, L. M., Gesel, S. A., & Lemons, C. J. (2018). Explicit phonological awareness instruction for preschoolers with down syndrome. *Inclusion, 6*(4), 239-257. doi:/10.1352/2326-6988-6.4.239

Lemons, C. J., Allor, J. H., Al Otaiba, S., & LeJeune, L. M. (2018). 10 research-based tips for enhancing literacy instruction for students with intellectual disability. *Teaching Exceptional Children, 50*(4), 220-232. doi:/10.1177/0040059918758162

Lemons, C. J., King, S. A., Davidson, K. A., Puranik, C. S., Al Otaiba, S., & Fidler, D. J. (2018). Personalized reading intervention for children with Down syndrome. *Journal of School Psychology, 66*, 67-84. doi: 10.1016/j.jsp.2017.07.006

Lemons, C. J., King, S. A., Davidson, K. A., Puranik, C. S., Fulmer, D., Mrachko, A. A., . . . Fidler, D. J. (2015). Adapting phonological awareness interventions for children with Down syndrome based on the behavioral phenotype: A promising approach? *Intellectual and Developmental Disabilities, 53*, 271–288.

Lemons, C. J., Mrachko, A. A., Kostewicz, D. E., & Paterra, M. F. (2012). Effectiveness of decoding and phonological awareness interventions for children with down syndrome. *Exceptional Children, 79*(1), 67-90.

Lonigan, C. J., Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (2007). Test of preschool early literacy. Austin, TX: Pro-Ed.

Martinez, R. S., Missall, K. N., Graney, S. B., Aricak, O. T., & Clarke, B. (2009). Technical adequacy of early numeracy curriculum-based measurement in kindergarten. *Assessment for Effective Intervention, 34*(2), 116-125. doi:/10.1177/1534508408326204

Mathes, P. G., Denton, C., Fletcher, J., Anthony, J., Francis, D., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. *Reading Research Quarterly, 40*, 148– 182. doi:10.1598/RRQ.40.2.2

McMaster, K. L., Fuchs, D., Fuchs, L. S., & Compton, D. L. (2005). Responding to nonresponders: An experimental field trial of identification and intervention methods. *Exceptional Children, 71*(4), 445-463.

National Reading Panel. (2000). Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. Washington, DC: U.S. Department of Health and Human Services (NIH Pub. No. 00-4754) In Neuman, S. B., & Dickinson, D. K. (Eds.). (2001). *Handbook of early literacy research*. New York: Guilford.

NCS Pearson. (2003a). Letter naming fluency (assessment probes). Retrieved from www.aimsweb.com

NCS Pearson. (2003b). Letter sound fluency (assessment probes). Retrieved from www.aimsweb.com

NCS Pearson. (2012a). AIMSweb: test of early literacy administration and scoring guide. Retrieved from www.aimsweb.com

NCS Pearson. (2012b). AIMSweb technical manual. Available from www.aimsweb.com

Nelson, J. R., Benner, G. J., & Gonzalez, J. (2003). Learner characteristics that influence the treatment effectiveness of early literacy interventions: A meta-analytic review. *Learning Disabilities: Research & Practice*, *18*, 255–267. doi:10.1111/1540-5826.00080

Niebling, B. C., & Elliott, S. N. (2005). Testing accommodations and inclusive assessment practices. *Assessment for Effective Intervention*, *31*, 1–6.

O'Connor, R., & Fuchs, L. S. (2013). Responsiveness to intervention in the elementary grades: Implications for early childhood education. In V. Buysse, E. Peisner-Feinberg, & J. Cantler (Eds.). Handbook of response to intervention (RTI) in early childhood education (pp. 41–56). Baltimore: Brookes.

O'Hearn, E. (2013). *The relationship between the boehm and AIMSweb on kindergarten student achievement in one northern michigan intermediate school district* (Order No. 3563541).

Parsons, L., Cordier, R., Munro, N., & Joosten, A. (2019). A play-based, peer-mediated pragmatic language intervention for school-aged children on the autism spectrum: Predicting who benefits most. *Journal of Autism and Developmental Disorders*, *49*(10), 4219-4231. doi:/10.1007/s10803-019-04137-3

Reilly, C. (2012). Behavioural phenotypes and special educational needs: Is aetiology important in the classroom? *Journal of Intellectual Disability Research*, *56*(10), 929–946. https://doi.org/10.1111/j.1365-2788.2012.01542.x

Samson, J. F., Hines, S. J., & Li, K. (2015). Effective use of paraprofessionals as

early intervention reading tutors in grades K-3. *Mentoring & Tutoring: Partnership in Learning, 23*(2), 164-177. doi:10.1080/13611267.2015.1049014

Sanford, C., Newman, L., Wagner, M., Cameto, R., Knokey, A. M., & Shaver, D. (2011). The post-high school outcomes of young adults with disabilities up to 6 years after high school. Key findings from the National Longitudinal Transition Study-2 (NLTS2). Menlo Park, CA: SRI International.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. New York: Houghton Mifflin.

Shinn, M.R. & Shinn, M.M. (2002a). Administration and scoring of early literacy measures for use with AIMSweb. AIMSweb Training Workbook. Eden Prairie, MN: Edformation Inc.

Shinn, M.R. &Shinn, M.M. (2002b). Administration and scoring of reading curriculum-based measurement (R-CBM) for use in general outcome measurement. AIMSweb Training Workbook. Eden Prairie, MN: Edformation Inc.

Slavin, R. E., Lake, C., Davis, S., & Madden, N. A. (2011). Effective programs for struggling readers: A best-evidence synthesis. *Educational Research Review, 6*(1), 1-26. doi:10.1016/j.edurev.2010.07.002

Snow, C., Burns, M. S., & Griffin, P. (Eds.). (1998). Preventing reading difficulties in young children. Washington, D.C.: National Academy Press.

Stevens, J. (1986). Applied multivariate statistics for the social sciences. Hillsdale, NJ: Lawrence Erlbaum Associates.

Tarar, J. M., Meisinger, E. B., & Dickens, R. H. (2015). Test of word reading efficiency-second edition. *Canadian Journal of School Psychology, 30*(4), 320-326.

Torgesen, J. K. (2000). Individual differences in response to early interventions in reading: The

lingering problem of treatment resisters. *Learning Disabilities Research and Practice, 15,* 55-64.

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (2012). Test of word reading efficiency-second edition (TOWRE-2). Austin, TX: Pro-Ed.

U.S. Department of Education. (2011). *National Assessment of Educational Progress (NAEP), selected years, 1992– 2009 Reading Assessments, NAEP Data Explorer* (NCES Publication No. 2011-033). Washington, DC: National Center for Education Statistics.

U.S. Department of Education (2015). National assessment of educational progress. Retrieved From: http://www.nationsreportcard.gov.

Villarreal, V. (2015). Test review: Schrank, F. A., mather, N., & McGrew, K. S. (2014). woodcock-johnson IV tests of achievement. *Journal of Psychoeducational Assessment, 33*(4), 391-398. doi:/10.1177/0734282915569447

Walker, V. L., Douglas, K. H., Douglas, S. N., & D'Agostino, S. R. (2020). Paraprofessional-implemented systematic instruction for students with disabilities: A systematic literature review. *Education and Training in Autism and Developmental Disabilities, 55*(3), 303-317.

Wanzek, J. A. (2005). *Response to varying amounts of time in reading intervention for students demonstrating insufficient response to intervention* (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global. (305385652).

Wanzek, J., Vaughn, S., Scammacca, N. K., Metz, K., Murray, C. S., Roberts, G., & Danielson, L. (2013). Extensive reading interventions for students with reading difficulties after grade 3. *Review of Educational Research, 83*(2), 163-195.

doi:10.3102/0034654313477212

Wei, X., Blackorby, J., & Schiller, E. (2011). Growth in reading achievement of students with disabilities, ages 7 to 17. *Exceptional Children, 78*, 89–106.

Williams, K. T. (2007). *Expressive vocabulary test* (2nd ed.). Bloomington, MN: Pearson.

Wilson, S. B., & Lonigan, C. J. (2010). Identifying preschool children at risk of later reading difficulties: Evaluation of two emergent literacy screening tools. *Journal of Learning Disabilities, 43*(1), 62-76. doi:/10.1177/0022219409345007