

The Effect of Implementing the Orton-Gillingham Approach to Reading
on the
Decoding Abilities of Struggling Eighth and Tenth Grade Readers

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Abstract

The purpose of this study was to examine the effects of the Orton-Gillingham approach to reading on eighth and tenth grade decoding abilities. This was a two-group quasi-experimental study that used students who were not randomly selected. Each class contained three students. The study used the results of the *Woodcock Johnson Test of Achievement IV: Letter-Word Identification* subtest measurement tool. Results of the statistical analysis indicated that the null hypothesis that intervention would have no effect on the students' reading levels could not be rejected at the customary level of statistical significance. Further analysis using effect sizes, however, indicated that there was a strong treatment effect. Not rejecting the null hypothesis, therefore, was due to the small sample size rather than trivial treatment effects. If the study were replicated with larger samples, the null hypothesis would most likely be rejected at typical p-levels.

CHAPTER I

INTRODUCTION

Reading and writing proficiently are both essential skills needed for all aspects of life no matter what a child's post-secondary goals are. Attending college, entering the workforce, or enlisting in the military all require reading and writing. To be a proficient reader, there are many skills needed such as word recognition, which includes phonological awareness, decoding and sight recognition. Then you have comprehension, which includes skills such as background knowledge, vocabulary, language structure, verbal knowledge, and literacy knowledge. From there, both word recognition and reading comprehension skills must be intertwined in order to be a skilled, fluent, reader (Scarborough, 2001). Considering how automatic and natural reading may come to some of us, it is quite a complex process that many students struggle with. The results of the most current computer-based assessment of students' writing skills in the Nations Report Card Writing of 2011 report that only 24% of students in grades 8 and 12 write at the proficient level. However, 54% of grade 8 students and 52% of grade 12 students write only at a basic level, leaving only 3% of grades 8 and 12 students writing at the advanced level (National Center for Education Statistics, 2012). The results from the Nations Report Cards (IES, 2015) for reading and writing and mandates of No Child Left Behind (2002) and Individuals with Disabilities Education Act (2004) stress the need for sound evidence-based pedagogical practices for literacy instruction.

To localize the statistics to Maryland, only 13% of eighth-grade students were proficient or better in reading in Baltimore City Public Schools, based on standardized assessments (National Center for Education Statistics, 2012). When looking at data from a Baltimore County high school's Performance Level Summary and disaggregating data to those with IEPs, a mere

3% of students in grade 10 met the expectations on The Partnership for Assessment of Readiness for College and Careers (PARCC) English Language Arts and Literacy Assessment (MSDE, 2018). Data continues to show that only 58% of Maryland high school graduates are not college and career ready and must pay for non-credit, remedial English classes before admission to community college (Maryland Longitudinal Data System, 2018). Literacy is a right, not a privilege.

Last spring, a 15-year-old student enrolled at this researcher's high school. He was slated to earn a high school diploma. This child had an IEP that addressed reading comprehension and written expression. He enjoyed playing basketball and Fortnite and was quite hilarious with his quick and witty rebuttals to peers. However, it did not take long to soon realize this child did not know how to read. This was heartbreaking. How did this child come this far, to freshman year of high school, with no intensive reading remediation? He was embarrassed. He was ashamed. This researcher questioned herself and questioned the education system. Did this child not receive the education he needed because he had no one to advocate for him, to fight his battle for him? The high school this researcher works at is located in a small, tight-knit, predominately white community, nestled in Baltimore county's south east side. The school did not have a reading intervention program, no program or specialists that had the knowledge or training in the science of reading. In the past, loading the student up with accommodations and modifications was just how things were done. A student can't read? Provide him with audio-books or a human reader. There was no addressing the problem. After much advocacy and collaboration with the Office of Special Education and Office of ELA, it was determined the school would begin a Tier 3 reading intervention for this child. Specialists and resource teachers from both offices came to train me one-on-one to begin implementation as soon as possible. The Orton-Gillingham reading program

was the intervention of choice. Since last spring, this researcher completed the Orton-Gillingham 60-hour training and two more students have been identified who also require a Tier 3 reading program at our school. Next year, that number will double.

As of 2019, Baltimore County Public Schools will require all middle and high school special educators and elementary reading specialists to attend the 60-hour Orton-Gillingham training, regardless of content area specialty. Although this will take a minimum of 4 years to achieve, it is a step in the right direction to bring more equity to literacy instruction.

This study focuses on the impact and effectiveness of the Orton-Gillingham reading program on this researcher's 10th grade class.

Statement of Problem

This study investigates the impact of the Orton-Gillingham reading program on a small sampling group of three tenth-grade students' decoding abilities as measured by the Woodcock Johnson IV (WJIV) subtest Letter-Word Identification.

Hypothesis

The implementation of the Orton-Gillingham reading program will not improve high school students' decoding abilities in a small-sampling group.

Operational Definitions

The key terms that must be identified and described are as follows:

The dependent variable is *decoding*, as measured by the *WJIV subtest Letter-Word Identification*.

The *WJIV subtest Letter-Word Identification* is a visual stimulus assessment which tasks the examinee to identify printed letters and words to assess reading *decoding* level.

Decoding is the recognition of visual word forms from a phonological lexicon and pronunciations associated with visual word forms.

The independent variable is the *Orton-Gillingham* Tier 3 reading program, which is a multi-sensory, systematic, synthetic phonetic approach to reading.

A *Tier 3* intervention focuses on explicit phonics instruction and will replace the core phonics curriculum and is conducted in a 1:3 teacher to student ratio.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review examines the research of dyslexia, studies of multi-sensory reading programs or interventions, and how dyslexia is being addressed in schools for older struggling readers. Section one will define dyslexia, describe how this learning disability affects individuals of all ages, and explore the current national concern of dyslexia. Section two will focus on reading interventions for students with dyslexia, specifically interventions or reading programs with a multi-sensory approach, and if they have or have not been proven effective. Section three delves into how high schools address students with reading disabilities in their Individualized Education Plan (IEP), specifically dyslexia, and what is being done to remediate the struggling readers and bridge the gap in reading scores when compared to same-aged non-disabled peers.

Dyslexia

Dyslexia is among the most common neurodevelopmental disorders; 20% of Americans are dyslexic. One in five children are diagnosed with dyslexia and the disability affects 1.6 males to every 1 female (Juul & Peterson, 2017). When looking at the disability, it is important to note the presence of familial risk. “A child with an affected parent [diagnosed dyslexia] has a risk of 40–60% of developing dyslexia. This risk is increased when other family members are also affected” (Schumacher, Hoffman, & Schmä, 2007).

Dyslexia is a language-based learning disability that refers to a certain set of symptoms, which result in people having difficulties with specific language skills, particularly reading. Students with dyslexia usually experience difficulties with other language skills such as spelling, writing, and pronouncing words. It is referred to as a learning disability because dyslexia can make it very difficult for a student to succeed academically in the typical instructional

environment, and “in its more severe forms, will qualify a student for special education, special accommodations, or extra support services” (Juil & Peterson, 2017, p. 372). Individuals with dyslexia have deficits in foundational reading skills such as phonological awareness, overall language, vocabulary, and nonlinguistic cognitive skills to decoding and reading comprehension. From the very bottom of the language tower there is phonology, then morphology, syntax, semantics and pragmatics. “It is important to understand each aspect of expressive and receptive language in learning and why and where there is a deficit” (Skebo et al., 2013, p. 3). Individuals with dyslexia usually have deficits in phonological (sounds) awareness which continues to effect word reading efficiency in older children with dyslexia if not addressed or remediated. A study conducted in the Netherlands tested and confirmed the hypothesis that the relation between phonological awareness and word reading efficiency differed for children with dyslexia versus typically developing children (Carolien, Segers, & Verhoeven, 2018).

Learning disabilities not only affect how children perform academically in the classroom but the disability effects their social and emotional confidence. The emotional effects of dyslexia can be lifelong. Michael A. McNulty published a study in 2003 in which he examined the life stories of adults diagnosed with dyslexia as children with emphasis on emotional experiences. The life story method of narrative analysis was used to compare and analyze the accounts of 12 participants who were interviewed extensively. The findings indicated that self-esteem problems may emerge by early childhood as individuals contend with aspects of their learning disabilities that interfere with typical development. By school age, all participants noted self-esteem problems when they experienced struggles or failures in school, which could feel traumatic. Testing and diagnosis improved self-esteem when conducted in a relevant manner that led to adaptation, remediation, and intervention. Niches in late adolescence and young adulthood held

potential to dramatically improve compensation. McNulty notes that because of the obstacles and the “hidden nature of learning disabilities, negative experiences and LD trauma are never totally avoidable” (2003, p. 378). Results from the study indicate that professional support can reduce the amount and intensity of these negative experiences, which exemplifies importance of a diagnosis, proper support and finding the appropriate remediation to aid in the challenges of having dyslexia.

With 20% of the American population struggling with the hardships of living with dyslexia, one might question what advocacy and educational laws are in place. Historically, it was common practice for districts to discourage or even prohibit teachers and school psychologists from using the term "dyslexia." The fear of using the term dyslexia was so prevalent that in 2015, the federal Office of Special Education and Rehabilitative Services issued a letter to school districts stating that, "There is nothing in the IDEA that would prohibit the use of the terms dyslexia, dyscalculia, and dysgraphia in IDEA evaluation, eligibility determinations, or IEP documents." (Youman & Mather, 2018). Locally, in Baltimore County, Dyslexia was added as a choice in the IEP eligibility under Learning Disability in 2018.

As of March 2018, the number of states with laws specific to dyslexia is now up to 42; this number has nearly doubled since 2013. Youman and Mather predict that in the next few years, all states will have dyslexia laws and provisions for screening, intervention, and accommodations will be well established in all school districts. Clear guidelines on how to implement universal screening for dyslexia, provide interventions and accommodations, and train and maintain professionals' knowledge related to dyslexia are now beginning to be outlined in statewide handbooks and guidance documents (2018).

For the sake of this study, it is vital to grasp an understanding of the fundamental core deficits and academic and emotional struggles individuals with dyslexia face. In understanding the struggles of a student with dyslexia and how a dyslexic brain works, it can aid in providing appropriate interventions. It is equally important to note the misconceptions, denial, and lack of research this disability has had historically. It is just in recent years that dyslexia has been acknowledged and accepted. Nationally, we are headed in the right direction, but there is still a long way to go.

Multi-Sensory Reading Programs

In 1936, Dr. Samuel Orton, a child neurologist, looked at reading disabilities in children and stated that an instructional approach should attempt to capitalize children's auditory competence by teaching them the phonetic equivalents of the printed letters and the process of blending sequences of such equivalents so that they might be able to produce for themselves the spoken form of the word from its graphic counterpart. In 1960, after Orton's ideas were developed into a curriculum by Anna Gillingham and Bessie Stillman, the Orton-Gillingham reading program was born (Ritchey & Goeke, 2006).

Orton-Gillingham (OG) is a multi-sensory systematic, synthetic, phonetic approach to reading. Explicit instruction is provided in phonology and phonological awareness, sound-symbol correspondence, syllables, morphology, syntax, and semantics. A key characteristic of OG reading instruction is that it is multisensory, involving visual, auditory, and kinesthetic/tactile learning pathways. Well-known adaptations and extensions include Alphabetic Phonics, Wilson Reading System, The Herman Method, Project ASSIST, The Slingerland Approach, The Spalding Method, Starting Over and Project Read. Many of these adaptations and

extensions of a multi-sensory approach to reading are still widely used in American schools today (Ritchey & Goeke, 2006).

A fairly dated study conducted by Simpson, Swanson, and Kunkel (1992) investigated reading remediation for students (aged 13-18 years old) placed in juvenile detention facilities. In a quasi-experimental design, students who received 90 minutes per day (5 days per week) of OG-based instruction were compared to a comparison group of students who received 45 minutes per day of traditional reading instruction in a second detention facility. Of the 116 students who began the study, 63 students were available for post testing. The OG instruction resulted in more reading growth-as assessed by the Woodcock Reading Mastery Test (Woodcock, 1989)-than the remedial English condition. In this case, students who received OG instruction, on average, outperformed the comparison condition. The authors concluded that students were likely to make more growth if they received more hours of instruction (Ritchey & Goeke, 2006). This study is relevant to this researcher's study because the target age-range is the same as well as the reading intervention program. This study confirms students who received OG instruction outperformed those students who received traditional reading instruction. However, it is important to note the limitations of this study in which some students were not available for post-testing. This study is also relevant to my study in that the assessment tool that was used, The Woodcock Johnson, is the same assessment tool that was used for this study to prove or disprove growth. It is important to note the year this study was conducted was over 20 years ago, however; the fundamentals of OG and Woodcock Johnson have remained the same throughout the years.

In addition, a study conducted in 2002 looked at the efficacy of the multi-sensory teaching approach to improve reading skills at the first-grade level. The control group was taught by the Houghton-Mifflin Basal Reading Program while the treatment group was taught by the

Language Basics: Elementary, which incorporates the Orton-Gillingham-based Alphabetic Phonics Method. The results of this study showed that first-grade children taught with the multisensory teaching approach based on OG principles performed better on tests of phonological awareness, decoding, and reading comprehension than the control groups. It may, therefore, be concluded that the higher scores for children from the treatment groups may be attributed to the multisensory approach used in this study (Joshi, Dahlgren, & Boulware-Gooden, 2002) Although this study does not address secondary students, it does address a multi-sensory approach to reading being used to successfully improve phonological awareness and decoding which are core deficits in individuals with dyslexia.

In 2016, a study was conducted to investigate whether the use of simultaneous multisensory structured language instruction promoted better letter name and sound production, word reading, and word spelling for second-grade children with typical development or with dyslexia than structured language instruction alone (Schlesinger & Gray, 2017). The results indicated both interventions had an overall effect for participants in both participant groups. However, the multisensory intervention did not provide a clear advantage over the structured intervention for typical developing participants and dyslexic participants. There is empirical evidence to support structured systematic phonics instruction, however, there is a lack of scientific evidence indicating the addition of multisensory input makes a significant difference. In addition, as of 2016, the body of research supporting multisensory structured language as an effective reading intervention is limited and often inconclusive. Schlesinger attributes this to the lack of well controlled studies comparing multisensory instruction to an alternative remedial approach (2017). Although the data does not present strong evidence to correlate multi-sensory

reading programs to academic achievement, research does validate that this type of reading program is advantageous for those with a dyslexia diagnosis.

Current Student Performance in Reading and Writing

Based on the results of the most current computer-based assessment of students writing skills in the Nations Report Card Writing of 2011, it shows that only 24% of students in grades 8 and 12 write at the proficient level. However, 54% of grade 8 students and 52% of grade 12 students write only at a basic level, leaving only 3% of grades 8 and 12 students writing at the advanced level (National Center for Education Statistics, 2012). The results from the Nations Report Cards (IES, 2015) for reading and writing and mandates of No Child Left Behind (2002) and Individuals with Disabilities Education Act (2004) stress the need for sound evidence based pedagogical practices for literacy instruction. To localize the statistics, only 13% of eighth-grade students were proficient or better in reading Baltimore City public school's based on standardized assessments (National Center for Education Statistics, 2012). When looking at data from a local Baltimore County high school's Performance Level Summary and desegregating data to those with IEPs, a mere 3% of students in grade 10 met the expectations on the PARCC English Language Arts and Literacy Assessment (MSDE, 2018). What is being done to bridge the gap between those older struggling readers to their non-disabled peers, at which 70% are meeting the PARCC expectations in reading and writing?

Addressing Reading Disabilities in High School

An investigation conducted in 2005 and published in the *Annals of Dyslexia* analyzed goals from the IEP's of 54 high school students with diagnosed reading disabilities in basic skills (decoding and/or word identification). Results showed that for 73% of the students, the IEPs

written when they were in high school failed to specify any objectives regarding their acute difficulties with basic skills. Comparisons with the IEPs from younger years showed a pattern of decline from elementary school to middle school to high school in the percentage of IEPs that commented on or set goals pertaining to weaknesses in decoding. These findings suggest that basic skills deficits that persist into the upper grade levels are not being sufficiently targeted for remediation and help explain why older students frequently fail to resolve their reading problems (Catone & Brady, 2005). Epidemiological data comparing growth in reading achievement between normal readers and poor readers indicate that while most children reach a plateau in basic reading skills by about the age of 12, deficient readers do so at significantly lower levels (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996). The data reveal that 74% of children diagnosed as dyslexic in Grade 3 remain significantly reading impaired in Grade 9.

There may be a number of reasons why the IEPs of older poor readers often lack instructional goals to reduce their basic skills deficits; however, it is partly due to the secondary curriculum which is focused more exclusively on the acquisition of content knowledge and the special education model that predominates is to teach reading through the content areas such as biology, history, or English. Another possibility for the failure to address reading deficits in basic skills is that educators, including those responsible for the provision of reading services for adolescent poor readers, lack the knowledge necessary to specifically teach students who have failed to acquire efficient decoding skills (Catone & Brady, 2005).

After an extensive review of the research on the literacy problems of adults, Catone concluded that treatment programs for older poor readers need to include assessment of specific component skills (such as weaknesses in phoneme awareness), along with systematic training, as

needed, in phoneme awareness, sound-symbol correspondences, and on the more complex word structures such as syllable, spelling, and morpheme patterns (Catone & Brady, 2005).

Summary

The urgency to remediate and support dyslexic students is a current hot topic for school systems across the nation. Although studies on multi-sensory reading programs that focus on phonological awareness such as the Orton-Gillingham Reading Program have been found to be limited, dated and inconclusive, this is one of the main reading intervention programs that Baltimore County Public Schools is adopting. Although teaching professionals in the secondary setting may feel unqualified to support struggling readers, and may lack the training, it is imperative to seek the resources or trained professionals in your school-system. Non-readers in the secondary setting should not be ignored. These adolescents and young adults need to be remediated and attention should be spent crafting appropriate IEPs that include instruction to bridge the gaps in phonological and decoding deficits.

CHAPTER III

METHODS

The purpose of this study was to examine the effects of a reading intervention program on 10th grade decoding abilities. This was a two-group quasi-experimental study that used a small-group sampling of three students who were identified as reading five grade levels below. The study used a pre and post-assessment of the *WJIV subtest Letter-Word*.

The independent variable was the reading intervention program that was provided to the small-group. The dependent variable was the students' decoding levels as measured by the *WJIV subtest Letter-Word*. Another dependent variable is attendance.

Design

The study used a two-group quasi-experimental design. Pre and post measures were gathered through measuring Letter-Word Identification progress from September of 2018 to March of 2019. Students were selected based on their deficits in decoding abilities, and diagnosis of dyslexia; there was no randomization of students.

Participants

The students in this study were eighth and tenth graders in a fairly small middle and high school in Baltimore County. This high school had an enrollment of 1092 at the time the study was written. The class contains one African American male and two White females. All three students have IEP's and are diagnosed with a Specific Learning Disability: Dyslexia.

For this study, the students who were enrolled in the Orton-Gillingham Tier 3 Reading Program were selected based on a diagnosis of dyslexia. A diagnosis of dyslexia begins with the gathering of information gained from work samples, observations, testing and interviews

conducted by classroom teachers, speech/language pathologist, special educator, and the school psychologist, which includes phonological awareness, decoding and sight recognition. When analyzing results of assessments, formal and informal, one must have significant delays in foundational reading skills such as phonological awareness, overall language, vocabulary, and nonlinguistic cognitive skills to decoding and reading comprehension. In Baltimore County, the official determination of a diagnosis of dyslexia is given by the school psychologist.

Although the sample size is very small, it is due in part to the newly recognized diagnosis. Baltimore County acknowledged dyslexia as a disability option on an IEP in 2018. When one considers the statistics that 20% of people are dyslexic, it can be assumed that many students are still undiagnosed and that a remedial reading program would be beneficial (Juul & Peterson, 2017).

Instruments

The Woodcock-Johnson IV (WJIV) is a formal educational assessment for examinees ages 2–90. The assessment was first developed by Richard Woodcock and Mary E. Bonner Johnson in 1977 and later revised in 1989, 2001 and most recently in 2014. The WJIV measures academic achievement broken down into different subtests (Mather & Schrank, 2015). The WJIV measures academic achievement, psychological processes, oral language, and intellectual abilities.

According to the Buros Center for Testing review, the WJIV was normed by gathering a large, nationally represented sample of more than 8,000 examinees. The sampling size consisted of 1,143 preschool children and 4,784 public, private and home-schooled children ranging from kindergarten to 12th grade. Within the sample, 1,165 college students were assessed and 1,843 adults age 25 and beyond. Individuals were randomly selected within a stratified sampling

design. The sampling group was controlled for ten specific community and individual variables and thirteen socio-economic status variables.

The average range of subtests of the WJIV show strong reliabilities of .80 or higher. The letter-word identification subtest has a reliability of .9. The reliability was calculated across their range of use and included all norming subjects tested per grade level. The WJIV assessment is a highly accurate and valid diagnostic system because the two batteries are co-normed. This means the normative data was based on a single sample and examiners can determine learning differences with minimal errors (Mather & Schrank, 2015).

Procedures

The Orton-Gillingham reading class consists of one 45-minute session every other day. This research ran two sessions; the male student in the first sessions 1:1 and the two female students in the second session 1:2. An Orton-Gillingham lesson can last one session, or it can stretch over weeks, depending on the students' progress and mastery. The Orton-Gillingham Reading Program that was used in the study was titled, "The Orton-Gillingham Plus Program" created by Fran Levin Bowman, Ed.D. In this program, each lesson in Phase One consists of six steps.

The session begins with the first step which is phonological awareness. Phonological Awareness is an awareness of how the sounds of a language works. A child's natural language development includes the deletion, categorization, blending, segmenting and sequencing of sounds and syllables. In this step, the teacher instructs the students to use mirrors to see the movements of their mouths, while they are producing vowel and consonant sounds. The students feel the movements of their lips, teeth, tongues, and jaw as they produce various sounds. They also use their fingers to touch their throats, in order to feel the vibrations of their larynxes, in an

effort to determine if sounds are voiced or unvoiced. During this step, phonological games and materials, which focus on the sound or rule, are being taught in the Orton-Gillingham lesson that day. Multisensory materials like bottles with removable caps (for deleting sounds), slinkies or strips of elastic (for blending sounds), Legos or building blocks (for segmenting sounds), multiple color "sticky dots" or multi-colored paper clips (for sequencing sounds), and musical instruments (for counting sounds) aid students in understanding these abstract concepts.

The next step is the card pack review. During this step, all previously-learned sounds are written on index cards for daily review. Cards are presented to the student daily, out-of-sequence so that the student becomes comfortable and automatic in recognizing both forms of the letter. The teacher shows the student a card and the student makes the corresponding sound. If the student makes a mistake, the teacher models the correct sound for the student.

Step three requires students to practice irregular words. The teacher writes an irregular word, at least 2-3 inches in height, in print form, while slowly saying the sounds in the word in a "stretched" fashion. The student traces over the word, while saying it slowly, and then tries to write the word from memory, while saying the sounds slowly. Students go back to the re-tracing step until they are able to write the word correctly from memory. During this step the teacher may use a sandbox, shaving cream, or any other multi-sensory, tactile material while tracing.

Step four has students practice their linkages in a multisensory fashion by simultaneously seeing the letter, saying the sound, and writing a large form of the letter representing the sound. The teacher models writing the large letter(s) on a board, while simultaneously saying the sound. The student traces over the teacher's model while saying the sound simultaneously. The student then copies the letter, while saying the sound simultaneously. Finally, the student writes the letter

and simultaneously says the sound from memory. Some letters have multiple sounds which are learned at different points in the program.

Step five requires the students to decode words, phrases and sentences. After learning a new sound/symbol association, students practice the application of that sound into words, phrases, and sentences. The teacher instructs the student to read aloud controlled words and passages of already mastered sounds, linkages, blends and words.

Step six has the students use Simultaneous Oral Sounding (S.O.S.) while writing words and sentences. The sentences, which contain phonetically-regular, and phonetically-irregular words are simply dictated to the student.

Once students show mastery of all six steps for that learned sound, blend or linkage, the student will proceed to the next lesson. The Orton-Gillingham Reading Program that the teacher uses consists of Phase One and Phase Two totaling in one hundred and thirty-one lessons. Once the student completes every lesson, the student has completed the reading program (Bowman, 2017).

CHAPTER IV

RESULTS

The purpose of this study was to analyze the impact of implementing the Orton-Gillingham reading intervention program with struggling 8th and 10th grade readers. Data used to determine the impact of the study were pre and post measures of The Woodcock Johnson IV: Letter-Word Identification subtest growth from October of 2018 to March of 2019. The data below indicates the treatment group (Orton-Gillingham) had a higher mean gain from pre-to-post than the comparison group (customary decoding program) on the WJIV subtest Letter-Word Identification. Because the sample sizes were three students per group, the mean difference failed to meet the usual p-level of .05. Effect size for the sample mean gains, however, was in the large range (none, small, medium, and large) using Cohen's delta.

Data Tables and Figures

Hypotheses for Testing the Sample Gains from Pre-to-Post

μ_1 : mean of Gain when Treat = C

μ_2 : mean of Gain when Treat = E

Difference: $\mu_1 - \mu_2$

Equal variances are not assumed for this analysis.

Table 1. Descriptive Statistics for Mean Gains

Descriptive Statistics: Gain

Treat	N	Mean	StDev	SE Mean
C	3	1.333	3.055	1.764
E	3	8.000	8.660	5.000

Table 2. t-Test for Significance of the Sample Mean Gains

Test

Null hypothesis $H_0: \mu_1 - \mu_2 = 0$

Alternative hypothesis $H_1: \mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
-1.26	2	0.3355

Table 3. Cohen's Delta Effect Size for Sample Mean Gains

Standardized Effect Size = 1.03 (Large effect size), favor the E-group

Non-standardized Effect Size = 6.67 WJIV points, favor the E-group

Conclusion

Were the samples equal to normal class size, the use of Orton-Gillingham would be associated with larger gains in WJIV decoding. The large effect sizes indicate that the lack of statistical significance is due to the small samples.

CHAPTER V

DISCUSSION

The purpose of this study was to analyze the impact of implementing the Orton-Gillingham reading intervention program with struggling eighth and tenth grade readers. Results of the statistical analysis reported in Chapter IV indicated that the null hypothesis that intervention would have no effect on the students' reading levels could not be rejected at the customary level of statistical significance. Further analysis using effect sizes, however, indicated that there was a strong treatment effect. Not rejecting the null hypothesis, therefore, was due to the small sample size rather than trivial treatment effects. If the study were replicated with larger samples, the null hypothesis would most likely be rejected at typical p-levels.

Implications of the Results

The results indicate that, although there is a large achievement gap between where tenth-grade students are and where they need to be as readers, intentionally teaching a multi-sensory, systematic and explicit instruction to reading can be effective. The results confirm the importance of this type of direct instruction in improving students' reading abilities, specifically decoding. This research also indicates the need for science-based interventions related to deficiencies in phonological and phonemic awareness, decoding, spelling and fluency in order to break the code that is reading for struggling secondary students.

The results of this study validate the use of data collection through progress monitoring to determine an appropriate reading program for students who lack competency in the fundamental areas of reading. Based on the results from this study, it can be concluded that remediating secondary students with a multi-sensory approach to reading demonstrates significant gains.

Threats to Validity

During this study, certain threats to validity occurred. The greatest threat to validity was the small size of the sample group. With only three students per group, a small change in scores for any individual could radically change the results. It is important to note the Orton-Gillingham program ratio should be no more than one teacher to every three students. Also, the small samples limit the power of the statistical test to detect a treatment effect that would likely replicate in similar classrooms.

Another threat to validity was attendance. Students generally attended 90% of the sessions, however one student in particular attended the program 77% of the time. This student's missed session could have affected the outcome of their reading score at the end of the study. This student in particular did not show progress from the pre to post assessment.

Another threat to validity was the difference in instructors. The treatment and control group had different teachers who had both received the sixty-hour Orton-Gillingham training but may have different styles in running the program. Although all sessions were forty-five minutes, many other external factors could contribute to student learning such as classroom routines, rules and expectations all which vary. Since this is an unknown factor, different students could have experienced more or less progress with reading instruction which may have affected the post test results.

Connections to Previous Studies/Existing Literature

The results of the study were supported by previous studies and existing literature. Several researchers came to various conclusions, suggesting mixed results of improving secondary students' reading gains through the use of a multi-sensory reading approach. Specifically, one

former study conducted in 2011 delves into a quasi-study comparing WJIV scores from students who received multi-sensory phonics instruction versus students who received indirect traditional reading services through their general education teacher. The results indicated that students who received reading intervention through the Orton-Gillingham multi-sensory approach significantly increased their decoding skills. This directly relates to the researcher's study; however, the researcher's study assessed students in the secondary setting, and this study looked at third graders. The assessment tool, the Woodcock Johnson, is the same measurement tool used to determine effectiveness and improvement in decoding (Steward, 2011).

Another previous study was conducted in 2009 and explored the effectiveness of teaching basic reading skills to adolescents. The study revealed an overall strong effect of teaching basic reading skills on adolescents' reading achievement performance, particularly on their fluency performance (Joseph & Schisler, 2009). This relates to the researcher's topic of interest because it targets reading intervention at the secondary level. However, it is important to note this study did not implement a multi-sensory approach to reading. This study corroborates the researcher's conclusion that going back to the basics and teaching the fundamentals of reading is beneficial in improving a student's overall reading ability, even in the secondary setting.

Implications for Future Research

The data continues to show that 58% of Maryland high school graduates are not college and career ready and must pay for non-credit, remedial English classes before admission to community college (Maryland Longitudinal Data System, 2018). It is clear the need for sound evidence-based pedagogical practices for literacy instruction is paramount.

The results of this research were encouraging; students enrolled in the Orton-Gillingham reading program showed gains in decoding abilities. However, the researcher suggests a more in-depth study to be conducted with a larger sample group in the future. With only three students per group, a small change in scores for any individual could radically change the results. With a larger group, improvement averages will improve the validity of the study.

Lastly, a future research study could be extended for a longer period of time than the intervention was in place between the pre and posttest so the researcher would be able to draw more specific conclusions and determine true effectiveness of the intervention program after the novelty has worn.

Conclusion/Summary

To emphasize the importance of this research, the results of the most current computer-based assessment of students' writing skills in the Nations Report Card Writing of 2011 report that only 24% of students in grades 8 and 12 write at the proficient level. However, 54% of grade 8 students and 52% of grade 12 students write only at a basic level, leaving only 3% of grades 8 and 12 students writing at the advanced level (National Center for Education Statistics, 2012). When looking at data from a Baltimore County high school's Performance Level Summary and disaggregating data to those with IEPs, a mere 3% of students in grade 10 met the expectations on The Partnership for Assessment of Readiness for College and Careers (PARCC) English Language Arts and Literacy Assessment (MSDE, 2018). Data continues to show that only 58% of Maryland high school graduates are not college and career ready and must pay for non-credit, remedial English classes before admission to community college (Maryland Longitudinal Data System, 2018). The data demonstrates the urgency to address the literacy deficits in our nations school systems.

The study concluded that secondary students reading significantly below grade level demonstrated gains in their decoding abilities when remediated with a multi-sensory approach to reading. The small sample size prevented the researcher from finding a statistically significant difference in favor of the treatment. Effect size analysis, however, confirmed that there was substantial treatment effect in favor of the Orton-Gillingham instruction.

References

- Bowman, F. L. (2017). *Orton-Gillingham Plus Program*. Owings Mills, MD: BES Publication.
- Carolien A N Knoop-van, C., Segers, E., & Verhoeven, L. (2018). How phonological awareness mediates the relation between working memory and word reading efficiency in children with dyslexia. *Dyslexia*, 24(2), 156-169.
- Catone, W. V., & Brady, S. A. (2005). The inadequacy of individual educational program (IEP) goals for high school students with word-level reading difficulties. *Annals of Dyslexia*, 55(1), 53-78.
- Cohen, J. (1988), *Statistical Power Analysis for the Behavioral Sciences*, 2nd Edition. Hillsdale, NJ: Lawrence Erlbaum.
- 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.
- Individuals With Disabilities Education Act, 20 U.S.C. § 1400 (2004).
- Joseph, L. M., & Schisler, R. (2009). Should adolescents go back to the basics? *Remedial and Special Education*, 30(3), 131-147. doi:<http://dx.doi.org/10.1177/0741932508315646>
- Joshi, R. M., Dahlgren, M., & Boulware-Gooden, R. (2002). Teaching reading in an inner-city school through a multisensory teaching approach. *Annals of Dyslexia*, 52, 229-242.
- Juul, H., & Petersen, D. K. (2017). Length effects in pseudo-word spelling: Stronger in dyslexic than in non-dyslexic students. *Annals of Dyslexia*, 67(3), 369-382.

- McNulty, M. A. (2003). Dyslexia and the life course. *Journal of Learning Disabilities*, 36(4), 363-81.
- No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).
- Ritchey, K. D., & Goeke, J. L. (2006). Orton-Gillingham and Orton-Gillingham-based reading instruction: A review of the literature. *The Journal of Special Education*, 40(3), 171-183.
- Schumacher, J., Hoffmann, P., Schmal, C., Schulte-Körne G., & Nöthen M.M. (2007) Genetics of dyslexia: the evolving landscape. *Journal of Medical Genetics* 44: 289–97.
- Schlesinger, N. W., & Gray, S. (2017). The impact of multisensory instruction on learning letter names and sounds, word reading, and spelling. *Annals of Dyslexia*, 67(3), 219-258.
- Schrank, F. A., McGrew, K. S., Mather, N., LaForte, E. M., Wendling, B. J., & Dailey, D. (2015). Woodcock-Johnson® IV Tests of Early Cognitive and Academic Development. Retrieved from <https://goucher.idm.oclc.org/login?url=http://search.ebscohost.com>
- Skebo, C. M., Lewis, B. A., Freebairn, L. A., Tag, J., Ciesla, A. A., & Stein, C. M. (2013). Reading skills of students with speech sound disorders at three stages of literacy development. *Language, Speech & Hearing Services in Schools (Online)*, 44(4), 360-373.
- Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. Neuman & D. Dickinson (Eds.), *Handbook for research in early literacy* (pp. 97–110). New York, NY: Guilford Press.
- Simpson, S. B., Swanson, J. M., & Kunkel, K. (1992). The impact of an intensive multisensory reading program on a population of learning-disabled delinquents. *Annals of Dyslexia*, 42, 54-66.

StataCorp. (2013), Stata Statistical Software: Release 13. College Station, TX: StataCorp L.P.

Stewart, E. D. (2012). The impact of systematic multisensory phonics instructional design on the decoding skills of struggling readers (Doctoral dissertation, Walden University; College of Education; 2011; Dr. Thomas Schnick, committee chairperson, 2011) (pp. 1-122).

Charleston, SC: Proquest, Umi Dissertation Publishing. U.S. Dept. of Education, National Center for Education Statistics. *Education Longitudinal Study of 2012*. Washington, D.C., 2012. (2012 ASI microfiche 4826-26).

Youman, M., & Mather, N. (2018). Dyslexia laws in the USA: A 2018 update. *Perspectives on Language and Literacy*, 41(4), 37-41.