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A Comparative Analysis of Student Achievement of First Grade Students Using Fundations vs. Heggerty and Words Their Way

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by

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

The Orton Gillingham (OG) teaching method is commonly used in schools (Ritchey & Goeke, 2006, p. 172). However, there is little evidence to support the use of OG based reading programs to help students learn more effectively in tier 1, 2 and 3 settings (Ring, Avrit, & Black, 2017, p. 384). The researcher sought to shed light on the effectiveness of an OG based reading program in comparison to the use of Heggerty's *Phonemic Awareness Program* and *Words Their Way*.

The Investigator completed a study to shed light on the *Fundations* program. *Fundations* is an OG based reading program that is used in a tier 1 setting. The Investigator compared the reading outcomes of one first grade classroom using the *Fundations* program to a different first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the word study portion of the school day. The Investigator also compared students that were at-risk for dyslexia in the *Fundations* classroom to the students that were at-risk for dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way*. The Investigator's study helped the administrative team in a small Midwestern school to select a new phonics program for the 2019 – 2020 school year.

The results from the study suggested that the *Fundations* program worked significantly better for all students in comparison to the Heggerty and *Words Their Way* programs in the areas of phonological awareness, letter-sound fluency, and decoding skills. The results of the case study support the use of the *Fundations* program in comparison to an alternative literacy program.

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Chapter One: Introduction

The purpose of this study was to shed light on the effectiveness of an Orton Gillingham (OG) based reading program. The researcher compared the achievement scores of a classroom using *Fundations* (An OG-based reading program) to a classroom using the Heggerty *Phonemic Awareness Program* (Literacy Resources, Inc., 2019; and *Words Their Way* (WTW, n.d.). Chapter One describes Orton Gillingham-based reading programs, gives the reader information about dyslexia, and describes the fundamental concepts of reading. The problem, setting, and purpose of the study are also discussed in Chapter One. The researcher defines important terms and identifies the limitations associated with the study. At the end of Chapter One, a summary of the information is given.

Background of the Study

The findings of the National Reading Panel (NRP, 2000) significantly changed the way teachers and researchers looked at reading. The NRP (2000) proved that there were five fundamental concepts involved in reading instruction. The fundamentals of reading were (1) phonics (2) phonemic awareness (3) vocabulary (4) fluency, and (5) comprehension (Kostewicz & Kubina, 2008, p. 63). According to the NRP, the best reading programs should contain the fundamental concepts of reading to be effective for students (National Reading Panel [NPR], 2000). The teaching of reading significantly changed based on the NRP's recommendations.

While the NRP's (2000) findings shed light on the fundamentals of literacy instruction, many students continued to struggle to become proficient in reading. Researchers believed that many students continued to struggle with reading acquisition,

due to the underlying processes involved in reading. The underlying processes of reading included working memory, phonological processing, letter-sound fluency, and the use of language. When students had an impairment in one or more of the underlying processes, learning to read became difficult (Henry et al., 2018; Wolf, 2015; Wolf & Bowers, 1999, p. 415).

Dyslexic students had considerable struggles in school, due to impairments in the underlying processes involved in reading. Oakland, Black, Stanford, Nussbaum, and Balise (1998) explained, "Dyslexia is a language learning disorder that results in deficits in reading, spelling and often written language. Students who evidence dyslexia have the adequate general ability but manifest considerable difficulty in learning to read via conventional instruction" (p. 140). Children that had reading difficulties due to dyslexia needed different methods of instruction to become proficient in the language arts.

Therefore, it made sense that specialized curriculum should be used to teach students with dyslexia. It was believed that the most effective curriculum to use with dyslexic students was an Orton Gillingham based reading program. OG programs were explicit and used a multi-sensory approach to instruction to help aid the working memory (Mather & Wendling, 2012, p. 26; Ritchey & Goeke, 2006, p. 171). Many educators believed dyslexic students benefited from reading programs that were systematic, explicit and gave aid to working memory.

Ritchey and Goeke (2006) described the Orton Gillingham (2006) approach by explaining, "The OG approach is a systematic, sequential, multisensory, synthetic and phonics-based approach to teaching reading. Explicit instruction is provided in phonology and phonological awareness, sound-symbol correspondence, syllables,

morphology, syntax, and semantics" (p. 171). Students that received Orton Gillingham based instruction learned concepts explicitly and systematically. Orton-Gillingham instruction also focused on making sure that each instructor had sufficient training and used data to drive instruction for each student (Ritchey & Goeke, 2006, p. 172).

The Wilson Reading Language Training Corporation (2012) developed *Fundations* based on the Orton Gillingham instructional principles. *Fundations* was a Tier-1 reading program designed to be used with an entire classroom of students. *Fundations* was a multisensory program that gave systematic and explicit instruction to students (Goss & Brown-Chisdey, 2012, p. 312). Teachers were trained to use data to drive instruction when using the *Fundations* program.

Statement of the Problem

Advocates of OG programs believed that the systematic, explicit, and multisensory approach to teaching reading worked better for children in need of remediation in comparison to alternative literacy programs. Educators embraced the OG method of reading instruction that was used in many school districts. Ritchey and Goeke (2006) explained, "Since their development, OG and OG-based reading instruction have been commonly accepted and frequently delivered interventions for students with reading disabilities" (p. 172). However, there was limited evidence to support the claim that OG reading programs worked better than alternative reading programs (Ring, Avrit, & Black, 2017, p. 384). There was a gap in the literature that proved that the use of OG programs was effective in comparison to alternative programs in teaching children how to read.

Purpose of the study

The purpose of this study was to shed light on the effectiveness of OG based reading programs. Ring et al. (2017) explained that OG programs were widely used in school districts. However, there was limited evidence that supported the use of OG based reading programs (p. 384). Reading scientists agreed that reading programs should be evidence-based when used in the classroom. When programs are used by educators based on belief and not evidence, irreparable harm may be done to children that were trying to learn how to read. Therefore, it was important that the effectiveness of OG based reading programs were evaluated to make sure they worked in a classroom setting. Galuschka, Ise, Krick, and Schulte-Korne (2014) explained, "The evidence-based development and the evaluation of interventions for children and adolescents with reading disabilities are, therefore, of particularly profound importance" (p. 1) The purpose of this study was to evaluate whether an OG based reading program (*Fundations*) worked better than an alternative reading program (*Words Their Way* and Heggerty's *Phonemic Awareness Program*).

Hypothesis Statements

Scores considered in analysis of hypotheses for this study were taken from the Formative Reading Assessment System for Teachers (FAST, University of Minnesota, n.d.).

Hypothesis 1— FAST Early Literacy Word Blending scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 2— FAST Early Literacy Word Blending scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 3 — FAST Early Literacy Nonsense Word Reading scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 4 — FAST Early Literacy Nonsense Word Reading scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 5 — FAST Early Letter Sound scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 6 — FAST Early Literacy Sound scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for Dyslexia as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 7 — Primary Spelling Inventory scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as

compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 8 — Primary Spelling Inventory scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to students considered at-risk for Dyslexia using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 9 – Parents of students considered at-risk for dyslexia will feel more positive about their children's reading progress as measured by the pre and post-survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Hypothesis 10 – Children that are considered at-risk for dyslexia will feel more positive about their reading progress as measured by the pre and post-test survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Definitions of Key Terms

For the purpose of this study, the following terms are defined:

Dyslexia – The International Dyslexia Association Board wrote,

> Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. (International Dyslexia Association Board of Directors, 2012)

At-Risk for Dyslexia – Students that exhibit weaknesses in the areas of accurate word recognition, letter-sound fluency, decoding, and orthography are the criteria used to label a child as at-risk for dyslexia.

Balanced Literacy – A balanced literacy approach emphasizes both phonics instruction and reading comprehension strategies (Farris & Werderich, 2011, p. 9).

Basal Readers – Basal readers include a teachers' manual, student workbook, and controlled vocabulary and sentence patterns (Farris & Werderich, 2011, p. 8).

Double-Deficit Hypothesis (DDH) – Wolf and Bowers (1999) argued, "In this article, we propose an alternative, integrative view—the double-deficit hypothesis—that phonological deficits and the processes underlying naming speed are separable sources of reading dysfunction, and their combined presence leads to profound reading impairment" (p. 415).

Evidence-Based Instruction – Brown (2016) explained, "Evidence-based instruction includes materials and methods that have been tested and found to be effective for large groups of diverse students and across two or more experimental research studies" (Fastbridge Resources, n.d., para. 5)

FAST Early Literacy Tests – The FAST (Formative Reading Assessment Tool for Teachers) Early Literacy Tests use evidence-based reading assessments for screening and monitoring student progress in the early primary grades. (Formative Reading Assessment Tool for Teachers, n.d.)

FAST Nonsense Words Assessment – Aranas (2016) explained, "Nonsense words are words that are made up and do not exist in the English language." (Fastbridge

Resources, n.d., para.9). The Nonsense Words Assessment measures a child's ability to decode words.

FAST Word Blending Assessment – The FAST Word Blending Assessment determines a student's ability to use phonological awareness to blend words (Fastbridge Resources, n.d.)

Fluency – The NPR explained, "Fluent readers can read text with speed, accuracy, and proper expression" (Snow et al., 1998, p. 3-1).

Fundations Level 1 – *Fundations* Level 1 is a first grade Orton Gillingham based phonics and phonological awareness program that is used with first-grade students (*Fundations* Overview and Studies of Program Effectiveness, 2014, p. 2).

Heggerty Phonemic Awareness Program – A systematic phonics instruction program used with students in pre-k through third grade (Phonemic Awareness Curriculum, n.d.).

Haptic Instruction – Haptic instruction involves having children physically manipulate letters in order to learn them (Minogue & Jones, 2006, p. 318).

Specific Language Impairment (SLI) – Bishop (1992) explained that when language does not develop at a typical rate despite the absence of an underlying cause, it is considered to be a specific language impairment (p. 119).

Morphology – Farris and Werderich (2011) explained, "The forms or structures of a language are referred to as morphology" (p. 366).

Orthography – Orthography is the ability to write language. Orthography includes skills such as spelling and punctuation (Orthographic Processing, 2014, para.1).

Orton Gillingham Reading Program – A systematic, multisensory instructional approach to teaching phonological awareness and phonics (Ring et al., 2017, p. 384).

Phonemic Awareness – Phonemic Awareness includes skills and knowledge related to the ability to notice, think about, or manipulate the individual sounds (phonemes) in words (Duff & Clark, 2010, p. 3).

Phonics – Phonics is an understanding of how written letters are linked to spoken sounds (phonemes) and an understanding of how to apply that knowledge for decoding and reading (Washburn, Joshi, & Binks-Cantrell, 2010, p. 23).

Phonological Awareness – Refers to the ability to attend to and manipulate the sounds in words (Washburn, Joshi, & Binks-Cantrell, 2010, p. 25).

Phonological Processing – Phonological processing refers to three separate areas of functioning. Phonological processing includes: phonological awareness, phonological memory, and rapid automatic naming (Learning Difficulties, 2014, p. 1)

Rapid Automatic Naming (RAN) – Henry, Van Dyke, and Kuperman (2018) stated,

> Rapid automatized naming (RAN) is a robust predictor of reading ability across languages, ages, and levels of skill. Performance in this task is typically defined as the time it takes participants to name a series of objects, colored squares and/or alphanumeric characters presented in a grid. (p. 1620)

Reader's Theater – Young and Rasinski (2009) explained, "Readers Theatre is a performance of a written script that demands repeated and assisted reading that is focused on delivering meaning to an audience" (p. 5).

Reading Wars – The reading wars describes the debate between two different instructional methods. Instructors on one side of the debate believed that explicitly teaching phonics worked well for students. Other Instructors believed that the whole-language approach to literacy worked best for student achievement (Castle, Rastle, & Nations, 2018, p. 5)

Tier 1 Instructional Method – The core curriculum presented during classroom instruction (O'Meara, 2011, p. 62).

Vocabulary – Aarnoutse, Leeuwe, Voeten, and Oud (2001) explained, "Vocabulary refers to the knowledge of lexical meanings of words and the concepts connected to these meanings" (p. 63).

Whole Language Method – An instructional approach that relies on learning processes, choice, and flexibility but provides less structure and direction for the classroom teacher (Farris & Werderich, 2011, p. 8, 9).

Words Their Way – *Words Their Way* is a program that uses data from assessments to drive instruction in phonics, vocabulary, and spelling. (Bear, Invernizzi, Templeton, & Johnston, 2012).

Limitations

Student attendance was a significant threat to validity. The school district that the researcher used in the study had student attendance issues. If students were absent from school for a significant number of days, their performance may be lower due to attendance and not the program that was used in the classroom. The researcher also believed that the number of participants in the study was a threat to validity. The OG based reading program classroom had 17 students using the *Fundations* program, and 16

students in the comparison classroom used *Words Their Way* and Heggerty. The researcher believes that such a small number of students was a limitation of the study. The reliability of the study would have been better if a larger sample size was used. The engagement level of the students in both classes was also a threat to validity. The engagement level of the students could not be measured and would inevitably vary. If students in one room were more engaged than students in a different classroom, the results would show higher growth even if the program was not as effective. The researcher used the *Fundations* program in his classroom for the duration of the study. I believed that being the teacher and researcher was a conflict of interest and a threat to the validity of the study.

The researcher used a convenience sample. The sample was limited to two classrooms. There were no additional classrooms that could be added to the study based on the school district's preference for the reading programs being used during the 2018-2019 school year. The makeup of the researcher's class and the classroom using *Words Their Way* and Haggerty was chosen by the administration in the summer of 2018. There was nothing that the researcher could do to address the makeup of each class.

Setting

In order to remain compliant with School District Policy, the researcher titled that school with a fictitious name, Woodoak Elementary School. Renaming the school allowed the district, staff, children, and parents involved in the research to stay anonymous. The study site was an elementary school located in Missouri. The sample population of the school district was less than 10,000 residents. The median income per household was above 50, 000 dollars per year. The residents in the town were

approximately 80% white, 5% black, and 15% Asian and other (Stats of U.S. Cities, 2009).

Sample Demographics

The school in this study had students in Kindergarten through Fifth grade. Four hundred and eighty-seven students attended this school. The study used a convenience sample. The researcher used the *Fundations* program with the students in his classroom. The comparison group received instruction with the Heggerty *Phonemic Awareness Program* and the *Words Their Way* Program.

The student demographics at the elementary school consisted of roughly 60% white, 20% African American and 5% to 7 % Hispanic, Asian and other. Forty-one and three tenths percent of the students received free and reduced lunches (St. Louis Post-Dispatch, 2019).

The student demographics of the OG based program (*Fundations*) consisted of 47.1% white, 35.3% African American, .058% Hispanic, and .12% Asian. The comparison group using the Heggerty *Phonemic Awareness Program* and WTW consisted of 94.1% white and .058% African-American.

Summary

This study was conducted to determine if student success was impacted by the use of an Orton Gillingham-based curriculum (*Fundations*). The information gathered in this study was used to determine the positive and negative impacts of using an Orton Gillingham based-curriculum (*Fundations*) versus the *Words Their Way* and the Heggerty *Phonemic Awareness Program*. In Chapter Two, a review of the literature is presented. The theoretical framework and theorists impacting this study are explained. A timeline

for the development of the Orton Gillingham instructional model is shared. Reading instruction in classrooms, at the time of this writing, is discussed, and trends in American education are outlined. Issues facing students and educators in reading instruction are overviewed. The importance of identifying impaired readers at an early age is reviewed, along with information about the *Fundations* Reading Program.

Chapter Two: Review of Literature

Introduction

Dyslexia is a topic that has been heavily researched. Reading scientists discovered common traits associated with students that were dyslexic (Rief & Stern, 2010, pp. 11-15). Dyslexia research led to students being identified with reading impairments at younger ages (Rief & Stern, 2010, p. 27; Reid, 2016, p. 58). Studies showed that the early identification of students with dyslexia led to better educational outcomes (Reid, 2016, p. 58).

Researchers also created programs designed to remediate the weaknesses that dyslexic students had in reading. Many of the programs were based on the OG instructional method. There were numerous studies that discussed the effectiveness of the Orton Gillingham instructional method. While the OG studies shed light on the instructional practices, they did little to show that OG-based instructional programs were better than alternative reading programs. There was a limited body of research that proved the OG instructional method was more effective for students with dyslexia than an alternative reading program (Ritchey & Goeke, 2006, p. 181; Ring et al., 2017, p. 384).

The goal of this literature review was to provide a summary of information needed for the reader to be able to judge the effectiveness of an OG instructional program. The review begins with a historical overview of reading instruction and the fundamental concepts of reading. The significance of remediating students with dyslexia is also discussed, as well as the importance of identifying students at-risk for reading disabilities at an early age. Also included is the theoretical foundation of the OG

instructional method, specifically how the OG method uses a multi-sensory approach to learning. Finally, an OG-based instructional program, *Fundations,* is reviewed. The lack of studies proving that OG-based programs worked better than alternative readings programs is discussed as well. The literature outlines the need for a comparative analysis to shed light on the effectiveness of OG-based instructional programs.

Historical Overview of Reading Instruction

The schools within our nation have a long and ever-changing history of language arts instruction. Parents, teachers, and lawmakers tried to combat the ill effects of illiteracy for many years. Castle, Rastles and Nation (2018) explained, "The indirect costs are far greater because the failure to attain satisfactory literacy blocks people from acquiring basic knowledge, such as understanding information about hygiene, diet, or safety" (p. 5). As a result, our language arts curriculum continually shifted as policymakers tried their best to make sure that all of our children learned to read.

One of the first instructional methods used in the 1900s to teach the language arts was oral reading (Farris & Werderich, 2011, p. 7). The emphasis of oral reading instruction continued for almost 20 years. In 1920, there was a shift in the preferred language arts instruction method.

Silent reading instruction rose to prominence in 1920 (Farrall, 2012, p. 15; Farris & Werderich, 2011, p. 7). Farrall (2012) explained, "In 1908 Edmund Burke Huey (1870 – 1913) of the United States published the *Psychology and Pedagogy of Reading*, the first definitive text on reading" (p. 15). In *Psychology and Pedagogy of Reading,* Huey explained that he believed oral reading might cause significant harm to children (as cited

in Farrall, 2012, p. 15). Henceforth, the instructional method of choice became silent reading instruction for the language arts.

Almost 20 years later, there was another shift in the Language Arts instruction. During World War II, it was discovered that many soldiers were illiterate. The illiteracy of the soldiers greatly concerned the government and citizens. Once again, the focus of language arts instruction shifted (Farris & Werderich, 2011, p. 7). The national concern for reading led to the development of basal readers.

Scott-Foresman developed basal readers as an answer to the nation's issue with illiteracy (Farris & Werderich, 2011, p. 7). Basal readers included a teacher's manual, student workbook, and controlled vocabulary and sentence patterns (Farris & Werderich, 2011, p. 8). The basal reader framework focused on the use of explicit instruction with student workbooks, texts, and phonics instruction. Teachers were given systematic scripted lessons to use each day. During this time, Chall (1967) proved the use of a systematic and explicit phonics program worked well with beginning readers (p. 307). Basal readers were used for many years in the classroom as an effective way to teach the language arts.

In the 1980s, the whole language instructional approach to the language arts became important. The whole language approach to literacy focused on meaning and reading strategy instruction. Farrall (2012) explained, "While there is no formal definition of the term whole language, it is generally acknowledged that whole language teachers work hard to motivate children to construct their own meaning by immersing them in rich language and literary traditions" (p. 15). Whole language advocates believed the strength of this reading program was that teachers creates their lessons based

on the needs of their students. Whole language advocates believed students made significant growth because their lessons were less disjointed. The whole language approach strove to make all lessons and skills meaningful (Goodman, 1986, p. 372; Goodman, 2011, p. 21). While many teachers and experts in the field of literacy were excited about the whole language process, others believed it was an incomplete instructional method. Farrall (2012) explained, "Whole language instruction, however, is also defined by what it is not, and for most whole language proponents, it does not include direct instruction in phonics" (p. 15). Many experts refused to accept that the whole language instructional method was superior to teaching phonics to children.

As the whole-language approach to teaching reading started to gain steam, it caused what many experts refer to as the "Reading Wars." Goodman (2011) stated, "The "reading wars" were declared, with national magazines proclaiming that whole language was at war with the true science of synthetic phonics" (p. 23). On one side of the debate were instructors who believed in explicit, systematic phonics instruction. On the other side were the believers of the whole language instructional method (Castles, Rastle, & Nation, 2018, p. 5).

In 1984, a report titled, *Becoming a Nation of Readers: The Report of the Commission on Reading,* was published. The key finding of the report was that the use of meaningful texts and phonics instructions should be a key component of a child's schooling (Farris & Werederich, 2011, p. 8; National Academy of Education & Anderson, 1985, p. 118). However, even after the publication of *Becoming a Nation of Readers: The Report of the Commission on Reading*, the debate over how to best teach reading continued.

The debate raged on about using the whole language approach vs. phonics instruction. The "Reading Wars" led to a government study by Adams (1990). Adams (1990) wanted to settle the whole language vs. phonics debate definitively. However, what Adams (1990) discovered in her work, did not satisfy either side of the debate. Adams (1990) explained, "Approaches in which systematic code is included along with the reading of meaningful, connected text result in superior reading achievement overall, for both low-readiness and better-prepared students" (p. 125). Adams (1990) also concluded that there should be a balance between reading and phonics instruction (p. 125). While Adams (1990) did not settle the "Reading Wars" debate, she did prove that the use of meaning and phonics were both needed for a child to effectively learn how to read.

In the 1990s, a balanced literacy approach gained prominence. A balanced literacy approach emphasized both phonics instruction and reading comprehension strategies (Farris & Werederich, 2011, p. 9). The balanced literacy approach aligned with the report that Adams published in 1990.

The balanced literacy approached gained more steam when Snow, Burns, and Griffin (1998) published *Preventing Reading Difficulties in Young Children*, in 1998. Snow et al. (1998) outlined the most important instructional strategies in the language arts. Snow et al. (1998) believed that teaching phonics, fluency, comprehension, and monitoring understanding were the most important instructional components to include in a language arts instructional program (p. 314).

In the year 2000, research once again changed the way schools and teachers viewed the teaching of the language arts. During this time, the National Reading Panel

(NPR) issued a report on the best reading practices. The NPR (2000) proved in their report that phonemic awareness, phonics, fluency, vocabulary, and reading comprehension instruction were the building blocks of teaching literacy (2-6, 2-120, 3-18, 4-20, 4-46). When the NPR completed their report, "The Reading Wars" should have ended. However, despite a significant amount of evidence that supported the use of phonics, many teachers continued to resist this evidence-based instructional method.

At the time of this writing, it was clear that phonics instruction did improve language arts achievement. The NPR suggested that students learned best when phonics, phonemic awareness, fluency, vocabulary, and reading comprehension strategies were part of the reading program. However, many teachers continued to resist teaching phonics despite the overwhelming amount of scientific evidence that proved that it worked. Castle et al. (2018) argued that teachers continued to resist teaching phonics, because they did not understand how it worked, and because teachers did not understand how to scaffold phonics instruction (p. 6). Castle et al. (2018) predicted that when teachers began to understand that learning to read was a multi-faceted process, they would be more apt to teach phonics (p. 6). When teachers began to use phonics in conjunction with phonemic awareness, fluency, vocabulary, and reading comprehension instruction, our students would benefit from a balanced form of literacy instruction that included all of the fundamental reading concepts outlined by the NPR.

Fundamental Reading Concepts

Phonological Awareness. Phonological Awareness is a foundational skill that children needed to develop to become successful readers. Moritz, Yomplosky, Papadelis, Thomson, and Wolf (2012) explained,

> Phonological awareness (PA) is the ability to segment the flow of speech over time into words, syllables, and phonemes (the individual sounds within words, such as /k/, /a/, and /t/ in the word cat), to blend phonemes (e.g., blend /k/, /a/, and /t/ into cat), and to manipulate segmented speech sounds (e.g., say cat without saying /k/ to produce at). (p. 741)

Phonological Awareness was important because children must be able to hear and produce the sounds in words in order to read them.

Phonological awareness encompassed a variety of skills children must understand to become proficient readers. Phonological awareness encompassed the students being able to understand that words made sounds and attending to those sounds, breaking words into syllables, and onset and rime manipulation (Schuele & Boudreau, 2008, p. 6). A more advanced skill within the realm of phonological awareness was phonemic awareness. Phonemic awareness was the ability to identify, segment, and blend phonemes (Schuele & Boudreau, 2008, p. 6; Dessemontet, Chambrier, Martinet, Moser, & Bayer, 2017, p. 476). The ability to blend and segment phonemes was critical to the development of learning how to read.

Researchers agreed that Phonological Awareness instruction should start in preschool to build a foundation for reading skills. Schuele and Boudreau (2008) stated, "Classroom-based phonological awareness instruction aims to establish a foundation of ability on which to build decoding and spelling skills in the early elementary grades" (p. 7). Melby-Lervag, Lyster and Hulme (2012) found, "Accepting that phonemic skills are one causal influence on the development of reading skills leads directly to recommendations that these skills should be directly taught to children in the early stages

of learning to read" (p. 342). Researchers agreed that phonemic awareness was an important early literacy skill that students must develop to become proficient readers. Students that were unable to grasp this skill, typically lagged behind their peers in reading achievement. When children were unable to manipulate the sounds in spoken words, it made the task of decoding much more difficult.

Phonics. Phonics knowledge was an essential component of becoming a fluent reader. Students that were proficient in phonics recognized that letters made sounds and manipulated those sounds to make and read words (Elderedge, 2005, p. 161; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001, p. 56). When students understood the letter-phoneme connection, they were more easily able to decode unknown words (Elderedge, 2005, p. 161; Rayner et al., 2001, p. 56). When students developed a proficiency in phonics, it was more likely that they would become proficient readers.

Many researchers were critical of the phonics approach. Castle et al. (2018) argued that many teachers continued to resist phonics instruction, because they did not understand how to teach it without using a "rote" method (p. 6). Many critics believed that teaching students to connect letters and phonemes was boring. Rayner, Forman, Perfetti, Pesetsky, and Seidenberg (2001) stated,

> The reason for this criticism is the emphasis phonics places on letter-sound correspondences at the expense of reading for meaning. However, this complaint is more often about the practice of phonics lessons, which are often derided as "rote drill," than about the essence of the approach. (p. 56; Bowey, 2006, p. 80)

However, reading scientists proved an explicit and systematic approach to phonics instruction was necessary and did work.

The essence of the phonics approach was teaching systematically to help students decode words in books. Ehri, Nunes, Stahl, and Willows (2001) stated, "Findings of the meta-analysis support the conclusion that systematic phonics instruction helps children learn to read more effectively than non-systematic or no phonics instruction" (p. 427). Ehri and Flugman (2017) proved that when students used a systematic phonics program, their reading achievement significantly increased (p. 446; NPR, 2000, pp. 2-112). In conclusion, phonics was a foundational skill in reading that gave students the ability to read words accurately.

Fluency. The NPR proved that fluency was a foundational skill of reading. The National Read Panel (2000) explained that fluent readers could read quickly, accurately, and with expression (p. 3-1). Hudson, Lane, and Pullen (2005) explained, "Reading fluency is one of the defining characteristics of good readers, and a lack of fluency is a common characteristic of poor readers" (p. 702). When children read fluently, they were more likely to comprehend the text that they were reading, because they did not have to stop and decode words.

When children read words efficiently, they had more cognitive resources available to attend to the text. When children could use more cognitive resources to focus on the meaning of the text, their reading comprehension improved (Arens, Grove, & Abate, 2018, p. 54). Fluent readers could smoothly read words and comprehend at the same time (Klauda & Guthrie, 2011, p. 310; NPR, 2000, pp. 3-8). Readers that lacked fluency typically only focused on either decoding or comprehension. When readers were not fluent, they struggled to read and understand the text (Klauda & Guthrie, 2011, p.

312; NPR, 2000, pp. 3-8). Researches agreed that various instructional methods were effective in increasing student reading fluency.

Reading research supported the use of repeated readings to enhance reading fluency for students. Therrien (2004) explained, "This analysis indicates that repeated reading can be used effectively with nondisabled students and students with learning disabilities to increase reading fluency and comprehension on a particular passage and as an intervention to increase overall fluency and comprehension ability" (p. 252). Repeated reading worked well and had the best results when students read for meaning while developing fluency. Furthermore, when repeated readings were connected to motivation, students were able to make a significant amount of fluency progress (Rasinski, 2006, p. 705).

Many reading scientists believed that repeated readings could be even more effective if we took motivation into account. Rasinski (2006) explained that reader's theater motivated students to complete repeated readings more often, because children wanted to perform well in front of their peers (p. 705; Hudson, Lane, & Pullen, 2005, p. 711). Reader's Theater was the process of performing a written text in front of an audience. Research also outlined that students made significant progress in their reading rate while using reader's theater (Hudson et al., 2005, p. 708; Rasinski, 2006, p. 705). Rasinski (2006) explained that when repeated readings and motivation were intertwined, fluency for students significantly increased (p. 705).

Castles, Rastle, and Nation (2018) also explained that sight word automaticity led to improved fluency (p. 24). Castles et al. (2018) argued that when children could quickly and easily read sight words, they were more likely to be able to read

independently (p. 24; Hudson et al., 2005, p. 703). Pikulski and Chard (2005) further illustrated this concept by stating, "If developing readers cannot instantly identify these words, they are unlikely to become fluent" (p. 514). Children who were able to read independently, felt positive about their reading skills. When children felt more positive about their reading skills, they read more often. While sight word automaticity and wide reading were important, reading for meaning helped to develop fluency as well.

An additional factor involved in reading fluency was morphology. Morphology and fluency were linked, because when students understood what they were reading, they read more fluently. Castles et al. (2018) explained that they "believe that, because of the importance of morphology in relating word forms to their meanings, there is an argument for explicit instruction on this aspect of the writing system" (p. 25). Therefore, there was a benefit to teaching students how to understand the meaning of words to further develop their reading fluency.

The key to developing fluency was to not work on reading words in isolation. Instead, teachers must develop fluency by working on multiple factors. Rasinski (2006) stated, "I think that instruction on accuracy, automaticity, and prosodic reading can and should occur in unison—in an integrated and synergistic manner" (p. 705). When children were motivated to read often and had explicit instruction in word automaticity and morphology, they were more likely to become fluent readers.

Vocabulary. Many teachers refer to vocabulary as 'knowing a word.' However, vocabulary encompasses much more than just 'knowing a word.' Aarnoutse et al. (2001) explained, "Vocabulary refers to the knowledge of lexical meanings of words and the concepts connected to these meanings" (p. 63). Vocabulary development and knowing

the meaning of words in context is necessary to become a proficient reader. When children develop strong semantic skills, they are more likely to be successful in school (Storch & Whitehurst, 2002, p. 934; Wasik & Iannone-Campbell, 2012, p. 322). Most children acquire vocabulary from their experiences and adult feedback (Wasik & Iannone-Campbell, 2012, p. 322). However, children that have difficulty acquiring vocabulary have been found to be at-risk for reading delays.

One of the greatest predictors of reading success was the number of words a child knows by the by the time that they enter preschool. Storch and Whitehurst (2002) argued that a child's vocabulary knowledge in preschool strongly related to a child's ability to learn how to read (p. 934). Whitehurst and Lonigan (1998) explained that vocabulary knowledge was important in preschool, because knowing words helped children to understand the meaning of a story (p. 850). Children that understood fewer words were unable to grasp content read and discussed in the classroom while their peers with significantly larger vocabularies understood the text and easily increased their semantic knowledge. Children with larger vocabularies acquired words easily while children with smaller vocabularies had more difficulty in learning new words (Lee, 2011, p. 70). Lee (2011) characterized early vocabulary acquisition by stating. "The rich get richer, and the poor get poorer" (p. 70). When children understood fewer words than their peers, they were at a disadvantage when it came to comprehending texts. Fortunately, teachers could provide interventions for children who have vocabulary deficits.

Research supports specific strategies to help children acquire vocabulary. Teachers should provide students with many ways to use words in meaningful ways. Teachers should also explicitly teach vocabulary and provide feedback to students

learning new words (Wasik et al., 2012, p. 331). The use of read-alouds in the classroom was one of the best ways for students to acquire vocabulary words (Meng, 2015, p. 92; Wasik et al., 2012, p. 331). The vocabulary terms in books could also be discussed on multiple occasions while the teacher provides feedback as necessary (Wasik et al., 2012, p. 331). Vocabulary acquisition significantly increased when children were placed in an environment that encouraged word learning. When children had strong vocabulary knowledge, they were also better able to comprehend the stories that they were reading.

Reading Comprehension. Reading comprehension allows the reader to develop meaning while reading a text. Reading comprehension is an important skill that leads to academic success. When readers were unable to comprehend a text, it became difficult for students to accomplish reading tasks that met the teacher's expectations. An impairment in reading comprehension made it difficult for a student to understand the text (Lopez & Campoverde, 2018, p. 105). When readers were unable to comprehend text, they had difficulty acquiring academic knowledge.

Reading comprehension relied on two different skills for learners to be successful in finding meaning within a text. Students must use decoding and oral language skills to comprehend a book. When students decoded words easily, they had more cognitive resources available to comprehend the text (Wooley, 2010, p. 119). When students spent an inordinate amount of time decoding, their reading comprehension suffered. Students must also have strong language skills to comprehend books properly.

Students that had strong oral language skills comprehended stories accurately. Many researchers referred to this as listening comprehension. Listening comprehension and strong decoding skills were required to comprehend a text. Kendeou, Broek, White,

and Lynch (2009) reported, "With respect to theoretical implications, they show that successful reading comprehension depends on decoding skills, such as phonological awareness and letter and word identification, but also on oral language skills such as vocabulary and discourse comprehension" (p. 775). Therefore, the strongest literacy programs promoted both the development of decoding with automaticity and language skills so that both processes could be intertwined. When students developed both decoding and language skills, they were more likely to become proficient at comprehending stories (Kendeou, Broeck, White & Lynch, 2009, p. 775; Verhoeven and van Leeuwe, 2008 p. 419-420). When students comprehended texts, they read to learn and were much more successful at learning academic content at school.

Summary of The Fundamental Concepts of Reading. The fundamental concepts of reading included phonological awareness, phonics, fluency, vocabulary, and reading comprehension. The NPR drew the conclusion that using the five foundational skills of reading would significantly help students to become proficient readers. While the research from the NPR helped teachers use evidence-based practices in the classroom, it has not helped all students to become excellent readers. Many students continued to struggle with reading in school. Many reading experts believed that students continued to struggle in reading, due to the underlying processes involved in reading.

Underlying Processes

When students struggled with reading, many of the underlying processes were to blame. The underlying processes included Rapid Automatic Naming (RAN), Letter Sound Automaticity (LSA), phonological memory, and the use of oral language. When

teachers looked at the underlying processes of reading, it became easier to identify children who were at-risk for reading impairments (Farrall, 2012, p. 191).

Rapid Automatic Naming. Rapid Automatic Naming was known to be a strong predictor of reading achievement. Henry et al., (2018) stated,

> Rapid automatized naming (RAN) is a robust predictor of reading ability across languages, ages, and levels of skill. Performance in this task is typically defined as the time it takes participants to name a series of objects, colored squares and/or alphanumeric characters presented in a grid." (p. 1620)

Henry et al. (2018) understood that RAN was an important predictor of reading success. However, experts disagreed about how RAN connected to reading.

RAN was controversial in reading, because many experts disagreed about the underlying processes that contributed to Rapid Automatic Naming. Arnell, Joanisse, Klein, Busseri, and Tannock (2009) argued, "Thus, despite the strong emphasis that has been placed on understanding the role of phonology in reading, RAN appears to tap a neuro-cognitive mechanism that is independent of phonology but that nevertheless plays an important role in reading development" (p. 174). Reading scientists continued to disagree about how RAN and reading were connected.

Georgiou, Parrila, and Papadopoulos (2016) studied the link between RAN and phonological processing, orthographic processing, and speed processing (p. 1794). Georgiou et al. (2016) concluded that the research in the field did not support the link between RAN and phonological processing, orthographic processing, and speed processing (p. 1794). However, Georgiou et al. (2016) did find a connection between speed processing and reading fluency (p. 1794). Georgiou et al. (2016) stated, "However,

when operationalized with speeded measures, it explained part of RAN's predictive value in reading fluency" (p. 1796). While researches argued about how RAN related to reading, they all agreed that the use of a RAN assessment could be used to accurately predict which children were at-risk for reading disabilities. However, it was clear that RAN should be studied more carefully in how it related to speed processing. Another area closely related to RAN was LSA – Letter Sound Automaticity.

Letter Sound Automaticity. It was important that children develop automaticity in their reading skills. Children that could automatically identify letters, sounds, and words could process text quickly and accurately. Children who were able to quickly identify letter sounds were more likely to become better readers. In Wolf's (2015) study, she determined that the children who were better able to decode single letters were also able to read Consonant-Vowel-Consonant (CVC) words more accurately (p. 12). Wolf's study proved that children that had letter-sound automaticity were also better word decoders (p. 12). When children did not have automaticity between letters and the sounds that they made, it could impair their reading. Children that had dyslexia were typically delayed compared to their peers in making letter-sound connections.

Researchers agreed that children with dyslexia were less automatic in connecting letters to their sounds. Bakos, Landerl, Bartling, Schulte-Korne, and Moll (2017) argued, "Automated letter-speech sound associations are likely to play a crucial role for fluent reading given that fluent reading requires fast access from the visually presented letter or word to its phonological form" (p. 2). Blomert (2011) explained, "Early reading failure thus may relate to an early problem in setting up effective connections between brain

areas involved in letter and speech sound processing" (p. 696). Additionally, there was a strong connection between LSA and letter writing automaticity.

Researchers believed, if a child could quickly access letter sounds stored in working memory, then they would be able to use less cognitive resources to spell words. Kim et al. (2013) believed that even though letter writing was a motor-based skill, letter-sound impairment would make it difficult to spell words. Therefore, having a strong knowledge of letter sounds would make it significantly easier for a student to write and spell unknown words. Kim et al. (2013) believed that having a strong LSA would free up cognitive resources to spell and write (p. 238). It was revealed in Kim et al.'s (2013) study that there was a moderate connection between LSA and letter writing automaticity (p. 251). However, it was clear that there was more research that was needed in this area to bring attention to the connection between the two processes.

While LSA and RAN highlighted processing speeds, they did not explain how a phonological processing impairment affected reading. The double-deficit hypothesis developed by Wolf and Bowers (1999) tried to bring further attention to the connection between RAN and phonological processing.

Double-Deficit Hypothesis. The Double-Deficit Hypothesis (DDH) was created to shed additional light on the process of how RAN related to reading impairment. Researchers consistently agreed that phonological processing was the main source of reading impairment. However, it was also well known that assessing RAN was highly predictive of reading impairment as well. Many researchers believed that RAN was actually a phonological processing task that was not a separate impairment.

However, some theorists believed that RAN and phonological processing were separate entities. RAN and phonological processing deficits caused a great struggle in learning how to read. Wolf and Bowers (1999) argued,

> In this article, we propose an alternative, integrative view—the double-deficit hypothesis—that phonological deficits and the processes underlying naming speed are separable sources of reading dysfunction, and their combined presence leads to profound reading impairment. (p. 415)

The Double-Deficit hypothesis led many researchers to study the connection between dyslexia, RAN, and phonological processing.

Wolf and Bowers (1999) created subtypes to help explain the double-deficit hypothesis. The "average" group had no deficits and average reading skills (p. 416). The "rate group" subtype had RAN impairment, but good phonological skills and poor reading comprehension (Wolf & Bowers, 1999, p. 416). The "phonology" subtype had intact naming speed (Wolf & Bowers, 1999, p. 416). The "double-deficit" subtype had RAN, phonological-decoding, and severe comprehension impairment (Wolf & Bowers, 1999, p. 416). Wolf and Bowers (1999) believed it was important to research how both RAN and phonological process affected reading. Wolf and Bowers (1999) explained, "A major implication of the conceptualization described in this article is that phonological deficit readers will benefit most from current phonological-based interventions, but that naming-speed deficit and double-deficit readers will be less comprehensively diagnosed and less fully remediated" (p. 430). Wolf and Bowers believed, if we could separate both skills, it would lead to the creation of better reading interventions for struggling readers.

Many researchers tried to validate Wolf and Bowers' DDH in the last 19 years. Nelson (2015) conducted an experimented that evaluated the DDH and all of the subtypes. Nelson (2015) concluded that the DDH did have value. However, it should be used with other theories to give researchers a better understanding of dyslexia (p. 175; Araujo, Pacheco, Faisca, Petersson, & Reis 2010, p. 451). While the DDH accounted for both phonological processing and processing speed, it did not account for the underlying process of language development and reading.

Language Development and Reading. Language skills provided the foundation for reading proficiency. When children have difficulty processing and using language, their ability to read may be impaired. Murphy, Justice, O'Connell, Pentimonti, and Kaderavek (2016) stated, "Given such relations, it is not surprising that there is a relatively high degree of overlap between reading and language disorders" (p. 1436). Language impairment (LI) difficulties follow children throughout their entire lives. Typically, their achievement was worse than their typically developing peers. Murphy et al. (2016) stated, "Taken together, there is substantial evidence showing that children with LI are susceptible to reading difficulties and that these difficulties have long-term academic, educational, and employment ramifications" (p. 1436). Children that had dyslexia were often delayed in their language development (Shaywitz, 2005, p. 94). When children had delayed language, it put them at significant risk for a reading impairment (Colenbrander, Ricketts, & Breadmore, 2018, p. 819).

Language was one of the underlying processes that contributed to dyslexia. Gallagher, Frith, and Snowling (2000) studied children that at risk for having dyslexia (p. 204). Gallagher et al. (2000) discovered that language skills were highly related to

reading impairment in these children (p. 210). Gallagher et al. (2000) proved that language was an underlying process in reading that could negatively impact reading (p. 210). When dyslexic students had an impairment in reading growth, there were significant problems that can occur.

Significance of the Problem

Dyslexia had a significant impact on the development of individuals. McNulty (2003) stated, "Failures in school and other important areas of life led to the individuals' feeling as if others felt something was wrong with them. This feeling resulted in low self-esteem. In more intense circumstances, it felt traumatic" (p. 376). Students with dyslexia were more likely to have disadvantaged employment opportunities and would not have as many opportunities for participation in public life (Neef, et al., 2017, p. 63). Students that were dyslexic also had a negative view of their academic self-concepts (Burden, 2008, p. 194). Others often had a negative view of people that had dyslexia, due to its invisible nature. Nalavany, Carawan, and Sauber (2013) stated, "Certainly individuals with dyslexia fit among the vulnerable groups living with invisible stigma" (p. 569). Dyslexic students started to develop a negative view about themselves, even before they started elementary school (McNulty, 2003, p. 376).

The significance of the problems associated with dyslexia start in early childhood. Students were asked to participate in class and were unable to do so. Dyslexic students often had difficulty completing tasks in a school setting which was often observed by teachers and other students (McNulty, 2003, p. 367). McNulty argued, "This potential experience will affect the sense of self and self-esteem in a negative way, leaving the child with a very early sense that 'something's different about me' or 'something's wrong

with me'" (McNulty, 2003, p. 367) When children felt like something was wrong with them, it could negatively impact their self-esteem, especially when they go to elementary school.

When dyslexic children begin elementary school, their achievement often lagged behind their peers. Dyslexic students often went unidentified for specialized reading instruction until they were older. When children go unidentified as being at-risk for dyslexia, numerous problems may occur. McNulty (2003) stated, "The symptoms related to dyslexia definitely become apparent by school age. Discovery of the learning disability was a process that inevitably involved time and the experience of difficulties or failures" (p. 377). Once children begin to fail in a classroom full of peers, they become self-aware of their learning deficits. Learning struggles led to other children identifying children that had dyslexia, which could lead to additional struggles. Singer (2005) explained:

> Moreover, being different makes a child vulnerable to bullying-a fact that children with dyslexia are very much aware of. It is probable that their lowered self-esteem makes them extra sensitive to being laughed at or teased and, thus, easily hurt. (p. 421)

The experience of failure and low self-esteem was devastating to young children. Dyslexic children also suffered; due to the inordinate amount of time it typically took them to be identified.

The greatest issue with dyslexia in schools, at the time of this writing, was that students must struggle before they were identified for a great length of time (McNulty, 2003, p. 376). Identifying dyslexic children at a young age improved their educational prognosis. Dyslexic children that did not receive help at a young age went through

various struggles. The struggles that dyslexic children faced led to a negative self-concept and a lack of positive feelings towards learning.

Students that had dyslexia were found to have negative experiences when it came to attending school. Humphrey (2002) found the following:

> In addition to the increased likelihood of a good educational prognosis for a child identified early in life (and, therefore, a more positive sense of self), we could also spare children with dyslexia some of the humiliation and trauma that they experience prior to identification. In the interviews I conducted with children with dyslexia (Humphrey, manuscript b), I found that the vast majority had had extremely negative experiences at school before they had been properly identified. Most worryingly, many of these experiences involved their class teachers calling them stupid, lazy or slow. (p. 35)

Children that heard negative comments about their learning from peers and teachers often came to believe that the comments were true (Humphrey, 2002, p. 35). Therefore, it was essential that schools identify dyslexic students at an early age. If schools were able to identify children at risk for dyslexia, they would be able to avoid various negative outcomes, such as negative feelings about school, disadvantaged employment, and poor self-esteem.

The best way to help a child that was at-risk for dyslexia was early identification. Humphrey (2002) stated, “In conclusion, I firmly believe that a combination of early identification, a more appropriate educational environment and, where necessary, intervention to enhance the developing self, can provide a grounding for children with dyslexia to feel valued and achieve excellence” (p. 35).

Early Identification of At-Risk Readers

When students had difficulty mastering the foundational skills of reading, it put them at risk of not making adequate yearly progress. When students fell behind in reading, they had a difficult time catching up to their peers. Schaars, Segers, and Verhoeven (2017) argued, "First, results show that children at risk for later reading problems should be screened early" (p. 157). Therefore, it was imperative that teachers identified at-risk readers as soon as possible. Early identification of dyslexic students led to better success in reading (Neef et al., 2017, p. 63).

Early identification and interventions were important for children that had dyslexia. Students that were dyslexic often had difficulties with letter-sound knowledge, decoding words, phonological awareness, and comprehending stories. The International Dyslexia Association (2002) defines dyslexia:

> Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge. (para.1)

The state of Missouri recently reviewed a plethora of research concerning dyslexia and negative outcomes. In the year 2018, Missouri passed legislation to identify students that were at-risk for dyslexia at an early age.

Early Identification in Missouri

The state of Missouri created a dyslexia task force formed to make recommendations to the schools about how to best help children with dyslexia. The task force argued that all young children in school should be screened for dyslexia (MO Dyslexia Law, 2017, para. 2). The dyslexia task force's recommendations were important because a significant portion of the population had dyslexia. Shaywitz (1998) stated, "Dyslexia is perhaps the most common neurobehavioral disorder affecting children, with prevalence rates ranging from 5 to 10 percent to 17.5 percent" (p. 338). The task force believed that if the state of Missouri could identify dyslexic students at an early age, they would have less negative learning outcomes.

Starting in the 2018-2019 school year, all schools became required to use a screening process to identify students that were at-risk for dyslexia and provide proper support for them. House Bill 2379 stated, "In the 2018-19 school year and subsequent years, each public school, including each charter school, shall conduct dyslexia screenings for students in the appropriate year consistent with the guidelines developed by the department of elementary and secondary education" (p. 1). The state of Missouri came up with a list of traits that would help identify children that were considered at-risk for Dyslexia.

Missouri considered children at-risk for dyslexia in the first grade when they had difficulty in the areas of phonological awareness, sound/symbol recognition, alphabet knowledge, word recognition fluency, orthography, and reading comprehension. The work in the field of early identification found that the greatest predictors of students that were at risk for dyslexia were measures of phonological awareness, letter knowledge, and

rapid automatic naming (Puolakanaho et al., 2007, p. 929; Thompson, Hulme, Nash, Gooch, Hayiou-Thomas, & Snowling, 2015, p. 983).

The state of Missouri developed a screening plan to help school districts identify children at-risk for dyslexia. Schaars et al. (2017) stated, "Second, curriculum-embedded measurement is a sensitive and efficient method to identify individual differences in beginning first-grade reading development" (p. 157). The state of Missouri recommended that school districts screen students in the areas of phonological awareness, letter naming fluency, letter-sound fluency, rapid automatic naming, phonics, reading comprehension, word recognition fluency, orthography, and a checklist of characteristics (Missouri Dyslexia Screener Guide, 2018). The screeners recommended by Missouri included sensitive and efficient tests to help identify students that were at-risk for dyslexia. Students that were identified for being at risk for dyslexia would receive research-based interventions in reading.

Early Interventions

It was imperative that dyslexic children were identified quickly. All children deserved the best education possible. For children with dyslexia that meant early identification and having resources available to provide effective interventions.

It would be best if the intervention began in early childhood, rather than a school setting. McNulty (2003) argued, "Early childhood specialists in various disciplines should be educated regarding these same signs and be prepared to intervene or obtain assistance for immediate difficulties" (p. 376). Schaars et al. (2017) explained, "Furthermore, explicit instruction and extra attention for children at risk needs to be provided from the very beginning" (p. 157). When children had effective interventions at

the beginning of the school years, it gave them a chance to make progress and lift the burden of failure.

When children were identified early and given appropriate interventions that were much more likely to be successful. Shaywitz and Shaywitz (2008) stated:

> In summary, these data demonstrate that an intensive evidence-based reading intervention brings about significant changes in brain organization so that brain activation patterns resemble those of typical readers. These data have important implications for public policy regarding teaching children to read: The provision of an evidence-based reading intervention at an early age improves reading and facilitates the development of those neural systems that underlie reading. (p. 1340)

Dyslexic children needed explicit, research-based interventions to be successful in school. The pioneers of developing a curriculum for children with dyslexia were Samuel Orton and Anna Gillingham, who created the Orton-Gillingham instructional method of teaching reading.

Historical Overview of Orton-Gillingham Instruction

Orton was a pioneer in the field of identifying children with learning disabilities. Orton identified several areas of reading deficits that were used to identify children with dyslexia, at the time of this writing. Orton became interested in children that had *strephosymbolia* (twisted symbols) (Henry, 1998, p. 6; Ritchie & Goeke, 2006, p. 171). The children Orton worked with would confuse letters such as “b” and “d.” Orton was interested in why children that presented with a normal intelligence had reading difficulties. He concluded that there was a connection between language disorders and

reading disabilities. Orton was one of the first medical professionals to claim that it was not vision, but rather language that led to difficulties associated with reading and *strephosymbolia* (Henry, 1998, p. 6).

Orton and Hinshelwood agreed that some children had "word blindness" that was not related to intelligence (Mather & Wendling, 2012, p. 24). Orton and Hinshelwood described word blindness as a deficit in the brain where words were stored (Mather & Wendling, 2012, p. 24). Orton elaborated on the concept of word blindness by stating that it ranged from mild to moderate and was related to differences in how the brain worked (Mather & Wendling, 2012, p. 25). Orton also believed that children that had word blindness were also mistakenly given a lower assessment of their intellect, due to unfair psychometric tests (Mather & Wendling, 2012, p. 25). Orton used this information to conduct further research on children that exhibited word blindness.

When Orton did further research, he noticed that many children had difficulty with recalling and reading letters. Specifically, Orton noticed that many children had poor recall of the orientation and sequencing of the letters (Mather & Wendling, 2012, p. 25). Orton believed that children with reading difficulties did not have a dominant left side of the brain. Orton believed that mirror images of words were stored in the right side of the brain (Ritchey & Goeke, 2006, p. 171). The mirror image theory was shown to be inaccurate. Researchers had proven that children with Dyslexia used the right side of their brain to compensate for their lack of letter-sound association (Ritchey & Goeke, 2006, p. 171). Children used the right side of their brain to memorize words they were unable to read. Shaywitz and Shaywitz (2008) stated,

> Dyslexic readers have a disruption in the left hemisphere posterior neural systems for reading but compensate by developing anterior systems in the left and right hemispheres and the posterior homolog of the visual word form area in the right hemisphere." (p. 1344)

Once Orton came up with the theory that children with word blindness exhibited weakness in the left hemisphere of the brain associated with reading, he came up with a method of instruction to correct word blindness.

Theoretical Foundation of Orton-Gillingham Instruction

Orton believed that a multisensory approach to learning would best help children that had word blindness to read. He also believed that children that exhibited difficulties in reading needed a systematic and explicit approach to instruction (Mather & Wendling, 2012, p. 26). Orton believed that when children received a systematic and explicit approach to letter learning, it was less likely that they would confuse letters that looked similar. Orton, took this knowledge to develop the OG instructional approach to reading.

Orton was head of the Language Research Project of the Neurological Institute of New York from 1932 to 1936 (Mather & Wendling, 2012, p. 26). Orton worked with Gillingham at the Neurological Institute to transform his ideas about best instructional practices for children that exhibited word blindness into a multisensory remedial approach to reading instruction (Mather & Wendling, 2012, p. 26). The approach that they collaborated to create was the Orton-Gillingham instructional method.

The Orton-Gillingham Instructional method included various components. Mather and Wendling (2012) explained, "Orton also believed that tracing could help build up the associations between letters and sounds and eliminate the tendency of

children to reverse and transpose letter sequences when reading and spelling" (p. 26). Orton and Gillingham took that information and transformed it into a model that used visual, auditory, kinesthetic, and tactile approaches to learning letters and sounds. Ritchie and Goeke (2006) stated, "A key characteristic of OG reading instruction is that it is multisensory, involving visual, auditory, and kinesthetic/tactile learning pathways, often referred to as the Language Triangle" (p. 171). The teacher showed sounds, the students said the sounds and wrote the letter (Mather & Wendling, 2012, p. 26). The use of multiple senses related to the previously stated belief of Orton that when teachers used a multi-sensory approach to learning in a systematic and explicit approach, there was less chance that students would confuse letters that looked similar (Mather & Wendling, 2012, p. 26).

The Orton-Gillingham approach was later developed into a curriculum. Ritchie and Goeke (2006) stated, "The instructional approach conceived by Orton was developed into a curriculum by Anna Gillingham and Bessie Stillman and first described in the manual, Remedial Training for Children with Specific Disability in Reading, Spelling, and Penmanship (1960)" (p. 171). The manual that Gillingham and Stillman created was currently in its eighth edition and was still used and referred to at the time of this writing (Ritchie & Goeke, 2006, p. 171).

Another important aspect of the Orton-Gillingham approach was the use of data to drive instruction to meet the individual needs of students (Ritchie & Goeke, 2006, p. 171). That meant teachers must constantly assess and use the data to meet the needs of the students in the language arts. The Orton-Gillingham approach also included explicit and systematic instruction in the areas of reading, spelling, sounds, letters, and the

blending of sounds into words (Mather & Wendling, 2012, p. 27). Ritchie and Goeke (2006) explained, "The OG approach is a systematic, sequential, multisensory, synthetic and phonics-based approach to teaching reading. The OG instructional method includes instruction in phonology, phonological awareness, sound-symbol correspondence, syllables, morphology, syntax, and semantics" (p. 171). In conclusion, the Orton-Gillingham approach met the needs of individual children. It used a highly structured literacy format that was systematic and explicit. It taught spelling, sounds, letters, and blending by using a multi-sensory approach to learning.

Multisensory Learning

Dyslexic children often failed to grasp the concepts of the alphabetic principle, phonological awareness, and decoding. Many of the instructional practices used in classrooms did not meet their needs when it came to grasping reading concepts, because they were auditory based. Joshi, Dahlgren, and Boulware-Gooden (2002) explained, "The OG is a multisensory method of teaching language-related skills that focuses on the use of sounds, syllables, words, sentences, and written discourse. Instruction is explicit, systematic, cumulative, direct, and sequential" (p. 231). Advocates of the Orton-Gillingham instructional method believed that multisensory reading instruction worked well to help children develop reading skills, because it involved multiple senses to learn letters, sounds, and decoding.

The multisensory learning in an Orton-Gillingham based classroom included haptic, visual, auditory, and graphomotor instructional methods. (Labat, Vallet, Magnan, & Ecalle, 2015, p. 381). Labat, Vallet, Magnan, and Ecalle (2015) stated, "The majority of research in the field of letter knowledge suggests that traces are more distinctive after a

more multisensory experience (visuo-haptic (VH) and visuo-graphomotor (VG)) than after a visual experience only" (p. 382). The research on letter knowledge showed that by involving multiple senses in learning, it was easier for the children to store the knowledge in their long-term memory. Labat et al. (2015) argued,

> These previous works indicate that multisensory letter knowledge has a positive effect, which cannot be easily explained by the majority of memory models. Conversely, multisensory training effects fit naturally within grounded approaches of memory in which knowledge remains grounded in its sensorimotor features. (p. 381)

Therefore, when children used haptic, visual, auditory, and graphomotor instructional methods, they were more likely to make progress in their reading instruction.

Haptic instruction involved having children physically manipulate letters to learn them. Minogue and Jones (2006) stated, "Today the term, in its broadest sense, encompasses the study of touch and the human interaction with the external environment through touch" (p. 318). Minogue and Jones (2006) argued that the sense of touch did not just offer a 'sensation' (p. 319). Rather when we touch something, we gain information that helps us to learn about the world (p. 319). When children manipulated letters with haptic feedback, learning was more efficient.

The OG method used the sense of touch throughout the learning process. Labat et al. (2015) stated, "Motor actions performed on the basis of letter shape seem to promote letter knowledge, spelling, and reading acquisition as behavioral, neuropsychological, and brain imaging evidence suggests" (p. 381). In Orton-Gillingham instruction children

often manipulated letters by writing them in the air, using their fingers to trace the letters and manipulating magnetic letters while making letter sounds and words.

Visual learning was also a component of the OG instructional method. However, most often it was combined with the sense of touch as well. OG advocated that when the Visual and Haptic styles of learning were combined, the process of learning was more effective. Xiong, Milleville-Pennel, Dumas, and Palluel-Germain (2013) found:

> Presumably, when two types of sensory information are used together, the approach represents more than a simple sum of unisensory input; it is an enhanced integration. As unisensory performance levels were not equal in these experiments, the major benefit of bi-sensory integration was seen. (p. 1820)

Therefore, when children received instruction that used all of their senses, it was found to be superior in comparison to a unisensory instructional model.

The auditory process also goes hand in hand with the haptic and visual learning. When multiple senses were combined, it increased the likelihood that the children would be able to learn the content. Oakland et al. (1998) stated, "Also, multisensory presentations will help anchor verbal information through nonlanguage mental representations" (p. 141). Therefore, it was argued by OG advocates that multisensory instruction was superior to methods that did not include it. Multisensory instruction that was both systematic and explicit was found to be highly effective for dyslexic students.

Explicit and Systematic Instruction

Explicit instruction was effective for dyslexic learners, because then the children knew exactly what to do. Mather and Wendling (2012) explained, "As noted in prior sections, the most effective instruction for individuals with dyslexia is explicit in nature,

which means that nothing is left to chance" (p. 186). When there was nothing left to chance, dyslexic children found an opportunity to be successful at reading, because they knew exactly what to do. In addition to explicit instruction, children with dyslexia also benefitted from a systematic program. A systematic program was sequential and was built around small steps that connected old learning to new learning (Mather & Wendling, 2012, p. 186).

Unfortunately, many schools did not offer such programs. Mather and Wendling (2012) explained, "Unfortunately, some schools do not implement these methodologies because of limited resources or lack of teacher training. As a result, some students with dyslexia do not receive help in an appropriate or timely fashion" (p. 175). Another difficulty in providing dyslexic children with systematic and explicit instruction was that there were very few tier-one programs available to teach in the classroom. *Fundations*, which was developed by Wilson Language Training Corporation (2012), was a tier-one instructional program designed to teach reading concepts to all students.

Fundations

Fundations was a unique reading curriculum, compared to other Orton-Gillingham programs. Most Orton-Gillingham programs were either Tier 2 or Tier 3 Interventions. Goss and Brown-Chidsey (2012) explained:

> Tier 2 includes additional instruction and assessment, generally provided in small groups on a regular basis for students identified as at risk. Tier 3 involves individualized, intensive instruction and assessment for students who do not respond to multiple research-based interventions in Tier 2, along with a

> comprehensive evaluation to determine whether the student meets the diagnostic criteria for special education services. (p. 65)

Therefore, most instructional programs designed to help dyslexic students were designed to be used in either small groups or for individualized instruction. *Fundations* was unique because it was designed to teach reading concepts to all students and was a Tier-One instructional program.

Fundations was a Tier-One instructional program designed for grades Kindergarten through third grade. Goss and Brown-Chidsey (2012) stated, "The first level, Tier 1, includes universal instruction and assessment. Tier 1 is the research-based core curricula and assessments used for all students in the classroom setting" (p. 65). Goss and Brown-Chidsey (2012) explained, "*Fundations* is based on the Wilson Reading System principles, with its research-based, multisensory, structure systematic, cumulative, and explicit approach" (p. 312). Reading scientists agreed that a curriculum that was multisensory, systematic and explicit was more likely to help students with dyslexia.

Fundations was designed to help students that had dyslexia. However, Wilson Language Training Corporation (2012) also used the research from the NPR to create *Fundations*. *Fundations* included instruction in phonological awareness, phonics, fluency, vocabulary, and comprehension. Phonological awareness, phonics, fluency, and vocabulary were proven to have a positive effect on all students' reading achievement. Therefore, *Fundations* was intentionally designed to be effective for all students in a classroom.

Another component used in the *Fundations* program was data collection at the end of the unit. The data in the *Fundations* program was used to inform the teacher about student progress in reading. When teachers progress monitored their students, student achievement significantly improved. Goss and Brown-Chidey (2012) stated, "An additional element of early reading instruction that has been identified as important for student success is regular progress monitoring" (p. 66). Progress monitoring was important because it gave teachers insight into how well the instruction was working. Goss and Brown-Chidey (2012) stated, "Progress monitoring provides teachers with information about how students are doing and whether the additional instruction is working" (p. 66). While the *Fundations* program was intentionally created to help all students, there was little research to prove that it was effective.

Lack of Research

Fundations became a popular instructional program. However, *Fundations* and the OG instructional method that helped to develop the *Fundations* program continued to be controversial. Many teachers and parents strongly supported *Fundations* and the OG method. However, many researchers continued to see a lack of evidence to support any OG instructional program. Ritchie and Goeke (2006) explained,

> In sum, the extant research literature provides both evidence that supports, as well as evidence that fails to support, the effectiveness of OG instruction in reading, when compared to other reading instruction. This review also highlights the disparity between research and practice. (p. 182)

Experts agreed that *Fundations* had a strong pedagogy. However, the only proof that *Fundations* worked was based on belief rather than evidence.

When there was a lack of scientific evidence to show that a program was effective, it posed a problem as to why schools should start using *Fundations*. Therefore, recommending that a school district use the *Fundations* program became problematic. Ritchie and Goeke (2006) explained:

> Since their development, OG and OG-based reading instruction have been commonly accepted and frequently delivered interventions for students with reading disabilities. Although the standard of identifying and using the best instructional practices is customary to special education, it appears that the widespread use of OG instruction has been fueled by anecdotal evidence and personal experience. (p. 182)

The report prepared by the Florida Center for Reading and Research (FCRR) supported the argument Ritchie and Goeke have made. While the FCRR reported that there were many strengths found within the *Fundations* program, the researchers drew the conclusion that the studies used to support *Fundations* had many limitations. The FCRR noted that a major problem with the methodology of studies that used *Fundations* was that there had not been appropriate control groups used (FCRR, 2004, p. 6). Without an appropriate control group, it was difficult to prove that the use of *Fundations* was better than was than doing nothing.

In conclusion, at the time of this writing the use of *Fundations* could not be supported based on the current research. The research was inadequate, and the methodology was lacking in quality (Ritchie & Goeke, 2006, p. 182). The What Works Clearinghouse drew the same conclusion about the effectiveness of the *Fundations* program. WWC argued:

> No studies of *Fundations*® that fall within the scope of the Students with Learning Disabilities review protocol meet the What Works Clearinghouse (WWC) evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, the WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of Fundations® on students with learning disabilities. (para. 1)

Therefore, there was not enough quality research that proved that *Fundations* was an effective program that would significantly help students with their reading.

Other Instructional Approaches

This study was designed with a comparison group. The comparison group received instruction with the Heggerty *Phonemic Awareness* – Revised English Primary Curriculum. The comparison group also received spelling and phonics instruction through the *Words Their Way* instructional program.

Heggerty Phonemic Awareness – Revised English Primary Curriculum

Phonemic Awareness – Revised English Primary Curriculum was a phonemic awareness program designed by Heggerty (n.d.). The *Phonemic Awareness* – Revised English Primary Curriculum was designed for grade levels Pre-K – 3rd grade. Heggerty (n.d.) Designed his *Phonemic Awareness Curriculum* based on the findings from the NPR in the year 2000. Literacy Resources Inc. (n.d.) stated, “As a first grade classroom teacher, Heggerty worked on an action research project on the importance of phonemic awareness in acquiring and mastering sound reading skills” (para. 2). Heggerty’s (n.d.) program explicitly teaches the sounds of language.

Words Their Way

Words Their Way is a word study program that enhances the spelling skills of students. Sterbinksy (2007) also believed that the *Words Their Way* program worked well with phonics and vocabulary programs (p. 2). *Words Their Way* was described as a program that used hands-on activities to develop students' spelling skills (Bear et al., 2012, p. 3). Teachers were encouraged to guide students during *Words Their Way* lessons to help students sort words and pictures into categories (Bear et al., 2012, p. 3). *Words Their Way* used pictures and words to show students they were the same and different. When students could compare and contrast orthographic spelling patterns, it reinforced their spelling and reading skills.

The *Words Their Way* Program also used data to drive instruction. Sterbinksy (2007) wrote, "Included in the WTW approach is a set of three inventories that assess student ability in key areas. These three inventories include the Primary Spelling Inventory, the Elementary Spelling Inventory, and the Upper-Level Spelling Inventory" (p. 2). Sterbinksy (2007) also examined the reliability of all three spelling inventories used by the *Words Their Way* Program. Sterbinsky (2007) proved that all three instruments were reliable (p. 19). Sterbinksy (2007) concluded that the *Words Their Way* program and assessments were valuable resources for educators to use with their students.

Children that were proficient spellers were also strong readers. Graham and Santangelo (2014) proved that spelling instruction was important through their meta-analysis. Graham and Santangelo (2014) stated, "The findings of this meta-analysis provide strong support for directly and systematically teaching students how to spell.

Such instruction improved students' spelling, reading, and phonological awareness skills" (p. 1738). Graham and Santangelo (2014) argued that spelling instruction was important. However, it should not replace phonological awareness instruction. Instead, spelling programs further enhanced the areas of reading and writing instruction (p. 1738).

Summary

There was clear evidence that there was a lack of high-quality research with a rigorous methodology that supported the effectiveness of the OG instructional method. While the OG method did include all of the fundamental reading concepts outlined by the NPR, there was no evidence that the OG method was more effective than other reading programs that used the panel's recommendations. The research showed that the OG method was used based on belief and not research. Additionally, there was a lack of evidence that showed that a Tier-1 based OG program was effective, as well. Most OG programs had only been studied in either a Tier-2 or Tier-3 setting. There is a need for research with a strong methodology to prove how effective OG-based instructional programs are in a Tier-1 setting.

Chapter Three: Research Method and Design

This chapter will provide information regarding the research design of the present study. The participants, instruments used, implementation of reading programs, and measures will be discussed. The scope of the data collection and analysis is described, as well.

Problem of Practice

This study was developed from the prior research conducted by Ring, Avrit, and Black (2017). Ring et al. (2017) discussed that Orton Gillingham based reading programs had been widely adopted, yet there was limited research on the efficacy of this instructional method (p. 384). The goal of the investigator's study was to add to the literature on Orton Gillingham programs and report data on the effectiveness of the program compared to the use of Heggerty's *Phonemic Awareness Program* and *Words Their Way* (WTW). A pretest-to-posttest comparison was used to compare the achievement gains of one class using an Orton Gillingham based reading program in comparison to a group using Heggerty's *Phonemic Awareness Program* and *Words Their Way*.

Hypotheses

Scores considered in analysis of null hypotheses for this study were taken from the Formative Reading Assessment System for Teachers (FAST, University of Minnesota, n.d.).

Null Hypothesis 1— FAST Early Literacy Word Blending scores will not show an increase in achievement when the *Fundations* program is used with a first-grade

classroom as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 2— FAST Early Literacy Word Blending scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 3 — FAST Early Literacy Nonsense Word Reading scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 4 — FAST Early Literacy Nonsense Word Reading scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 5 — FAST Early Letter Sound scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 6 — FAST Early Literacy Sound scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for Dyslexia as compared to students considered at-risk for Dyslexia using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 7 — Primary Spelling Inventory scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 8 — Primary Spelling Inventory scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to students considered at-risk for Dyslexia using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 9 – Parents of students considered at-risk for dyslexia will not feel more positive about their children's reading progress as measured by the pre and post-survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Null Hypothesis 10 – Children that are considered at-risk for dyslexia will not feel more positive about their reading progress as measured by the pre and post-test survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Research Design

A pretest-to-posttest design was used to explore the impact of an Orton Gillingham-based reading program (*Fundations*) on a group of first-grade participants in this study compared to another class using the Heggerty and WTW programs. The Fastbridge Letter Sound Fluency, Word Blending, and Nonsense Word Fluency scores were recorded at the beginning of the year and again at the end of the year. The

researcher collected the Primary Spelling Inventory assessment data at the beginning and end of the year.

The *Fundations* and the Heggerty and WTW groups were compared to shed light on the impact of an Orton Gillingham-based reading program. A pretest-to-posttest study design was commonly used to measure change when comparing two groups (Dimitrov & Rumrill, 2003, p. 159; Gliner, Morgan, & Harmon, 2003, p. 500). The researcher analyzed the results of the Fastbridge and Primary Spelling Inventory data before the students received reading instruction with the *Fundations*, Heggerty and WTW program. The researcher also analyzed the Fastbridge and Primary Spelling Inventory data at the end of the school year with a t-test of independent means. The students in the OG based reading program received *Fundations* instruction for one school year. The students in the comparison group received Heggerty, and WTW programs received instruction for one school year.

The researcher used the pretest-to-posttest design to collect data about students' perceptions about reading. Student data were collected by using the Elementary Reading Attitude Survey (ERAS). The ERAS was a tool commonly used to evaluate the attitudes that children have about reading. McKenna and Kear (1990) explained:

> Its placement into the public domain by means of this article provides teachers with a tool that can be used with relative confidence to estimate the attitude levels of their students and initiate informal assessment efforts into the role attitude plays in the students' development as readers. (p. 629)

Students completed the surveys in September and May.

The researcher collected data about the parents' perceptions of their child's reading abilities. The researcher used the pretest-to-posttest study design to analyze parent perception data. Parents completed the surveys in September and April.

Setting and Sample

The study site was an elementary school located in Missouri. The school in this study included grades Kindergarten through Fifth. Four hundred and eighty-seven students attended this school. The study used a convenience sample. The researcher used the *Fundations* program with the students in his classroom. The comparison group received instruction with the Heggerty *Phonemic Awareness Program* and the *Words Their Way* Program.

The student demographics at the elementary school consisted of roughly 60% white, 20% African American and 5% to 7 % Hispanic, Asian and other. Forty-one and three tenths percent of the students received free and reduced lunches (St. Louis Post-Dispatch, 2019).

The student demographics of the OG based program (*Fundations*) consisted of 47.1% white, 35.3% African American, .058% Hispanic and 0.12% Asian. The comparison group using the Heggerty *Phonemic Awareness Program* and WTW consisted of 94.1% white and .058% African-American.

Implementation of Fundations (components/pacing)

The *Fundations* program was approved to be used in one first grade classroom by the building administrator. *Fundations* was a Tier 1 instructional program. All students in the researcher's classroom received *Fundations* instruction during the phonics and

phonological awareness portion of the school day. *Fundations* had several components included in each lesson.

Components of the Fundations program

The *Fundations* program encompassed many activities throughout the program. The researcher listed the activities included in Wilson Language Training Corporation (2012) below.

Dictation/Sounds – First the teacher says a letter sound. Next, the students echo the sound made by the teacher. Last, the students write the sound that was said by the teacher. (Wilson Language Training Corporation, 2012, p. 28).

Dictation/Words (Single Syllable Words) – The teacher states a word (mat). The students place their elbows up and tap the sounds out in the word (/m/ /a/ /t/). Next, the students spell and write the word (mat) and check their work (Wilson Language Training Corporation, 2012, p. 31).

Dictation/Words (Multisyllabic Words) – The teacher states a word (mascot). The students echo the word. The students state the syllables and touch the syllable frames. Last, the students write the word mascot and check their work (Wilson Language Training Corporation, 2012, p. 33).

Dictation Trick Words – The teacher asks the students if they can tap the trick words. The students all respond by saying, "No." The students respond that they have to memorize the words. The students say the trick word out loud and write the word with two fingers on their desks. Next, the students spell the trick word out loud. Last, the students write the trick word on their whiteboards. (Wilson Language Training Corporation, 2012, p. 35).

Dictation Sentences – The teacher states a sentence out loud to the class. The students echo the sentence stated by the teacher. The students place the sentence frames on the board. The teacher circles the frames that have a trick word. Next, the students write the sentence on either their whiteboard or composition notebook. The students proofread and discuss the sentence after they check their work (Wilson Language Training Corporation, 2012, p. 37).

Drill Sounds/Warm-Up – *Fundations* lessons always start with warming up with sounds. The teacher selects a sound, and the students echo those sounds (Wilson Language Training Corporation, 2012, p. 39).

Echo/Find Letters – The Wilson Language Training Corporation (2012) explained, "Students reinforce their skill of matching a letter with a given sound. This activity helps to solidify sound-symbol correspondence and sets the foundation for spelling" (p. 40).

Echo/Find Words (Single Syllable Words) – Teachers select a word and state it out loud (mad). The students echo the word. Next, the students put their elbows up and tap out the sounds in the word (/m/ /a/ /d/). The students spell the word (mad) out loud. Last, the students check their word and use it in a sentence (Wilson Language Training Corporation, 2012, p. 43).

Echo/Find Words (Multisyllabic Words) – The teacher selects a word (mascot). The students echo the word used. The teacher asks the students to name each syllable. The students respond by stating (mas-cot). The students then find each syllable and spell the word one syllable at a time (Wilson Language Training Corporation, 2012, p. 45).

Echo/Letter Formation – Students get into correct letter writing formation. Next, the teacher dictates a sound /t/. The students echo the sound and name the letter that makes that sound. The teacher goes over the letter formation procedures for the letter on the letter formation poster. Last, the students make the letter on their whiteboards (Wilson Language Training Corporation, 2012, p. 47).

Letter-Keyword-Sound – The teacher holds up the large sound cards and names the letter, picture and the sound. Next, the students repeat the name of the letter, picture, and sound (Wilson Language Training Corporation, 2012, p. 49).

Sky Write/Letter Formation – The teacher instructs the students to get their bodies ready to sky-write. The teacher gives instructions to point to all of the lines on the large letter formation grid, one at a time. The teacher asks the children where a letter starts and they respond with the corresponding line. Next, the teacher demonstrates how to write the letter on the large letter formation grid. Last, the students echo write the letter in the air by using two fingers (Wilson Language Training Corporation, 2012, p. 51).

Teach Trick Words Reading – The teacher reminds the class that trick words have to be memorized. Next, the teacher dictates the sentence (Meg had the red hat). The students echo the same sentence. A student is asked to place the sentence frames on the board. Next, the teacher writes the word on the frames as she says them. The teacher circles the trick word and asks the students which word was circled (Wilson Language Training Corporation, 2012, p. 53).

Teach Trick Words Spelling – First, the teacher writes the letters on the board and asks the students if they know the word. A student is called on to recite the word.

The teacher explains that trick words must be memorized and explains why the word is tricky. The teacher then demonstrates how to sky-write the word. Next, the students close their eyes, and the class sky writes the word again. Last, the students write the word on their desks with two of their fingers and then write the word in their dictionaries with a pencil (Wilson Language Training Corporation, 2012, p. 55).

Word of the Day – During word of the day, students are taught a new vocabulary term that is related to the unit phonics skill. The word is marked up and used in a sentence (Wilson Language Training Corporation, 2012, p. 57).

Word Talk – Students use word talk to review concepts and vocabulary that was previously learned. The Wilson Language Training Corporation explained (2012), "This activity helps to develop accuracy and automaticity of word reading. It solidifies the conceptual understanding of word structure and develops vocabulary" (p. 58).

Implementation of Comparison Group Programs (Sample lessons/pacing)

The comparison group used the Heggerty Phonemic Awareness program for phonemic awareness instruction. The comparison group used the *Words Their Way* Program for phonics instruction. The comparison group received instruction in Heggerty and WTW during the phonics and phonological awareness portion of the school day.

Components of Heggerty Phonemic Awareness Program

The comparison group was given phonemic awareness (PA) instruction in the Heggerty program titled *Phonemic Awareness: The Skills That They Need to Help Them Succeed (Primary Version)!* The PA lessons are designed to increase in difficulty as the year progresses. Heggerty and Van Hekken (2017) explained that the lessons were designed to take between 10 and 12 minutes daily (p. x). There were 35 weeks' worth of

lessons to use in the classroom. It was recommended by Heggerty and Van Hekken (2017) to use this resource in Tier 2 instruction if students were having difficulty becoming proficient in phonemic awareness.

Sample Lesson (Monday Week 8) – Below is a sample lesson from *Phonemic Awareness: The Skills That They Need to Help Them Succeed (Primary Version)!*

Letter Naming – Heggerty and Van Hekken (2017) explained, "Teacher holds up flashcards one at a time in random order, and students and teachers say the letters' name and sound(s). Provide long and short sounds for vowels" (p. 22).

Rhyme Recognition – Heggerty and Van Hekken (2017) explained, "Instruction varies by day. Mon, Wed, & Fri: Teacher reads the word set. Students repeat only the one non-rhyming word. Tues & Thurs: Teacher reads the word set. Students repeat only the two rhyming words" (p. 22).

Onset Fluency – Heggerty and Van Hekken (2017) explained, "Teachers read word pairs. Students do 'Thumbs Up' if the words begins with the same sound, or 'Thumbs Down' if they do not" (p. 22).

Blending Phonemes – Heggerty and Van Hekken (2017) explained, "The teacher says the individual phonemes, students listen and then say the whole word. Ex. T: g-o S: go" (p. 22).

Blending hand motion – Heggerty and Van Hekken (2017) explained, "Place palms together to create 'choppers.' As the teacher, you will chop your hands from right to left, one chop for each phoneme. Then slide your hands right to left to say the whole word. Students will mirror the teacher" (p. 22).

Components of Words Their Way Program

The comparison group teacher started the WTW program by giving her students the Primary Spelling Inventory. The data were analyzed by using the feature guide in the PSI. Next, the teacher organized groups of students by using a classroom composite score from the PSI. The teachers chose this method as it was recommended by Bear, Invernizzi, Templeton, and Johnston (2012) to organize instruction (p. 34).

Instruction in the WTW program used sorts to teach orthography. The teacher used personal judgment and student data to select which sorting activities would be used each week for her students in the comparison group. The WTW instruction was completed five days a week throughout the 2018-2019 school year. During WTW instruction the teacher used the sorts described below.

Sound Sorts – The teacher models the sort and then students sort either independently or with a group. There are key pictures that are used to associate with the sound that students are learning (Bear et al., 2012, p. 57)

Pattern Sorts – Words are organized underneath headers that contain the letter pattern that is being taught as part of the WTW program (Bear et al., 2012, p. 58).

Meaning Sorts – Bear et al. (2012) explained, "Sometimes the focus of a sort is on meaning. The two major types of meaning sorts are concept sorts and meaning sorts related to spelling" (p. 58).

Concept Sorts – Students are asked to sort objects, pictures or words by concepts. The goal is to develop vocabulary knowledge before starting a new unit in the content areas for greater understanding in of the lessons (Bear et al., 2012, p. 58).

Spelling-Meaning Sorts – Students are asked to discuss the meanings of words during WTW instruction. An example of a spelling-mean sort would be using the words; transport, import, portable and port-a-potty (Bear et al., 2012, p. 59).

Repeated Sorts – During repeated sorts, students either sort individually or with a partner in a time outside of the WTW instruction. The goal of this sort is to increase word fluency (Bear et al., 2012, p. 64).

Buddy Sorts – During a buddy sort, students work together to complete the sort (Bear et al., 2012, p. 64).

Blind Sorts – Bear et al. (2012) explained, "In a blind sort, headers or keywords are used to establish categories, but then the teacher or a partner shuffles the word cards and calls each word aloud without showing it. The student indicates the correct category by pointing to or naming the header" (p. 65).

Writing Sorts- During a writing sort, students use old WTW sorts and record the words under keywords. Bear et al. (2012) explained, "Writing sorts encourage the use of analogy as students consider the keyword as a clue for the spelling of words that have the same sound, pattern, or meaning" (p. 65).

Word Hunts – In word hunts, students locate words from their sorts in books, the classroom and around the school building (Bear et al., 2012, p. 65).

Speed Sorts – During a speed sort, students set up their headers and mix up the rest of their cards. When the teacher says, "Go," students are expected to sort their words as quickly as possible (Bear et al., 2012, p. 67).

Teacher Training

The OG based reading program group instructor received *Fundations* level 1 training at the Churchill Center and School in Town and Country, Missouri. The training was six hours long. The training received at the Churchill Center and School certified the teacher to use the *Fundations* level 1 program in a whole group classroom setting.

The comparison group teacher did not receive training to use the *Words Their Way* program. The comparison group teacher did not receive training to use the *Phonemic Awareness: The Skills That They Need to Help Them Succeed!* Program.

Selection Process for At-Risk for Dyslexia

McMaster and Wagner (2007) explained, "In addition to selecting screening tools, criteria for risk status must be established. Currently, there is not a consensus regarding what these criteria should be" (p226). Adlof, Scoggins, Brazendale, Babb, and Petscher (2017) explained that some schools use the data from reading assessments to identify children that need intensive reading instruction (p. 3508). However, other schools used the reading assessment data to identify children for special education and closer observation (Adlof, Scoggins, Brazendale, Babb, & Petscher, 2017, p. 3508). It was clear in the literature that schools did not use a uniform approach to identify children that were at-risk for dyslexia and reading impairments. The present study used a combination of data to identify students at-risk for dyslexia. Students were referred to as being at-risk for dyslexia if they scored at the 15th percentile or below in Letter Sound Fluency, Word Blending, and Nonsense Word Fluency.

Students that have dyslexia have difficulty identifying letters and their associated sounds (Caravalas et al., 2012, p. 678). Students with dyslexia often have difficulty decoding

and spelling words (Caravalas et al., 2012, p. 678). Students that have dyslexia typically show a weakness in phonological awareness (Caravalas et al., 2015, p. 678). The LSF, WB, NWF, and Primary Spelling Inventory gave valid and reliable information about many of the skills that dyslexic students often struggle within the classroom. The LSF, WB, and NWF gave a percentile rank score. The researcher compiled all of the first-grade PSI data and assigned students a percentile rank within the school. The percentile rank was used to identify children that were at-risk for dyslexia.

There was no consensus in the literature about the percentile score at which students were considered at-risk for dyslexia. Therefore, the researcher used the guidelines set by Fastbridge for assessing risk. Fastbridge assessments were used to collect data in this study. Brown (2018) explained:

> Students noted to be high risk are those whose winter screening scores suggest that they are very unlikely to reach the year-end learning goals. In the FastBridge system, high-risk scores are those falling below the 15th percentile as compared to national norms. High-risk scores are indicated with two exclamation marks (!!). Research suggests that students whose scores indicate high risk require intensive intervention in order to meet learning goals. (para. 3)

In the present study, students were considered at-risk for dyslexia if they scored in the 15th percentile or lower in the LSF, WB and NWF. The 15th percentile or lower is considered to be “High Risk” by Fastbridge. The researcher used the guidelines set by Fastbridge to identify the students that were most likely to be at-risk for dyslexia.

Measures (LSF, WB, NWF, ESI), Child Survey, Parent Survey (Validity and Reliability)

LSF – The EarlyReading Composite (2018) explained, "Letter Sounds is one of the 13 subtests that make up the EarlyReading assessment suite. The Letter Sounds subtest is timed and assesses students' ability and automaticity providing the sounds for lowercase letters in isolation" (Letter Sounds, 2018, para. 1). The Fastbridge Letter Sounds test was considered to be valid at the Kindergarten level. The coefficient range was .10 to .63 (p. 38). The Coefficient Median was .49 (p. 38). The internal consistency for the LSF was strong as well. The Alpha range was .93 to .98 (p. 39). The Alpha median was .98 (p. 39). The Test-Retest Reliability Coefficient was .92 (p. 39). There were no validity and reliability numbers available from Fastbridge for the first-grade LSF assessment.

Word Blending (WB) – The EarlyReading Composite (2018) explained,

> The Word Blending subtest assesses students' ability to form a word from individually-spoken sounds or phonemes. Phonemes are the smallest units of sound in spoken language. During the Word Blending subtest, examiners say each phoneme in a word and the student is expected to say the complete word. (Word Blending Introduction, 2018, para. 1)

The Concurrent and Predictive Validity for FAST EarlyReading had a coefficient range of .12 to .56. The Coefficient Median was .38.

The Internal Consistency for FAST EarlyReading subtest was a .90 median Alpha for Word Blending. The Test-Retest Reliability for FAST EarlyReading was a coefficient of .77 for Word Blending.

NWF – Early Reading Composite (2018) explained,

> The Nonsense Words subtest is timed and assesses students' ability to read phonetically regular "words" (e.g., "vit"). It is called Nonsense Words because the "words" are not real but can all be decoded using English phonics rules. Unlike the Decodable Word Reading subtest, it controls for words that students might already know and be able to read without decoding. (Nonsense Words Introduction, para. 1)

The Concurrent and Predictive Validity for the FAST Early Reading Nonsense Word Fluency test had a coefficient range of .43 to .67. The Coefficient Median was .60. The Internal Consistency for FAST EarlyReading subtests for the NWF probe was a median Alpha of .93. The Test-Retest Reliability for FAST EarlyReading had a Coefficient of .76.

PSI -The Primary Spelling Inventory was designed to be used in grades Kindergarten through third grade. Bear et al. explained, "It is recommended for kindergarten through early third grade because it assesses features found from emergent stage through the within word pattern stage" (p. 29). The PSI was often used by schools to track the growth of students over time (Bear et al., 2012, p. 29). The ESI was considered to be both reliable and valid.

The PSI has Inter-rater reliability of .76 to .95. The test-retest value of the PSI is .76 to .95. The internal consistency was .93. The validity of the PSI was excellent, as well. The concurrent was .48 to .74. The Predictive was .53 to .73. The PSI was a valid and reliable instrument.

Elementary Reading Attitude Survey

The Elementary Reading Attitude Survey (ERAS) was a tool that measured a child's attitude toward reading. McKenna and Kear (1990) explained, "The recent emphasis on enhanced reading proficiency has often ignored the important role played by children's attitudes in the process of becoming literate" (p. 626). It was believed that children that were at-risk for dyslexia exhibited a dislike for reading at an early age (Morgan, Fuchs, Compton, Cordray, & Fuchs, 2008, p. 387). The purpose of using the Elementary Reading Attitude Survey was to identify if a child's attitude towards reading would improve, if an Orton Gillingham based teaching resource (*Fundations*) was used in the classroom.

The ERAS was designed to be used with children in grades 1 through 6. Mckenna and Kear (1990) made sure that the survey would be usable by young children by using pictorial information in the survey (p. 627). The ERAS was nationally normed and was a valid and reliable instrument. The ERAS can be administered in either small groups or large groups.

The coefficient in the recreational scale for first grade was .74. The median for the first-grade recreational scale was 31. The coefficient in the academic scale was .81. The median for the academic scale was 31. The coefficient for the full-scale score was .87. The median for the full-scale score was 61. McKenna and Kear (1990) explained, "Taken together, the factor analyses produced evidence extremely supportive of the claim that the survey's two subscales reflect discrete aspects of reading attitude" (p. 638). The researcher was able to gather data with the ERAS with confidence that the tool would be both valid and reliable.

Parent Survey – The parent survey was designed to gather data that would align with the quantitative tasks measured by the Fastbridge Resources (n.d.) assessments. The researcher wanted to measure whether the quantitative and qualitative data aligned. The researcher asked the parents about their children's attitudes toward reading, homework, and school. The researcher also wanted to know if the parents felt that their children were able to spell words, use reading strategies, and read sight words independently. The survey had a limited number of questions. The survey was intentionally designed with a limited number of questions to ensure that the surveys would be completed and given back. The sample was limited in the OG instructional group. Therefore, the return of the surveys was important to the researcher.

Data Collection and Analysis Procedures

The study used a convenience sample. The researcher's students received instruction with the OG-based reading program (*Fundations*). The comparison group received instruction with the Heggerty *Phonemic Awareness Program*. The comparison group also received instruction with the *Words Their Way* Program.

A pretest-to-posttest model was used to gather data. A team of teachers gathered Fastbridge data in the Fall and again in the Spring. The researcher completed the Letter Sounds probe in the Fall and again in the Spring. Each classroom teacher completed the Primary Spelling Inventory in the Fall and again in the Spring.

The researcher completed a *t*-test of independent means to see if the students in the *Fundations* classroom improved their Fastbridge early reading and PSI scores in comparison to the Heggerty and *Words Their Way* group. The researcher used a *t*-test of independent means to compare the difference in achievement between the two groups. A

t-test of independent means works well when a researcher uses the same population for both groups being researched (Siegle, 2002, slide 3). The *Fundations* and Heggerty and WTW groups came from the same school. Therefore, a *t*-test of independent means was an appropriate test to use.

The parent surveys were completed and given to the researcher in the Fall of 2018. The survey was given once again in the Spring of 2019 and given back to the researcher. The Elementary Reading Attitude Survey was given to students in the Fall of 2018. The survey was given to the students again in the Spring of 2019. The researcher used a *t*-test of dependent means to compare to attitude survey data from the parents and students. It is common to use a *t*-test of dependent means when a researcher is evaluating the effectiveness of a program on the same group (Shayib, 2018, 10.4, para. 1).

Limitations

The researcher believed that student attendance was a significant threat to validity. The school district that the researcher used in the study had student attendance issues. If students were absent from school for a significant number of days, their performance may be lower due to attendance and not the program that was used in the classroom. The researcher also believed that the number of participants in the study was a threat to validity. The OG based reading program classroom had 17 students using the *Fundations* program and 16 students in the comparison classroom used *Words Their Way* and Heggerty. The researcher believes that such a small number of students was a limitation of the study. If would be beneficial to have a larger sample size. The engagement level of the students in both classes was also a threat to validity. The engagement level of the students could not be measured and would inevitably vary. If

students in one room were more engaged than students in a different classroom, the results would show higher growth, even if the program was not as effective. The researcher used the *Fundations* program in his classroom for the duration of the study. The researcher believed that being the teacher and researcher was a conflict of interest and a threat to the validity of the study.

The researcher used a convenience sample. The sample was limited to two classrooms. There were no additional classrooms that could be added to the study based on the school district's preference for the reading programs being used during the 2018-2019 school year. The makeup of the researcher's class and the classroom using *Words Their Way* and Haggerty was chosen by the administration last summer. There was nothing that the researcher could do to address the makeup of each class.

Protection of Human Subjects

The researcher followed all of the guidelines set by the Lindenwood University Institutional Review Board (IRB) to protect human subjects involved in the study. The students and parents that took surveys gave their consent before completing the instruments. All data were kept secure and confidential. These steps ensured that all participants would stay anonymous. Teachers that were involved in the study were informed about how their classroom data would be used and kept confidential. All participants were informed of their right to withdraw from the study at any given time.

Chapter Four: Analysis

The purpose of this study was to complete a comparative analysis of students taught with an Orton Gillingham based reading program (*Fundations*) vs. students taught with *Words Their Way* and Heggerty instruction during the word study portion of the school day. This study determined differences in achievement scores in the areas of decoding, phonological awareness, word recognition, letter-sound fluency, and orthography. This study was also designed to shed light on how student attitudes towards reading change from the beginning to the end of the year when they are exposed to an Orton Gillingham based reading program. Parent attitudes about their children's reading were studied as well.

Scores considered in analysis of null hypotheses for this study were taken from the Formative Reading Assessment System for Teachers (FAST, University of Minnesota, n.d.). Based on the methodology in Chapter Three, the researcher was able to respond to the following Null Hypotheses:

Null Hypothesis 1— FAST Early Literacy Word Blending scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 2— FAST Early Literacy Word Blending scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 3 — FAST Early Literacy Nonsense Word Reading scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 4 — FAST Early Literacy Nonsense Word Reading scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 5 — FAST Early Letter Sound scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 6 — FAST Early Literacy Sound scores will not show an increase in achievement when the *Fundations* program is used with students considered at-risk for Dyslexia as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 7 — Primary Spelling Inventory scores will not show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 8 — Primary Spelling Inventory scores will not show an increase in achievement when the *Fundations* program is used with students considered

at-risk for dyslexia as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Null Hypothesis 9 – Parents of students considered at-risk for dyslexia will not feel more positive about their children's reading progress as measured by the pre and post-survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Null Hypothesis 10 – Children that are considered at-risk for dyslexia will not feel more positive about their reading progress as measured by the pre and post-test survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Review of Collection Methods

In order to answer the Null Hypotheses, data were collected from an elementary school in Missouri. The administrator at that school granted the researcher permission to gather and analyze secondary data from the school. The secondary data that were collected from the school included Fastbridge Assessments in the areas of Word Blending, Letter Sounds, and Nonsense Words. Permission was also granted by the administrator to collect Primary Spelling Inventory data. Secondary data were collected from the Elementary school during the Fall, Winter, and Spring of the 2018-2019 school year.

Children that were considered at risk for dyslexia in this study received assent forms before they completed the ERAS in the Fall and Spring. Parents of the students that were considered at risk for dyslexia, gave their consent to use their responses in this study. Parent data were collected in the Fall and again in the Spring.

Results: Quantitative Data

Null Hypothesis 1. The researcher conducted a *t*-test of independent means to see if the students in the *Fundations* class improved their Word Blends scores more than students in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 4.18, SD = 3.05) was significantly higher than that of the Heggerty and *Words Their Way* class (M = 2.25, SD = 1.73); $t(15) = 2.25$, $p = .020$. The researcher rejected the null hypothesis and concluded that *Fundations* class increased their Word Blends scores significantly more than the Heggerty and *Words Their Way* class.

Null Hypothesis 2. The researcher conducted a *t*-test of independent means to see if the students at risk for dyslexia in the *Fundations* class improved their Word Blends scores more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 7.00, SD = 1.87) was significantly higher than that of the Heggerty and *Words Their Way* class (M = 4.33, SD = 1.52); $t(6) = 2.07$, $p = .042$. The researcher rejected the null hypothesis and concluded that the students at risk for dyslexia in the *Fundations* class increased their Word Blends scores significantly more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class.

Table 1 summarizes the improvement in Word Blend scores analyzed in Null Hypotheses 1 and 2.

Table 1

Fastbridge Word Blend Scores

Group	Number	BOY/EOY Gain	SD
Fundations Class	17	4.18	3.05
Heggerty/WTW Class	16	2.25	1.73
At risk for dyslexia Fundations	5	7.00	1.87
At risk for dyslexia Heggerty/WTW	3	4.33	1.52

Null Hypothesis 3. The researcher conducted a *t*-test of independent means to see if the students in the *Fundations* class improved their Nonsense Words scores more than students in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 19.35, SD = 9.62) was significantly higher than that of the Heggerty and *Words Their Way* class (M = 10.81, SD = 6.02); $t(31) = 3.03$, $p = .002$. The researcher rejected the null hypothesis and concluded that *Fundations* class increased their Nonsense Words scores significantly more than the Heggerty and *Words Their Way* class.

Null Hypothesis 4. The researcher conducted a *t*-test of independent means to see if the students at risk for dyslexia in the *Fundations* class improved their Nonsense Word scores more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 16.4, SD =

2.70) was significantly higher than that of the Heggerty and *Words Their Way* class (M = 6.33, SD = 3.79); $t(6) = 4.44$, $p = .002$. The researcher rejected the null hypothesis and concluded that the students at risk for dyslexia in the *Fundations* class increased their Nonsense Word scores significantly more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class.

Table 2 summarizes the improvement in Nonsense Word scores that were analyzed in Hypotheses 3 and 4.

Table 2

Fastbridge Nonsense Word Scores

Group	Number	BOY/EOY Gain	SD
Fundations Class	17	19.35	9.62
Heggerty/WTW Class	16	10.81	6.02
At risk for dyslexia Fundations	5	16.4	2.70
At risk for dyslexia Heggerty/WTW	3	6.33	3.79

Null Hypothesis 5. The researcher conducted a *t*-Test of independent means to see if the students in the *Fundations* class improved their Letter Sounds scores more than students in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 35.24, SD = 11.52) was significantly higher than that of the Heggerty and *Words Their Way* class (M = 10.75, SD = 9.26); $t(31) = 6.70$, $p < .001$. The researcher rejected the null hypothesis and concluded that *Fundations* class increased

their Letter Sounds scores significantly more than the Heggerty and *Words Their Way* class.

Null Hypothesis 6. The researcher conducted a *t*-test of independent means to see if the students at risk for dyslexia in the *Fundations* class improved their Letter Sounds scores more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 42.60, SD = 9.99) were significantly higher than that of the Heggerty and *Words Their Way* class (M = 19.67, SD = 10.02); $t(6) = 3.14$, $p = .010$. The researcher rejected the null hypothesis and concluded that the students at risk for dyslexia in the *Fundations* class increased their Letter Sounds scores significantly more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class.

Table 3 summarizes the improvement in Letter Sound scores that were analyzed in Hypotheses 5 and 6.

Table 3

Fastbridge Letter Sound Scores

Group	Number	BOY/EOY Gain	SD
Fundations Class	17	35.24	11.52
Heggerty/WTW Class	16	10.75	9.26
At risk for dyslexia Fundations	5	42.60	9.99
At risk for dyslexia Heggerty/WTW	3	19.67	10.02

Null Hypothesis 7. The researcher conducted a *t*-test of independent means to see if the students in the *Fundations* class improved their PSI scores more than students in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 27.88, SD = 10.33) was significantly higher than that of the Heggerty and *Words Their Way* class (M = 20.13, SD = 8.88); $t(31) = 2.31$, $p = .014$. The researcher rejected the null hypothesis and concluded that the *Fundations* class increased their PSI scores significantly more than the Heggerty and *Words Their Way* class.

Null Hypothesis 8. The researcher conducted a *t*-Test of independent means to see if the students at risk for dyslexia in the *Fundations* class improved their PSI scores more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class. A preliminary test of variances revealed that the variances were equal. The analysis revealed that the increase in scores for the *Fundations* class (M = 32, SD = 14.32) was not significantly higher than that of the Heggerty and *Words Their Way* class (M = 27, SD = 6.08); $t(6) = 0.561$, $p = .298$. The researcher failed to reject the null hypothesis and concluded that the students at risk for dyslexia in the *Fundations* class did not increase their PSI scores significantly more than the students at risk for dyslexia in the Heggerty and *Words Their Way* class.

Table 4 summarizes the improvement in the Primary Spelling Inventory scores that were analyzed in Hypotheses 7 and 8.

Table 4

Primary Spelling Inventory Scores

Group	Number	BOY/EOY Gain	SD
Fundations Class	17	27.88	10.33
Heggerty/WTW Class	16	20.13	8.88
At risk for dyslexia Fundations	5	32	14.32
At risk for dyslexia Heggerty/WTW	3	27	6.08

Null Hypothesis 9. The researcher conducted a *t*-test of dependent means to see if parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their enjoyment of reading books from the beginning to the end of the year. The analysis revealed that the increase (M = 0.6, SD = 0.55) was significant; $t(4) = 2.45$, $p = .0352$. The researcher rejected the null hypothesis and concluded that parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their enjoyment of reading books from the beginning to the end of the year.

Table 5 summarizes the parent responses to the enjoyment of reading survey question that was analyzed in Hypotheses 9.

Table 5

Parent responses to the enjoyment of reading survey question

Parent	BOY Score	EOY Score	Gain
A	3	3	0
B	4	5	1

Table 5. Continued

C	3	3	0
D	4	5	1
E	3	4	1

The researcher conducted a *t*-Test of dependent means to see if parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their confidence while completing reading homework from the beginning to the end of the year. The analysis revealed that the increase (M = 1.6, SD = 1.82) was not significant; $t(4) = 1.97$, $p = .060$. The researcher failed to reject the null hypothesis and concluded that parents of the students at risk for dyslexia in the *Fundations* class did not believe that their children increased their confidence about completing their reading homework from the beginning to the end of the year

Table 6 summarizes the parent responses to the homework completion question that was analyzed in Hypotheses 9.

Table 6

Parents' responses to homework completion survey question

Parent	BOY Score	EOY Score	Gain
A	1	5	4
B	3	5	2
C	2	4	2
D	3	2	-1
E	1	2	1

The researcher conducted a *t*-Test of dependent means to see if parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their ability to spell words independently from the beginning to the end of the year. The analysis revealed that the increase (M = 1, SD = 1.22) was not significant; $t(4) = 1.83$, $p = .071$. The researcher failed to reject the null hypothesis and concluded that parents of the students at risk for dyslexia in the *Fundations* class did not believe that their children increased their ability to spell words independently from the beginning to the end of the year.

Table 7 summarizes the parent responses to the word spelling survey question that was analyzed in Hypotheses 9.

Table 7

Parents' responses to word spelling survey question

Parent	**BOY Score**	**EOY Score**	**Gain**
A	4	3	-1
B	2	4	2
C	1	3	2
D	2	3	1
E	2	3	1

The researcher conducted a *t*-test of dependent means to see if parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their attitudes about going to school from the beginning to the end of the year. The analysis revealed that the increase (M = 1.4, SD = 1.67) was not significant; $t(4) = 1.871$, $p = .067$. The researcher failed to reject the null hypothesis and concluded that parents of

the students at risk for dyslexia in the *Fundations* class did not believe that their children increased their attitudes about going to school from the beginning to the end of the year.

Table 8 summarizes the parent responses to the school enjoyment survey question that was analyzed in Hypotheses 9.

Table 8

Parents' responses to school enjoyment survey question

Parent	BOY Score	EOY Score	Gain
A	1	5	4
B	5	5	0
C	5	5	0
D	4	5	1
E	3	5	2

The researcher conducted a *t*-test of dependent means to see if parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their abilities to use different reading strategies when reading difficult words from the beginning to the end of the year. The analysis revealed that the increase (M = 0.60, SD = 0.55) was significant; $t(4) = 2.45$, $p = .035$. The researcher rejected the null hypothesis and concluded that the parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their abilities to use different reading strategies when reading difficult words from the beginning to the end of the year.

Table 9 summarizes the parent responses to the reading strategies survey question that was analyzed in Hypotheses 9.

Table 9

Parents' responses to the reading strategies survey question

Parent	BOY Score	EOY Score	Gain
A	5	5	0
B	4	5	1
C	3	4	1
D	4	4	0
E	3	4	1

The researcher conducted a *t*-test of dependent means to see if parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased their number of known sight words from the beginning to the end of the year. The analysis revealed that the increase (M = 2, SD = 1.41) was significant; $t(4) = 3.16$, $p = .017$. The researcher rejected the null hypothesis and concluded that the parents of the students at risk for dyslexia in the *Fundations* class believed that their children increased the number of sight words that they knew from the beginning to the end of the year.

Table 10 summarizes the parent responses to the sight word survey question that was analyzed in Hypotheses 9.

Table 10

Parent responses to sight word question

Parent	BOY Score	EOY Score	Gain
A	3	4	1
B	4	5	1

Table 10. Continued

C	1	4	3
D	2	3	1
E	1	5	4

Null Hypothesis 10. The researcher conducted a *t*-test of dependent means to see if the overall attitudes about reading of the students at risk for dyslexia in the *Fundations* class increased from the beginning to the end of the year. The analysis revealed that the increase (M = 29.00, SD = 22.17) was significant; $t(4) = 2.93$, $p = .022$. The researcher rejected the null hypothesis and concluded that the overall attitudes about reading of the students at risk for dyslexia in the *Fundations* class increased from the beginning to the end of the year.

Table 11 summarizes the improvement in the ERAS overall reading attitude scores that were analyzed in Hypotheses 10.

Table 11

ERAS Overall Reading Attitude Scores

Student	BOY Percentile Rank	EOY Percentile Rank	Gain
1	43.00	59.00	16.00
2	49.00	46.00	-3.00
3	31.00	82.00	51.00
4	55.00	99.00	44.00
5	25.00	62.00	37.00

The researcher conducted a *t*-test of dependent means to see if the academic attitudes about reading of the students at risk for dyslexia in the *Fundations* class increased from the beginning to the end of the year. The analysis revealed that the increase (M = 5.6, SD = 29.97) was not significant; $t(4) = 0.418$, $p = .349$. The researcher failed to reject the null hypothesis and concluded that the academic attitudes about reading of the students at risk for dyslexia in the *Fundations* class did not increase from the beginning to the end of the year.

Table 12 summarizes the improvement in the ERAS Academic Reading Attitude scores that were analyzed in Hypotheses 10.

Table 12

ERAS Academic Reading Attitude Scores

Student	BOY Percentile Rank	EOY Percentile Rank	Gain
1	44.00	39.00	-5.00
2	86.00	44.00	-42.00
3	65.00	91.00	36.00
4	81.00	99.00	18.00
5	38.00	69.00	31.00

The researcher conducted a *t*-Test of dependent means to see if the recreational attitudes about reading of the students at risk for dyslexia in the *Fundations* class increased from the beginning to the end of the year. The analysis revealed that the

increase (M = 45.2, SD = 15.47) was significant; $t(4) = 6.54$, $p = .001$. The researcher rejected the null hypothesis and concluded that the recreational attitudes about reading of the students at risk for dyslexia in the *Fundations* class increased from the beginning to the end of the year.

Table 13 summarizes the improvement in the ERAS Recreational Attitude scores that were analyzed in Hypotheses 10.

Table 13

ERAS Recreational Reading Attitude Scores

Student	BOY Percentile Rank	EOY Percentile Rank	Gain
1	44.00	72.00	28.00
2	21.00	72.00	51.00
3	14.00	65.00	51.00
4	34.00	99.00	65.00
5	21.00	52.00	31.00

Summary

The data from this study suggested that an Orton Gillingham based reading program (*Fundations*) produced significantly better achievement for all students. Students in the OG based reading program classroom had significantly higher achievement scores in Word Blending, Letter Sounds, Nonsense Word, and the Primary Spelling Inventory assessment. Students that were considered at risk for dyslexia in the

Fundations group also had high achievement scores in comparison to the Heggerty and *Words Their Way* group. Students that were considered at risk for dyslexia had higher scores in the areas of Word Blending, Letter Sounds, and Nonsense Words. The only area that students that were at risk for dyslexia did not score significantly higher than the comparison group was in the PSI. However, the average improvement was still higher than that of the comparison group (32 vs. 27).

The survey data from the ERAS showed that the students that were considered at risk for dyslexia significantly improved their attitudes about reading from the beginning of the school year to the end of the school year. However, the academic reading attitudes of children that were considered at risk for dyslexia did not significantly improve while the at-risk students' recreational attitudes about reading did greatly improve by the end of the year.

The parents of the children that were considered at risk for dyslexia survey data showed mixed results. The parents believed that their children significantly increased their enjoyment from reading books by the end of the year. However, parents did not believe that their children did significantly better when completing reading homework. Parents in this study also did not believe that their children were able to spell words better by the end of the school year.

Parents also reported that their children did not have an improved attitude about going to school each day by the end of this study. The parents of the students that were considered at risk for dyslexia did report that their children knew more reading strategies to use at home by the end of this study. Parents also reported that their children knew

more sight word, as well. Chapter Five will explore the results, and the researcher will make recommendations for teaching practices and future research.

Chapter Five: Discussion

Orton Gillingham (OG) based reading programs were commonly used by teachers in an effort to remediate students who were at risk for dyslexia. While the use of OG programs significantly grew over the years, there was still little evidence that supported their use. Research showed that OG based reading programs had mixed results. This study was created to shed light on the effectiveness of an OG based reading program (*Fundations*) in comparison to an alternative reading program (Heggerty's *Phonemic Awareness Program* and *Words Their Way*).

The current study compared the achievement of students in two first grade classrooms. One classroom used *Fundations* (An OG based reading program) during the word study portion of the school day. The comparison classroom used WTW and Heggerty's *Phonemic Awareness Program*.

The researcher also sought to shed light on the effectiveness of an OG based reading program in a Tier 1 setting. While many reading scientists studied the effectiveness of OG based programs on students that were at risk for dyslexia, there has been very little research performed on students in a general classroom setting. The researcher wanted to add to the literature in this area.

The attitudes of both students and parents were examined in this study. The researcher examined feelings of students related to their reading achievement before and after exposure to an OG based reading program. Parents were also asked to rate their feelings about their children's reading achievement. The researcher conducted an exhaustive search of the literature and was unable to find any studies that examined how

both parents and students felt about their reading achievement when placed in an OG based reading program. The researcher wanted to add to the literature in this area.

Review of Methodology

A pretest-to-posttest design was used to compare achievement scores of the students in this study. All of the data analyzed in this study were secondary data. The administration at the small Midwestern school permitted the researcher to evaluate the data by using a comparison model after it was collected.

The researcher compared secondary data in the areas of phonological awareness, decoding, orthography, and letter-sound automaticity. The school district in this study chose to collect data by using the Early Reading Fastbridge Assessments. The Fastbridge assessments reviewed in this study included Word Blending (Phonological Awareness), Nonsense Word Reading (Decoding), and Letter Sounds (Letter Sound Automaticity). Students completed the Fastbridge assessments in the Fall, Winter, and Spring.

The school district in this study used a different tool to measure orthography. The tool used to compare the difference in orthography achievement was the Primary Spelling Inventory (PSI). Students completed the PSI assessment in the Fall, Winter, and Spring. The researcher analyzed the PSI data by using a pretest-to-posttest model.

Parents and students completed surveys in the Fall and Spring. The parents and students answered questions about their feelings towards reading and school. The researcher designed the parent questionnaire. Students completed the Elementary Reading Attitude Survey (ERAS). The researcher compared the survey data by using the pretest-to-posttest model.

Word Blending Analysis (First Grade Classroom)

Discussion of Hypothesis 1 and 2

Hypothesis 1— FAST Early Literacy Word Blending scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 2— FAST Early Literacy Word Blending scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Table 14 summarizes the results of the Word Blending scores that were analyzed for Hypotheses 1 and 2.

Table 14

Word Blending Analysis

Hypothesis	Group	Result
Hypothesis 1	Fundations Classroom	Supported the Hypothesis
Hypothesis 2	Fundations at-risk for dyslexia group	Supported the Hypothesis

The *Fundations* groups significantly outperformed the Heggerty and *Words Their Way* groups in the area of Word Blending. The analysis revealed that the *Fundations* class Fastbridge Word Blending scores (M = 4.18, SD = 3.05) were significantly higher than that of the Heggerty and WTW class (M = 2.25, SD = 1.73). The results for the *Fundations* group that was at risk for dyslexia were also positive. The analysis revealed that the *Fundations* students that were at risk for dyslexia Fastbridge Word Blending

scores (M = 7.00, SD = 1.87) were significantly higher than that of the Heggerty and *Words Their Way* class (M = 4.33, SD = 1.52). The results from the analysis of the Fastbridge data suggested that *Fundations* was an effective, instructional approach that a teacher could use to increase phonological awareness skills in comparison to using Heggerty and WTW. The *Fundations* program worked well for both Tier 1 students and children considered at risk for dyslexia.

The strength of both the Heggerty *Phonemic Awareness Program* and *Fundations* were their systematic and explicit approach to teaching. A systematic and explicit approach to instruction has proven to be effective for all students when it comes to reading instruction (Mather & Wendling, 2012, p. 186). However, the weakness of the Heggerty program in comparison to *Fundations* was that Heggerty was primarily an auditory-based phonological awareness program.

The researcher determined that *Fundations* worked better than *Heggerty* and WTW because the *Fundations* program used alphabetic letters (Magnetic letter tiles and letter cards) in conjunction with phonological awareness (PA) instruction. Ehri et al. (2001) believed that using visual aids for letters with phonemic awareness instruction was effective because, "Sounds are ephemeral, short-lived and are hard to grasp, whereas letters provide concrete, visible symbols for phonemes. Thus, we might expect children to have an easier time acquiring PA when they are given letters to manipulate" (p. 255). Ehri et al. (2001) believed that when children were given letters to manipulate while they were learning phonemic awareness, their performance would be significantly better (p. 255). The results of this study suggested that letter manipulation during phonemic

awareness instruction was significantly better than using a predominantly auditory methodology when teaching phonemic awareness.

Discussion of Hypothesis 3 and 4

Table 15 summarizes the results of the Nonsense Word scores that were analyzed in Hypotheses 3 and 4.

Hypothesis 3 — FAST Early Literacy Nonsense Word Reading scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 4 — FAST Early Literacy Nonsense Word Reading scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Table 15

Nonsense Word Analysis (Decoding)

Hypothesis	Group	Result
Hypothesis 3	Fundations Classroom	Supported the Hypothesis
Hypothesis 4	Fundations at-risk for dyslexia group	Supported the Hypothesis

The *Fundations* groups significantly outperformed the Heggerty and *Words Their Way* groups in the area of Nonsense Word Reading. The Nonsense Word reading scores of the *Fundations* class (M = 19.35, SD = 9.62) were significantly higher than that of the Heggerty and *Words Their Way* class (M = 10.81, SD = 6.02). The group of students that

was considered at risk for dyslexia in the *Fundations* class (M = 16.4, SD = 2.70) also scored significantly higher than the Heggerty and *Words Their Way* students that were considered at risk for dyslexia (M = 6.33, SD = 3.79). The results from this study showed that *Fundations* was more effective at improving the decoding skills of children in a Tier 1 setting and children that are at risk for dyslexia.

The *Fundations* Tier 1 group and the children that were at risk for dyslexia outperformed the Heggerty and WTW group. The researcher concluded that the *Fundations* group outperformed the WTW group, because WTW was used as a phonics program in the comparison classroom. However, the problem with the phonics instruction in the comparison classroom was that WTW was not a phonics program. Sterbinsky (2007) explained that WTW was a program that worked well with phonics and vocabulary programs (p. 2). However, under no circumstances should it replace a phonics program. The results of this study suggested that using WTW as a phonics program does not work well for both Tier 1 students and students that are at risk for dyslexia.

The National Reading Panel (NPR) brought attention to the effectiveness of using a phonics program in comparison to an alternative approach in the year 2000. Research by Ehri and Flugman (2017) proved that when students used a systematic phonics program, their reading achievement significantly increased (p. 446; NPR, 2000, pp. 2-112). However, programs such as WTW continued to be used as an alternative to phonics instruction, even though administrators and teachers have known for 19 years that teaching phonics was a far more effective path to helping children to become literate. The researcher believes that programs such as WTW should continue to be used instead

of phonics programs, because of teacher and administrator belief, rather than evidence. Rayner et al. (2001) stated,

> The reason for this criticism is the emphasis phonics places on letter-sound correspondences at the expense of reading for meaning. However, this complaint is more often about the practice of phonics lessons, which are often derided as 'rote drill,' than about the essence of the approach. (p. 56; Bowey, 2006, p. 80)

The data from Hypotheses 3 and 4 suggest that using *Fundations* increases decoding ability in comparison to an WTW and Heggerty's *Phonemic Awareness Program*.

Discussion of Hypothesis 5 and 6

Table 16 summarizes the results of the Letter Sound Automaticity scores that were analyzed in Hypotheses 5 and 6.

Hypothesis 5 — FAST Early Letter Sound scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to a first-grade classroom using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 6 — FAST Early Literacy Sound scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for Dyslexia as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Table 16

Letter Sound Automaticity Analysis

Hypothesis	Group	Result
Hypothesis 5	Fundations Classroom	Supported the Hypothesis
Hypothesis 6	Fundations at-risk for dyslexia group	Supported the Hypothesis

The *Fundations* groups significantly outperformed the Heggerty and WTW groups in the area of Letter Sound Automaticity. The *Fundations* classroom Letter Sounds scores (M = 35.24, SD = 11.52) were significantly higher than that of the Heggerty and *Words Their Way* class (M = 10.75, SD = 9.26). The *Fundations* students that were considered at risk for dyslexia Letter Sounds scores (M = 42.60, SD = 9.99) were significantly higher than that of the Heggerty and *Words Their Way* class (M = 19.67, SD = 10.02). The results suggest that *Fundations* was more effective at improving the letter-sound association skills of children in a Tier 1 setting and children that are at risk for dyslexia in comparison to using Heggerty and WTW.

Based on research completed for this, the researcher believes that the *Fundations* group performed better than the Heggerty and WTW group in the Letter Sound assessment, due to the components of the *Fundations* program. The *Fundations* program explicitly and systematically teaches sounds. After a sound is taught by the instructor, the teacher reviews the sounds (*Fundations* Level 1, 2017, p. 4). The instructor reviews sounds by using the drill sounds component at the beginning of each lesson. During the drill sound section of the lesson, teachers are asked to use classroom data to provide instruction to review sounds that children need to become proficient readers (*Fundations*

Teachers Manual Level 1, 2017, p. 9, 10). *Fundations* makes learning the grapheme to phoneme connection a priority in its methodology.

The Heggerty *Phonemic Awareness Program* also instructs students on individual sounds. The Heggerty program also uses letter cards for the letter naming portion of the program. However, the difference between the *Fundations* and Heggerty group was that keywords were also assigned to each letter. The keyword helps to give children a visual image of the sound that they are asked to make. The evidence suggested that the connection between visual and auditory information and the use of data to drive instruction made the *Fundations* program more effective for students that struggled to make a letter to sound connections.

Discussion of Hypothesis 7 and 8

Table 17 summarizes the results of the Spelling Analysis scores that were analyzed in Hypotheses 7 and 8.

Hypothesis 7 — Primary Spelling Inventory scores will show an increase in achievement when the *Fundations* program is used with a first-grade classroom as compared to students considered at-risk for Dyslexia using Heggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Hypothesis 8 — Primary Spelling Inventory scores will show an increase in achievement when the *Fundations* program is used with students considered at-risk for dyslexia as compared to students considered at-risk for Dyslexia using Haggerty's *Phonemic Awareness Program* and *Words Their Way* during the 2018-2019 school year.

Table 17

Spelling Analysis

Hypothesis	Group	Result
Hypothesis 7	Fundations Classroom	Supported the Hypothesis
Hypothesis 8	Fundations at-risk for dyslexia group	Did Not Support the Hypothesis

The *Fundations* Tier 1 group significantly outperformed the Heggerty and WTW group in the area of spelling. The *Fundations* Tier 1 group scores (M = 27.88, SD = 10.33) were significantly higher than that of the Heggerty and *Words Their Way* group (M = 20.13, SD = 8.88). The data from this study suggested that Tier 1 instruction in an OG based reading program worked better for children than a classroom that used *Words Their Way* and Heggerty. Based on research completed for this study, the researcher believes that the Tier 1 students in the *Fundations* classroom outperformed the comparison group, because spelling skills relied on additional cognitive processes involved in literacy. To be a proficient speller, students must have strong phonological awareness skills. The data from this study suggested that students in the *Fundations* classroom had significantly better phonological awareness skills that the Heggerty and WTW group. Therefore, the *Fundations* classroom's phonological awareness skills led to students that were able to spell more accurately in comparison to the Heggerty and WTW classroom.

The students that were classified as at risk for dyslexia in the *Fundations* classroom did make greater gains in the area of spelling achievement than the Heggerty

and WTW students that were classified as at risk for dyslexia in this study. However, the results did not show a significant difference in the achievement between the groups. The analysis revealed that the increase in scores for the *Fundations* students that were considered at risk for dyslexia (M = 32, SD = 14.32) was not significantly higher than that of the Heggerty and WTW class (M = 27, SD = 6.08). The spelling achievement results of the students that were considered at risk for dyslexia were surprising. Typically, students that have a better foundation in phonological awareness were better spellers. However, in this study, the *Fundations* students were not significantly better than the comparison group in the area of spelling achievement. Based on research completed for this study the researcher believes that the students in the *Fundations* classroom were not significantly better spellers than the comparison group, due to an underlying process involved in spelling words.

When a child spells words, they are using both phonological awareness and fine motor muscles as well. If a student has difficulty with either phonological awareness or the graphomotor process, spellings scores are typically impacted negatively. The data from this study suggested that the *Fundations* students had made excellent phonological awareness progress. However, because the students that were considered at risk for dyslexia in the *Fundations* room spelling scores were not significantly better than the comparison group, the researcher believes that the motor processes involved in spelling may have impaired the spelling scores of these students.

Discussion of Hypothesis 9

Table 18 summarizes the results of the parent survey questions that were analyzed in Hypotheses 10.

Hypothesis 9 – Parents of students considered at-risk for dyslexia will feel more positive about their children's reading progress as measured by the pre and post-survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Table 18

Parent Survey Questions Analysis

Hypothesis 10 Questions	Group	Result
Question 1 – Enjoyment of reading	Fundations at-risk for dyslexia group	Support the Hypothesis
Question 2 – Reading Homework	Fundations at-risk for dyslexia group	Did Not Support the Hypothesis
Question 3 – Spelling ability improvement	Fundations at-risk for dyslexia	Did Not Support the Hypothesis
Question 4 – Enjoyment of going to school	Fundations at-risk for dyslexia group	Did Not Support the Hypothesis
Question 5 – Increased abilities to read difficult words	Fundations at-risk for dyslexia group	Support the Hypothesis
Question 6 – Sight word knowledge	Fundations at-risk for dyslexia group	Support the Hypothesis

The survey that parents completed about their children's attitudes and progress in school delivered mixed results. The first question in the survey received a positive response. When parents were asked about their children's attitude towards reading, the data showed that there was a significant improvement. The analysis revealed that the increase ($M = 0.6$, $SD = 0.55$) was significant. The positive response from question one supported the ERAS recreational reading attitude data that also suggested that the

children that were considered at-risk for dyslexia in this study improved their recreational reading attitudes.

Based on research completed for this study, the researcher believes that when children improve their reading skills, they feel better about reading. The children that were considered at-risk for dyslexia significantly improved their reading skills in this study. The improved student literacy skills led to improved recreational reading attitudes at home (Both the students and the parents reported this). The parent survey and ERAS data suggested that when children improved their reading skills, they enjoyed reading in a recreational setting.

The parents reported that they did not believe that their children significantly improved their attitude towards completing reading homework. The analysis revealed that the increase ($M = 1.6$, $SD = 1.82$) was not significant. The researcher believes that the parents did not see an improvement in their child's reading homework, because the parents needed more guidance to help their children with this important routine.

Parents in this study needed more guidance when it came to helping their children with reading homework each night. This much was evident from reviewing Brante's study of dyslexic children. Brante (2013) explained that all of the respondents in her study had difficulties when it came to reading in school. All of the respondents reported avoided reading, and English Language Arts work at home due to their struggles and the amount of time that it would take to complete a literacy task (Brante, 2013, p. 81, 82). Bailey, Silvern, Brabham, and Ross (2004) believed that parents should attend a homework workshop so that they are better prepared to help their children during this daily task (p. 177). The researcher also believes that the parents in this study also needed

additional help in locating texts that matched their child's reading ability for their night homework routine.

The parents of the students that were considered at-risk for dyslexia did not report a significant improvement in their children's spelling abilities. The analysis revealed that the increase (M = 1, SD = 1.22) was not significant. The results of Null Hypothesis 8 supported the data collected from the parent surveys. In Null Hypothesis 8, the data suggested that there was not a significant difference in spelling achievement between the at-risk for dyslexia students in the *Fundations* classroom versus the students in the Heggerty Phonemic Awareness and WTW group. As was discussed earlier in Chapter Five, the researcher believes that children that are considered at-risk for dyslexia in this study used too many cognitive resources in letter formation rather than spelling. This process impairs children that are considered at-risk for dyslexia in their spelling ability. The results from Null Hypotheses 8 and question 3 in the parental survey supported this conclusion.

Question 4 asked the parents the rate their children's attitudes about attending school each day. The data showed that children that were considered at-risk for dyslexia in this study did not significantly improve their attitudes about attending school. The analysis revealed that the increase (M = 1.4, SD = 1.67) was not significant. The data from question 4 supported the conclusion drawn from Null Hypothesis 9 when students were asked about their academic attitudes about reading. The results from the ERAS academic reading attitudes showed that students did not significantly improve their attitudes about reading. Therefore, the researcher believes that children in this study may not like going to school, due to the structure of the literacy block. As stated earlier, the

students in this study spent 73% of their reading block using the *Units of Study for Reading* program. The other 27% of the reading block was spent using the *Fundations* program. The researcher concluded that the children did not like going to school due to the large amount of independent and shared reading time during the reader's workshop portion of the day.

Question 5 asked the parents to rate their children's decoding abilities. The parents in this study believed that their children made a significant amount of improvement when they were decoding words. The analysis revealed that the increase ($M = 0.60$, $SD = 0.55$) was significant. The data suggested that the parents noticed the success of the *Fundations* program in the home setting. The *Fundations* program is a systematic and explicit phonics program that gave the children that were considered at-risk for dyslexia in this study many skills to help them to decode words better. The *Fundations* methodology advocated teaching students to use metacognitive skills to help them understand the structure of the words that they were reading. Improved metacognition leads to students that are better able to decode words (*Fundations* Teacher Manual Level 1, 2017, p. 11). The parents in this study noticed that their children were becoming better at decoding words, due to their newly developed metacognitive skill set.

Question six asked the parents to describe their children's ability to read sight words. The parents reported a significant increase in the number of sight words known. The analysis revealed that the increase ($M = 2$, $SD = 1.41$) was significant. Sight word instruction is a key component of the *Fundations* program. The *Fundations* Teacher Manual explained that these "trick" words must be memorized, because they were used

so commonly in the English language (*Fundations* Teacher Manual Level 1, 2017, p. 5). Students that are able to quickly read sight words have an easier time reading stories.

Hypothesis 10 Discussion

Table 19 summarizes the results of the ERAS scores that were analyzed in Hypothesis 10.

Hypothesis 10 – Children that are considered at-risk for dyslexia will feel more positive about their reading progress as measured by the pre and post-test survey, by the end of the 2018-2019 school year when the *Fundations* program is used.

Table 19

ERAS Analysis

Hypothesis 9	Group	Result
Overall ERAS Reading Attitude Scores	Fundations at-risk for dyslexia group	Supported the Hypothesis
ERAS recreational attitudes about reading	Fundations at-risk for dyslexia group	Supported the Hypothesis
ERAS Academic reading attitudes	Fundations at-risk for dyslexia group	Did Not Support the Null Hypothesis

The students in the *Fundations* classroom that were considered at-risk for dyslexia improved their overall attitudes about reading. The overall ERAS scores revealed that the increase ($M = 29.00$, $SD = 22.17$) was significant. The researcher also drew that conclusion that the students that were at-risk for dyslexia in the *Fundations* classroom improved their recreational attitudes about reading. The analysis revealed that the increase ($M = 45.2$, $SD = 15.47$) was significant. The students that were considered at risk for dyslexia were found to have improved their overall attitudes about reading.

The students classified as being at risk for dyslexia also improved their attitudes about reading recreationally by the end of this study, as well.

The students that were considered at-risk for dyslexia did not improve their academic attitudes about reading. The analysis revealed that the increase ($M = 5.6$, $SD = 29.97$) was not significant. Several reasons can explain why the students in this study did not improve their academic attitudes about reading.

The duration of the *Fundations* reading program was approximately 30 minutes each day. The time allotted for reading instruction for the entire day at the small midwestern school in this study was 110 minutes. That means *Fundations* was only 27% of the reading block each day. The other reading program that was used during the reading block was the *Units of Study for Teaching Reading*. The researcher thinks that the students classified as being at risk for dyslexia enjoyed using the *Fundations* program each day. However, based on research completed for this study, the researcher believes that the students considered at risk for dyslexia had a limited amount of reading enjoyment during the *Units of Study for Teaching Reading* portion of the day. (The other 73% of the day). The children that were considered at risk for dyslexia in this study may not have enjoyed the *Units of Study for Teaching Reading* instruction, because the program did not meet their learning needs.

The *Fundations* program is explicit and systematic. The teacher does not move on to teaching new content until 80% of the students achieve mastery at the end of each unit (*Fundations* Teacher Manual Level 1, 2017, p. 99). When students do not achieve mastery, teachers use data to drive their instruction to help catch those students up (*Fundations* Teacher Manual Level 1, 2017, p. 11). Based on research completed for this

study, the researcher believes that the students felt confident during the *Fundations* portion of the school day because they knew that they would be successful.

The *Units of Study for Teaching Reading* program explained that children should be reading for a significant amount of time each day. The Teacher's College website explained that children should be guaranteed up to 45 minutes of uninterrupted reading time daily (Teachers College Reading and Writing Project, n.d., para. 5). The Teachers College Reading and Writing Project (n.d.) explained, "Providing students with protected reading time is necessary to support their growth in reading" (para. 5). Many reading scientists agreed with this approach to teaching reading. There was a significant amount of evidence that proved that when children read more often, they could make significant reading progress (Allington, 2013, p. 525; Brozo, Shiel, & Topping, 2007, p. 311). Wide reading is an excellent idea for all children. However, it only works if the books available during the independent and shared reading portion of the day are appropriate for all learners.

Lucy Calkins and the Teachers College agreed that readers must select appropriate texts. The Teachers College Reading and Writing Project explained (n. d.), "Multiple studies have found specifically that matching readers to texts supports growth in reading" (para. 7). However, more guidance needs to be given to teachers and school districts about book selection, when it comes to students that are at-risk for dyslexia. The authors from the Teacher's College believed that explaining to teachers that students should read books at their independent level would be sufficient for all learners. The Teachers College Reading and Writing Project (n.d,) argued, "The authors conclude by contending that in order for students to become proficient readers, they must read texts

which match their independent reading levels" (para. 8). While reading independent level texts based on reading level works for some readers, it can also be highly problematic for children that are at risk for dyslexia.

Children that are considered at-risk for dyslexia are believed to develop poor reading habits when their independent leveled books are not controlled for phonics patterns that they have already been taught. Spear-Swerling (2018) explained, "Especially for struggling decoders, such texts often lend themselves more to guessing at words based on pictures and sentence context than to the application of decoding skills" (p. 205). Children that received instruction in typical literacy programs such as the *Units of Study for Teaching Reading* are taught to decode unknown words based on the meaning and context of the story (Spear-Swerling, 2018, p. 205). When children guess words that are unknown to them, bad reading habits develop. Spear-Swerling (2018) explained that is why many structured literacy programs do not allocate a significant amount of time to independent reading. Spear-Swerling (2018) stated, "Also, for students with dyslexia and other serious decoding problems, it is difficult for the teacher to know during silent independent reading the extent to which students are reading words accurately" (p. 209). Therefore, the *Units of Study for Teaching Reading* program should be reevaluated when it comes to teaching students that are at-risk for dyslexia.

Implications

The Five Pillars of Reading Instruction Are Effective for All Students. The purpose of this study was to shed light on the effectiveness of an Orton Gillingham based reading program. The researcher collected data from a first-grade classroom that used

Fundations (An OG based reading program) and a classroom using Heggerty's *Phonemic Awareness Program* and WTW during the word study portion on the day.

The results from the whole classroom suggested that the OG based reading program (*Fundations*) was significantly more effective than the comparison program. All of the results from the *Fundations* classroom were significantly higher than the comparison classroom in the areas of phonological awareness, decoding, letter-sound fluency, and spelling. The students that were considered at risk for dyslexia also scored significantly higher than the students in the comparison classroom in the areas of phonological awareness, decoding, and letter-sound fluency. The at-risk students for dyslexia also scored higher on the spelling assessment than the comparison group. However, not significantly higher.

The data in this study supported the conclusions that were drawn by the NPR. The NPR recommended that classroom teachers give their students instruction in the areas of phonemic awareness, phonics, fluency, vocabulary, and reading comprehension. The NRP found that phonemic awareness, phonics, fluency, vocabulary, and reading comprehension instruction significantly improved children's reading abilities (NPR, 2000, 2-6, 2-120, 3-18, 4-20, 4-46). The *Fundations* program uses the five pillars of reading instruction that are recommended by the NPR.

The OG method used by *Fundations* worked well for all students in this study because it was created by researchers that relied on evidence about best teaching practices from the NRP. The results suggest that the Orton Gillingham instructional method is effective for both students in a classroom setting, as well as students that are considered at risk for dyslexia.

Students Need A Reader's Workshop that Works for Everyone. The student survey data from this study suggested that students improved their enjoyment of reading as a recreational activity. When students enjoy reading outside of school, they read more often and develop important language and literacy skills. Kim (2009) suggests that recreational reading activities have a strong influence on foundational reading skills (p. 76). The data from this study showed that the *Fundations* program was a success in influencing reading attitudes.

However, the student and parent survey data suggested that there was not a significant improvement in academic reading attitudes. The students that were considered at risk for dyslexia made a significant amount of improvement in phonological awareness, decoding, and letter-sound fluency. This group of students also increased their spelling achievement, but not by a significant amount compared to the Heggerty and WTW students considered at risk for dyslexia.

The *Fundations* program is systematic and explicit. Students in the *Fundations* classroom spent a small amount of time reading controlled text stories each week. Controlled texts stories only contained spelling and word patterns that have been taught in the classroom. The students that were considered at risk for dyslexia read for the greatest amount of time during reader's workshop. The students read independent level books during reader's workshop, not controlled texts. The researcher believes that the students did not enjoy the time that they spent reading independently and with partners during reader's workshop.

The students that were considered at risk for dyslexia in this study did not enjoy their independent and shared reading time, due to the methodology used in their typical

literacy portion of the day. The reader's workshop program used by the small midwestern school district explained that children should read for a large amount of time each day (Research Base Underlying the Teachers College Reading and Writing Project's Approach to Literacy Instruction, n.d., para. 4). Sparks, Patoon, and Murdoch (2013) explained, "There is a strong consensus in the research literature and in popular culture about the importance of broad and frequent reading" (p. 190). According to Fisher, Ross, and Grant (2010) wide reading can help students make significant gains in reading. However, the research has not gone far enough to evaluate the effectiveness of wide reading and academic success for students that are considered at risk for dyslexia. Sparks, Patton, and Murdoch (2013) explained, "As early as first grade, a pattern is established whereby children with strong early reading skills engage in reading more than their less skilled peers" (p. 209). Based on research completed for this study, the researcher believes that the students that were at risk for dyslexia would enjoy their academic reading time significantly more if these students selected books based on reading skills they had already learned instead of the recommendations of the program, which suggest using high-interest texts based on a child's independent reading level. However, using a child's independent reading level ignores what skills they have mastered.

Based on research completed for this study, the researcher believes that the students that are considered at risk for dyslexia need to start the reader's workshop with only decodable texts. While selecting an independent level book is helpful to teachers for most readers, it is not helpful when selecting books for students at risk for dyslexia. Students considered at risk for dyslexia will often fail to read books that they select in

their guided reading level, due to the number of unknown words and varying complexity of texts within each guided reading level. This leads to a vicious cycle of word guess and frustration. To avoid this inevitable cycle, students that are considered at risk for dyslexia must use decodable texts during the reader's workshop portion of the school day.

The researcher also recommends that reading scientists need to develop a new reader's workshop model. This model must give guidance beyond high-interest books and independent reading levels. The new Reader's Workshop model will give teachers explicit guidance about how to appropriately match books to each reader. When a new model of reader's workshop is created, the academic reading attitudes of all students considered at risk for dyslexia will significantly improve.

Homework Training Model for Parents.

The parents in this study did not see significant improvement in their children's confidence while completing homework. Based on research completed for this study, the researcher believes that the students considered at risk for dyslexia in this study did not increase their confidence while completing reading homework, because their parents were not trained in how to best help their children while completing reading homework. When parents receive homework training from experts, their children are more successful with reading homework. Bailey et al. (2004) explained that parents that received homework instruction, had children with better reading performance throughout the school year (p. 177; Orkin, May, & Wolf, 2017, p. 532).

Bailey et al. (2004) believed that a homework training model should be used to ensure that children receive the best instructional support possible at home (p. 178). Bailey et al. (2004) explained:

> Educators are also urged to involve parents in homework workshop sessions that will (a) provide them with the skills they need to effectively assist their students to draw conclusions about reading selections, (b) utilize their ideas for creating reading assignments that are interesting to parents and students, and (c) motivate their involvement using research on student achievement directly related to parent involvement. (p. 178)

There is a growing body of evidence that supports the need for parental training in student homework. Dumont, Trautwein, Nagy, and Nagenast (2014) argued, "Improving parents' skills so that they can provide adequate help with homework seems to be particularly important for low achieving children" (p. 158). Students that struggled with reading, often did not like to complete reading homework, because it was challenging for them. This might also lead to parent frustration if parents are not properly trained to help their children.

Homework frustration from both parents and children can lead to negative interactions at home when it comes to completing reading homework. Dumont et al. (2014) argued:

> Furthermore, the fact that parental control was not only influenced by low achievement but also led to more homework procrastination, which then led to lower achievement, implies that there is a risk that parents and students will fall into a vicious circle in the homework context. (p. 158)

The data from this study suggested that homework became problematic because the students that were considered at risk for dyslexia struggled to complete the homework, due to their reading impairments. When children struggle to complete reading homework, it might lead to parental frustration. The researcher concluded that the best way to fix this problem was to offer more support to parents when it comes to homework completion.

Recommendations for Future Research

Based on research completed for this study, the researcher believes that the connection between phonological awareness and graphomotor processing must be further researched. In this study, the *Fundations* students that were considered at risk for dyslexia scored significantly higher than the comparison group in the phonological awareness assessment. However, their spelling scores were not significantly higher. There needs to be more research completed to help educators figure out how to help students that are considered at risk for dyslexia to become better spellers.

Based on research completed for this study, the researcher believes that the students were not significantly better at spelling in the *Fundations* group, because the children that were considered at risk for dyslexia spent too many of their cognitive resources on letter formation rather than spelling each word. When students spend too much of their cognitive power on handwriting, there are not enough cognitive resources left to spell a word correctly. Kandel, Lassus-Sangosse, Grosjacques, and Perret (2017) explained, “The difficulties with orthographic processing affected motor processing by increasing movement time and producing more dysfluency while writing” (p. 241; Graham, Harris, & Adkins, 2018, p. 1275). Kandel et al. (2017) proved that adding the

additional process of motor movement to spelling impairs dyslexic students more significantly than their peers. Kandel et al. (2017) stated, "The children with dyslexia and dysgraphia systematically exhibited longer and more dysfluency than controls. This means that the spelling activation spread into motor processes in a stronger manner" (p. 241, 242; Adkins et al., 2018, p. 1275). The researcher concluded that the students that were considered at risk for dyslexia did not have significantly better spellings scores than the comparison group because they did not have fluent handwriting skills.

One difference between the Heggerty and WTW group and the *Fundations* students was that the comparison group used the same handwriting program in both Kindergarten and first grade. The *Fundations* group used *Handwriting without Tears* in Kindergarten and then relied on the *Fundations* program for handwriting instruction. The researcher determined that the comparison group spent more time during the school year perfecting their handwriting, compared to the *Fundations* group. If the Heggerty and WTW students were more fluent in their handwriting skills, it would be easier for them to spell words more efficiently, compared to the at-risk-for-dyslexia students in the *Fundations* classroom. The students that were at risk for dyslexia in the *Fundations* classroom may have benefitted from using the same handwriting program for more than one year.

The study by Graham, Harris, and Adkins (2018) supported this conclusion: Graham et al. (2018) explained, "When compared to students receiving phonological awareness instruction, students who received supplemental handwriting and spelling instruction made greater gains on the alphabet handwriting fluency and paragraph handwriting fluency measures" (p. 1287). In the study completed by Graham et al.

(2018), the handwriting intervention group made significantly better gains than a group that just received phonological awareness support. Graham et al. (2018) explained, "The combined supplemental handwriting and spelling instruction these children received had a positive impact on their handwriting and spelling" (p. 1290). Therefore, the researcher concluded that when students that are considered at risk for dyslexia, receive additional handwriting support, their cognitive resources are more available to spell words accurately. That would explain the difference in the scores between the groups. The Heggerty and WTW group received more handwriting training than the *Fundations* group. This handwriting practice decreased the gap in achievement between the two groups. However, the researcher's belief needs further research to help administrators, policymakers, and teachers come up with better spelling interventions for students that are considered at risk for dyslexia.

The OG method that was used to create *Fundations* relied heavily upon using a multisensory approach to teaching phonics. While the data from this study suggested that the *Fundations* program worked better than Heggerty and WTW, it is not clear if the multi-sensory aspect of the instruction helped to produced better gains. The OG method that Orton and Gillingham created employed the use of visual, auditory, and kinesthetic information to teach phonics to students (Ritchey & Goeke, 2006, p. 171). However, there was little evidence to support that the multi-sensory aspect of the OG method works better in comparison to an alternative method.

The researcher recommends that researchers conduct additional comparison studies to shed light on the multisensory process. A phonics program that does not use a

multisensory approach to teaching reading should be compared to *Fundations*. In the future, researchers should find alternative programs and compare the differences.

The researcher believes that *Fundations* worked better than Heggerty and WTW, because *Fundations* was created by using the recommendations of the NPR. The WTW and Heggerty group was lacking a true phonics program. Therefore, it was difficult to compare to the effectiveness of the two groups. The main conclusion that the researcher can draw from this study is that teaching, based on the recommendations of the evidence from the NPR, works significantly better than using programs that are not based on NRP evidence.

Limitations

The researcher determined that student attendance was a significant threat to validity. The school district the researcher used in the study had student attendance issues. If students were absent from school for a significant number of days, their performance may be lower due to attendance and not the program used in the classroom. The researcher also concluded that the number of participants in the study was a threat to validity. The OG based reading program classroom had 17 students using the *Fundations* program and 16 students in the comparison classroom used *Words Their Way* and Heggerty. The small number of students in each classroom is a limitation of the study. It would be beneficial to have a larger sample size. The engagement level of the students in both classes is also a threat to validity. The engagement level of the students cannot be measured and will inevitably vary. If students in one room are more engaged than students in a different classroom, the results will show higher growth even if the program was not as effective. The researcher used the *Fundations* program in his classroom for

the duration of the study. The researcher concluded that being the teacher and researcher is a conflict of interest and a threat to the validity of the study.

The researcher used a convenience sample. The sample was limited to two classrooms. There were no additional classrooms that could be added to the study based, on the school district's preference for the reading programs being used during the 2018-2019 school year. The makeup of the researcher's class and the classroom using *Words Their Way* and Heggerty's *Phonemic Awareness Program* was chosen by the administration during the previous summer. There was nothing that the researcher could do to address the makeup of each class.

Conclusion

The Orton Gillingham teaching method was commonly used in schools (Ritchey & Goeke, 2006, p. 172). However, there was little evidence to support the use of OG based reading programs to help students learn more effectively in Tier 1, 2 and 3 settings (Ring et al., 2017, p. 384). The researcher sought to shed light on the effectiveness of an OG based reading program in comparison to the use of Heggerty's *Phonemic Awareness Program* and *Words Their Way*.

The researcher analyzed data collected from the *Fundations* group and the Heggerty and *Words Their Way* group. A pretest-postest model was used to compare the data collected from both classrooms. The areas of phonological awareness, decoding, letter-sound fluency, and spelling were collected to analyze student achievement. The achievement was compared in two different groups. The researcher compared the achievement of *Fundations* students to the Heggerty and *Words Their Way* students. The second group that was analyzed were the group of students considered at risk for dyslexia

in the *Fundations* classroom compared to the students considered at risk for dyslexia in the Heggerty and *Words Their Way* classroom.

Student and parent survey data were collected from the children considered at risk for dyslexia in the *Fundations* classroom. Data were collected from the at-risk-for-dyslexia group to measure the growth in academic and recreational reading attitudes. The parents and students were given the surveys in the Fall and the Spring.

The survey data suggested that students in the OG based reading program (*Fundations*) improved their reading abilities significantly more than the students in the Heggerty and *Words Their Way* classroom. The whole classroom data suggested that the *Fundations* group fared significantly better in the areas of phonological awareness, decoding, letter-sound fluency, and spelling than the Heggerty and *Words Their Way* group.

The students that were considered at risk for dyslexia in the *Fundations* group also performed significantly better than the students in the comparison classroom. The students considered at risk for dyslexia in the *Fundations* classroom performed significantly better than the comparison group in phonological awareness, decoding, and letter-sound fluency. The *Fundations* group also performed better in spelling. However, the spelling scores were not significantly better than the Heggerty and *Words Their Way* group.

The student survey data suggested that the children improved their recreational attitudes and overall attitudes about reading. However, the students considered at risk for dyslexia did not show a significant amount of improvement in their academic reading attitudes. Based on research completed for this study, the researcher believes that the

students enjoyed the *Fundations* portion of the school day. However, the researcher concluded that the students considered at risk for dyslexia did not enjoy the typical literacy instruction used in the reader's workshop portion of the school day. Therefore, policymakers, administrators, and educators must research the effectiveness of each reading program before it is implemented.

The parent survey data revealed that parents believed that their children significantly improved their attitudes about reading; they were able to use many strategies to decode words, and that their sight word knowledge increased. The parents also believed that their children did not enjoy reading homework, that their spelling abilities did not improve and that their children did not increase their enjoyment of going to school.

The data from the parents suggested that caretakers may need more help with using effective homework strategies at home. Based on research completed for this study the researcher believes that a homework workshop model should be used to help parents with homework. The student attitudes about academic reading also need more research. Policymakers, administrators, and teachers need more guidance on how to implement the typical literacy practices used in reader's workshop for students that are considered at risk for dyslexia.

The survey data from parents' attitudes about spelling achievement also supported the PSI student data from the children that were considered at risk for dyslexia. The students that were considered at risk for dyslexia did not perform significantly better than the comparison group in spelling achievement. More research must be completed to shed

additional light on how the phonological awareness process connects to the motor processes involved in spelling.

The most significant finding from the study is that the OG based reading program worked significantly better than the comparison program of Heggerty and *Words Their Way*. The researcher determined that *Fundations* worked well in this study, because it was created by using evidence from the NPR. Therefore, when administrators are considering using an OG based reading program, they should first investigate whether the program uses evidence from the NPR to support the instructional methodology used by the program. If the program is grounded in evidence used by the NPR, then it should work well for students in a Tier 1 setting and with children that are considered at risk for dyslexia.

References

Aarnoutse, C., Leeuwe, J. V., Voeten, M., & Oud, H. (2001). Developing of decoding, reading comprehension, vocabulary, and spelling during the elementary school years. *Reading and Writing: An Interdisciplinary Journal, 14*(1-2), 61-89.

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.

Adlof, S. M., Scoggins, J., Brazendale, A., Babb, S., & Petscher, Y. (2017). Identifying children at risk for language impairment or dyslexia with group-administered measures. *Journal of Speech, Language, and Hearing Research, 60*(12), 3507-3522. doi:10.1044/2017_jslhr-l-16-0473

Allington, R. L. (2013). What really matters when working with struggling readers. *The Reading Teacher, 66*(7), 520-530. doi:10.1002/trtr.1154

Araújo, S., Pacheco, A., Faísca, L., Petersson, K. M., & Reis, A. (2010). Visual rapid naming and phonological abilities: Different subtypes in dyslexic children. *International Journal of Psychology, 45*(6), 443-452. doi:10.1080/00207594.2010.499949

Arens, K., Grove, M. K., & Abate, R. (2018). Oral reading fluency with Ipods. *Reading Improvement, Summer*, 55(2), 54-62.

Arnell, K. M., Joanisse, M. F., Klein, R. M., Busseri, M. A., & Tannock, R. (2009). Decomposing the relation between Rapid Automatized Naming (RAN) and reading ability. *Canadian Journal of Experimental Psychology, 63*(3), 173-184. doi:10.1037/a0015721

Bailey, L. B., Silvern, S. B., Brabham, E., & Ross, M. (2004). The effects of interactive reading homework and parent involvement on children's inference responses. *Early Childhood Education Journal,32*(3), 173-178. doi:10.1023/b:ecej.00000 48969.91442.36

Bakos, S., Landerl, K., Bartling, J., Schulte-Körne, G., & Moll, K. (2017). Deficits in letter-speech sound associations but intact visual conflict processing in dyslexia: Results from a Novel ERP-Paradigm. *Frontiers in Human Neuroscience, 11*. doi: 10.3389/fnhum.2017.00116

Bear, D. R., Invernizzi, M., Templeton, S., & Johnston, F. R. (2012). *Words their way: Word study for phonics, vocabulary, and spelling instruction*. Upper Saddle River, NJ: Pearson Education.

Bishop, D. V. M., & Adams, C. (1992). Comprehension problems in children with specific language impairment: Literal and inferential meaning. *Journal of Speech and Hearing Research, 35*(1), 119-129.

Blomert, L. (2011). The neural signature of orthographic–phonological binding in successful and failing reading development. *NeuroImage, 57*(3), 695-703. doi:10. 1016/j.neuroimage.2010.11.003

Bowey, J. A. (2006). Need for systematic synthetic phonics teaching within the early reading curriculum. *Australian Psychologist, 41*(2), 79-84. doi:10.1080/ 00050060600610334

Brante, E. W. (2013). 'I don't know what it is to be able to read': How students with dyslexia experience their reading impairment. *Support for Learning, 28*(2), 79-86. doi:10.1111/1467-9604.12022

Brozo, W. G., Shiel, G., & Topping, K. (2007). Engagement in reading: Lessons learned from three PISA countries. *Journal of Adolescent & Adult Literacy, 51*(4), 304-315. doi:10.1598/jaal.51.4.2

Burden, R. (2008). Is dyslexia necessarily associated with negative feelings of self-worth? A review and implications for future research. *Dyslexia*. doi:10.1002/dys.371

Caravalas, M., Lervåg, A., Mousikou, P., Efrim, C., Litavský, M., Onochie-Quintanilla, E., Salas, N., . . . Hulme, C. (2012). Common patterns of prediction of literacy development in different alphabetic orthographies. *Psychological Science*, *23*(6), 678–686. doi: 10.1177/0956797611434536

Castles, A., Rastle, K., & Nation, K. (2018). Corrigendum: Ending the Reading Wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest, 19*(2), 93-93. doi:10.1177/1529100618786959

Chall, J. S. (1967). *Learning to read: The great debate.* New York, NY: McGraw-Hill.

Colenbrander, D., Ricketts, J., & Breadmore, H. L. (2018). Early identification of dyslexia: Understanding the issues. *Language, Speech, and Hearing Services in Schools*, *49*(4), 817-828. doi:10.1044/2018_LSHSS-DYSLC-18-0007

Dessemontet, R. S., Chambrier, A. D., Martinet, C., Moser, U., & Bayer, N. (2017). Exploring phonological awareness skills in children with intellectual disability. *American Journal on Intellectual and Developmental Disabilities, 122*(6), 476-491. doi:10.1352/1944-7558-122.6.476

Dimitrov, D. M., & Rumrill, P. D. (2003). Pretest-posttest designs and measurement of change. *Work, 20*(2003), 159-165.

Duff, F. J., & Clarke, P. J. (2010). Practitioner review: Reading disorders: What are the effective interventions and how should they be implemented and evaluated? *Journal of Child Psychology and Psychiatry, 52*(1), 3-12. doi:10.1111/j.1469-7610.2010. 02310.x

Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology, 106*(1), 144-161. doi:10.1037/a0034100

Dyslexia Screening Organizer. (n.d.). Retrieved from https://dese.mo.gov/sites/default/files/curr- dyslexia-screening-organizer.pdf

EarlyReading Composite. (2018). In *Fastbridge Learning*. Retrieved from https://prod-app02-green.fastbridge.org/training/module.do?moduleId=36.

Ehri, L. C., & Flugman, B. (2017). Mentoring teachers in systematic phonics instruction: Effectiveness of an intensive year-long program for kindergarten through 3rd grade teachers and their students. *Reading and Writing, 31*(2), 425-456. doi:10.1007/s11145-017-9792-7

Ehri, L. C., Nunes, S. R., Stahl, S. A., & Willows, D. M. (2001). Systematic phonics instruction helps students learn to read: Evidence from the National Reading Panel's Meta-Analysis. *Review of Educational Research, 71*(3), 393-447. doi:10.3102/00346543071003393

Eldredge, J. L. (2005). Foundations of fluency: An exploration. *Reading Psychology, 26*(2), 161-181. doi:10.1080/02702710590930519

Farrall, M. L. (2012). *Reading assessment: Linking language, literacy, and cognition*. Hoboken, NJ: John Wiley and Sons.

Farris, P. J., & Werderich, D. E. (2011). *Language arts: Process, product, and assessment for diverse classrooms*. Long Grove, IL: Waveland Press.

Fastbridge Resources. (n.d.). Retrieved from https://prod-app02-blue.fastbridge.org/training/newHome.do

Fisher, D., Ross, D., & Grant, M. (2010). Building background knowledge: Improving student achievement through wide reading. *The Science Teacher, 77*(1), 23-26. Retrieved from http://www.jstor.org/stable/24145051

Florida Center for Reading Research (2003, January). *Fundations*. Retrieved from https://www.wilsonlanguage.com/wp-content/uploads/2015/04/FCRR_Fundations_Report.pdf

Fundations®: Students with a specific learning disability. (n.d.). Retrieved from https://ies.ed.gov/ncee/wwc/EvidenceSnapshot/196

Fundations overview and studies of program effectiveness. (2014). Oxford, MA: Wilson Language Training Corporation.

Gallagher, A., Frith, U., & Snowling, M. J. (2000). Precursors of literacy delay among children at genetic risk of dyslexia. *The Journal of Child Psychology and Psychiatry and Allied Disciplines, 41*(2), 203-213. doi:10.1017/S0021963099005284

Galuschka, K., Ise, E., Krick, K., & Schulte-Körne, G. (2014). Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis

of randomized controlled trials. *PLoS ONE,9*(2). doi:10.1371/journal.pone.0089900

Georgiou, G. K., Parrila, R., & Papadopoulos, T. C. (2016). The anatomy of the RAN-reading relationship. *Reading and Writing, 29*(9), 1793-1815. doi:10.1007/s11145-016-9653-9

Gliner, J., Morgan, G., & J Harmon, R. (2003). Pretest-posttest comparison group designs: Analysis and interpretation. *Journal of the American Academy of Child and Adolescent Psychiatry, 42*(4). 500-3. doi: 10.1097/01.CHI.0000046809.95464. BE.

Goodman, K. S. (1986). Acquiring literacy is natural: Who skilled cock robin? *Theory Into Practice,26*(Sup1), 368-373. doi:10.1080/00405848709543301

Goodman, Y. M. (2011). Sixty years of Language Arts education: Looking back in order to look forward. *English Journal, September, 101*(1), 17-25.

Goss, C. L., & Brown-Chidsey, R. (2012). Tier 2 reading interventions: Comparison of reading mastery and Fundations double dose. *Preventing School Failure: Alternative Education for Children and Youth, 56*(1), 65-74. doi:10.1080/1045988x.2011.565385

Graham, S., Harris, K. R., & Adkins, M. (2018). The impact of supplemental handwriting and spelling instruction with first grade students who do not acquire transcription skills as rapidly as peers: A randomized control trial. *Reading and Writing, 31*(6), 1273-1294. doi:10.1007/s11145-018-9822-0

Graham, S., & Santangelo, T. (2014). Does spelling instruction make students better spellers, readers, and writers? A meta-analytic review. *Reading and Writing, 27*(9), 1703-1743. doi:10.1007/s11145-014-9517-0

Heggerty. (n.d.). *English primary phonemic awareness curriculum*. Retrieved from https://www.heggerty.org/phonemic-awareness-curriculum/english-primary-phonemic-awareness-curriculum

Heggerty, M., & Van Hekken, A. (2017). *Phonemic awareness: The skills that they need to help them succeed!* (Primary version): *A 35 week curriculum of daily phonemic awareness lesson plans developed on a systematic scope and sequence of skills with explicit modeling*. River Forest, IL: Literacy Resources.

Henry, M. K. (1998). Structured, sequential, multisensory teaching: The Orton legacy. *Annals of Dyslexia, 48*(1), 1-26. doi:10.1007/s11881-998-0002-9

Henry, R., Van Dyke, & Kuperman, V. (2018). Oculomotor planning in RAN and reading: A strong test of the visual scanning hypothesis. *Reading and Writing, May,* 1619-1643. doi:https://doi.org/10.1007/s11145-018-9856-3

House Bill NO.2379. (2016). Retrieved from https://house.mo.gov/billtracking/bills161/billpdf/truly/HB2379T.PDF

Hudson, R. F., Lane, H. B., & Pullen, P. C. (2005). Reading Fluency Assessment and instruction: What, why, and how? *The Reading Teacher, 58*(8), 702-714. doi:10.1598/rt.58.8.1

Humphrey, N. (2002). Teacher and pupil ratings of self-esteem in developmental dyslexia. *British Journal of Special Education, 29*(1), 29-36. doi:10.1111/1467-8527.00234

International Dyslexia Association Board of Directors. (n.d.). International Dyslexia Association, Definition of dyslexia. Retrieved from https://dyslexiaida.org/definition-of-dyslexia/

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*(1), 229-242. doi:10.1007/s11881-002-0014-9

Kandel, S., Lassus-Sangosse, D., Grosjacques, G., & Perret, C. (2017). The impact of developmental dyslexia and dysgraphia on movement production during word writing. *Cognitive Neuropsychology, 34*(3-4), 219-251. doi:10.1080/02643294.2017.1389706

Kendeou, P., Broek, P. V., White, M. J., & Lynch, J. S. (2009). Predicting reading comprehension in early elementary school: The independent contributions of oral language and decoding skills. *Journal of Educational Psychology, 101*(4), 765-778. doi:10.1037/a0015956

Kim, Y. (2007). The relationship between home literacy practices and developmental trajectories of emergent literacy and conventional literacy skills for Korean children. *Reading and Writing, 22*(1), 57-84. doi:10.1007/s11145-007-9103-9

Kim, Y., Otaiba, S. A., Puranik, C., Folsom, J. S., & Gruelich, L. (2013). The contributions of vocabulary and letter writing automaticity to word reading and spelling for kindergartners. *Reading and Writing*, *27*(2), 237-253. doi:10.1007/s11145-013-9440-9

Klauda, S. L., & Guthrie, J. T. (2008). Relationships of three components of reading fluency to reading comprehension. *Journal of Educational Psychology, 100*(2), 310-321. doi:10.1037/0022-0663.100.2.310

Kostewicz, D. E., & Kubina, R. M. (2008). The National Reading Panel Guidepost: A review of reading outcome measures for students with emotional and behavioral disorders. *Behavioral Disorders*, *33*(2), 62–74. doi: 10.1177/019874290803300201

Labat, H., Vallet, G., Magnan, A., & Ecalle, J. (2015). Facilitating effect of multisensory letter encoding on reading and spelling in 5-year-old children. *Applied Cognitive Psychology, 29*(3), 381-391. doi:10.1002/acp.3116

Learning Difficulties: Factsheet 6: What is phonological processing? (2014). Retrieved from https://www.education.act.gov.au/__data/assets/pdf_file/0009/714339/Learning-Difficulties-Factsheet-6.pdf

Lee, J. (2011). Size matters: Early vocabulary as a predictor of language and literacy competence. *Applied Psycholinguistics, 32*(01), 69-92. doi:10.1017/s0142716410000299

Literacy Resources, Inc. (n.d.). Retrieved from https://www.literacyresources inc. com/

Literacy Resources, Inc. (2019). Heggerty Phonemic Awareness Curriculum. Retrieved from https://www.heggerty.org/

Lopez, J., & Campoverde, J. (2018). Development of reading comprehension with graphic organizers for students with dyslexia. *Journal of Technology and Science Education, 8*(2), 105. doi:10.3926/jotse.414

Mather, N., & Wendling, B. J. (2012). *Essentials of dyslexia assessment and intervention*. Hoboken, N.J: Wiley.

Mckenna, M. C., & Kear, D. J. (1990). Measuring attitude toward reading: A new tool for teachers. *The Reading Teacher, 43*(8), 626-639. doi:10.1598/rt.43.8.3

McMaster, K. L., & Wagner, D. (2007). Monitoring response to general education instruction. In S. R. Jimerson, M. K. Burns, & A. M. Van Der Heyde (Eds.), *Handbook of Response to intervention* (pp. 223-233). Boston, MA: Springer.

Mcnulty, M. A. (2003). Dyslexia and the life course. *Journal of Learning Disabilities, 36*(4), 363-381. doi:10.1177/00222194030360040701

Melby-Lervag, M., Halaas Lyster, S., & Hulme, C. (2012). Phonological skills and their role in learning to read: A meta-analytic review. *Psychological Bulletin, 138*(2), 322-352. doi:10.1037/a0026744.suppPhonemic Awareness Curriculum. (n.d.). Retrieved from https://www.literacyresourcesinc.com/version-descriptions/

Meng, C. (2015). Joint book reading and receptive vocabulary: A parallel process model. *Infant and Child Development, 25*(1), 84-94. doi:10.1002/icd.1925

Minogue, J., & Jones, M. G. (2006). Haptics in education: Exploring an untapped sensory modality. *Review of Educational Research, 76*(3), 317-348. doi:10.3102/0034 6543076003317

MO Dyslexia Law and Dyslexia Task Force Recommendations. (n.d.). Retrieved from http://decodingdyslexia-mo.org/mo-dyslexia-law-addresses-screening-classroom-support-teacher-training-establishes-the-dyslexia-task-force/

Morgan, P. L., Fuchs, D., Compton, D. L., Cordray, D. S., & Fuchs, L. S. (2008). Does early reading failure decrease children's reading motivation? *Journal of Learning Disabilities, 41*(5), 387-404. doi:10.1177/0022219408321112

Moritz, C., Yampolsky, S., Papadelis, G., Thomson, J., & Wolf, M. (2012). Links between early rhythm skills, musical training, and phonological awareness. *Reading and Writing, 26*(5), 739-769. doi:10.1007/s11145-012-9389-0

Murphy, K. A., Justice, L. M., Oconnell, A. A., Pentimonti, J. M., & Kaderavek, J. N. (2016). Understanding risk for reading difficulties in children with language impairment. *Journal of Speech, Language, and Hearing Research, 59*(6), 1436-1447. doi:10.1044/2016_jslhr-l-15-0110

Nalavany, B. A., Carawan, L. W., & Sauber, S. (2013). Adults with dyslexia, an invisible disability: The mediational role of concealment on perceived family support and self-esteem. *British Journal of Social Work, 45*(2), 568-586. doi:10.1093/bjsw/bct152

National Academy of Education., & Anderson, R. C. (1985). *Becoming a nation of readers: The report of the Commission on Reading*. Washington, D.C: National Academy of Education.

National Reading Panel (U.S.), & National Institute of Child Health and Human Development (U.S.). (2000). *Teaching children to read: an evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: reports of the subgroups*. Report of the National Reading Panel. Washington, D.C.: National Institute of Child Health and Human Development, National Institutes of Health.

Neef, N. E., Muller, B., Liebeg, J., Schaadt, G., Grigutsch, M., Gunter, T. C., . . . Friederici, A. D. (2017). Dyslexia risk gene relates to representation of sound in the auditory brainstem. *Developmental Cognitive Neuroscience, 24*, 63-71. http://dx.doi.org/10.1016/j.dcn.2017.01.008 1878-9293

Nelson, J. M. (2015). Examination of the double-deficit hypothesis with adolescents and young adults with dyslexia. *Annals of Dyslexia, 65*(3), 159-177. doi:10.1007/s11881-015-0105-z

Oakland, T., Black, J. L., Stanford, G., Nussbaum, N. L., & Balise, R. R. (1998). An evaluation of the dyslexia training program. *Journal of Learning Disabilities, 31*(2), 140-147. doi:10.1177/002221949803100204

O'Meara, J. (2011). *RTI with differentiated instruction, grades K–5 : A classroom teacher's guide*. Thousand Oaks, CA: Corwin.

Orkin, M., May, S., & Wolf, M. (2017). How parental support during homework contributes to helpless behaviors among struggling readers. *Reading Psychology, 38*(5), 506-541. doi:10.1080/02702711.2017.1299822

Orthographic Processing: A subcomponent, not a subtype, of developmental dyslexia. (2014, November). Dallas, TX: Luke Waites Center for Dyslexia and Learning Disorders.

Pikulski, J. J., & Chard, D. J. (2005). Fluency: Bridge between decoding and reading comprehension. *The Reading Teacher, 58*(6), 510-519. doi:10.1598/rt.58.6.2

Puolakanaho, A., Ahonen, T., Aro, M., Eklund, K., Leppänen, P. H., Poikkeus, A., . . . Lyytinen, H. (2007). Very early phonological and language skills: Estimating

individual risk of reading disability. *Journal of Child Psychology and Psychiatry, 48*(9), 923-931. doi:10.1111/j.1469-7610.2007.01763.x

Rasinski, T. (2006). Reading fluency instruction: Moving beyond accuracy, automaticity, and prosody. *The Reading Teacher, 59*(7), 704-706. doi:10.1598/rt.59.7.10

Rayner, K., Forman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *American Psychological Society, 2*(2), 31-74. Retrieved from https://www.jstor.org/stable/40062357.

Reid, G. (2016). *Dyslexia: A practitioner's handbook*. Chichester, West Sussex: John Wiley & Sons.

Ring, J. J., Avrit, K. J., & Black, J. L. (2017). Take flight: The evolution of an Orton Gillingham-based curriculum. *Annals of Dyslexia, 67*(3), 383-400. doi:10.1007/s11881-017-0151-9

Rief, S. F., & Stern, J. M. (2010). *The dyslexia checklist: A practical reference for parents and teachers*. San Francisco, CA: Jossey-Bass.

Ritchey, K. D., & Goeke, J. L. (2006). Orton-Gillingham and Orton-Gillingham—Based Reading Instruction. *The Journal of Special Education, 40*(3), 171-183. doi:10.1177/00224669060400030501

Schaars, M. M., Segers, E., & Verhoeven, L. (2017). Word decoding development during phonics instruction in children at risk for dyslexia. *Dyslexia, 23*(2), 141-160. doi:10.1002/dys.1556

Schuele, C. M., & Boudreau, D. (2008). Phonological Awareness Intervention: Beyond the Basics. *Language speech and hearing services in schools, 39*(1), 3. doi:10.1044/0161-1461(2008/002)

Serving students at-risk for Dyslexia: Guidance to LEA's. (n.d.). Jefferson City, MO: Department of Elementary and Secondary Education, Missouri.

Shayib, M. (2018). *Descriptive statistics – The basics for biostatistics* (1st ed., Vol. 1). London, UK: Bookboon.

Shaywitz, S. E., & Shaywitz, B. A. (2008). Paying attention to reading: The neurobiology of reading and dyslexia. *Development and Psychopathology, 20*(04), 1329. doi:10.1017/s0954579408000631

Shaywitz, S. E. (1998). Dyslexia. *New England Journal of Medicine, 338*(5), 307-312. doi:10.1056/nejm199801293380507

Shaywitz, S. E. (2005). *Overcoming dyslexia: A new and complete science-based program for reading problems at any level*. New York, NY: A. A. Knopf.

Siegle, D. (2002). An Introduction to t tests. [PowerPoint]. Retrieved from https://researchbasics.education.uconn.edu/t-test/.

Singer, E. (2005). The strategies adopted by Dutch children with dyslexia to maintain their self-esteem when teased at school. *Journal of Learning Disabilities, 38*(5), 411-423. doi:10.1177/00222194050380050401

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

Sparks, R. L., Patton, J., & Murdoch, A. (2013, March 31). Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years

later'. Retrieved from https://link.springer.com/article/10.1007/s11145-013-9439-2

Spear-Swerling, L. (2018). Structured literacy and typical literacy practices: Understanding differences to create instructional opportunities. *TEACHING Exceptional Children, 51*(3), 201-211. doi:10.1177/0040059917750160

Stats about all US cities - Real estate, relocation info, crime, house prices, cost of living, races, home value estimator, recent sales, income, photos, schools, maps, weather, neighborhoods, and more. (2009). Retrieved from http://www.city-data.com/city/

Sterbinsky, A. (2007). *Words Their Way: Spelling Inventories Reliability and Validation Study* (pp. 1-20). Memphis, TN: Center for Research in Educational Policy.

St. Louis Post-Dispatch (2019) *School District Data.* Retrieved from https://graphics.stltoday.com/apps/education/schools.

Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology, 38*(6), 934-947. doi:10.1037//0012-1649.38.6.934

Teachers College Reading and Writing Project. (n.d.). Research base underlying the Teachers College Reading and Writing Workshop's approach to literacy instruction. Retrieved from https://readingandwritingproject.org/about/research-base

Therrien, W. J. (2004). Fluency and comprehension gains as a result of repeated reading. *Remedial and Special Education, 25*(4), 252-261. doi:10.1177/07419325040250040801

Thompson, P. A., Hulme, C., Nash, H. M., Gooch, D., Hayiou-Thomas, E., & Snowling, M. J. (2015). Developmental dyslexia: Predicting individual risk. *Journal of Child Psychology and Psychiatry, 56*(9), 976-987. doi:10.1111/jccp.12412

University of Minnesota Office for Technology Commercialization. (n.d.). Formative Reading Assessment System for Teachers (FAST) - fast20100205. Retrieved from http://license.umn.edu/technologies/fast20100205_formative-reading-assessment-system-for-teachers-fast

Verhoeven, L., & Leeuwe, J. V. (2008). Prediction of the development of reading comprehension: A longitudinal study. *Applied Cognitive Psychology, 22*(3), 407-423. doi:10.1002/acp.1414

Wasik, B. A., & Iannone-Campbell, C. (2012). Developing vocabulary through purposeful, strategic conversations. *The Reading Teacher, 66*(4), 321-332. doi:10.1002/trtr.01095

Washburn, E. K., Joshi, R. M., & Cantrell, E. B. (2010). Are preservice teachers prepared to teach struggling readers? *Annals of Dyslexia, 61*(1), 21-43. doi:10.1007/s 11881-010-0040-y

Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development, 69*(3), 848. doi:10.2307/1132208

Wilson Language Training Corporation. (2012). *Fundations Teacher's Manual* (2nd ed.). Oxford, MA: Wilson Language Training Corporation

Wolf, M., & Bowers, P. G. (1999). The double-deficit hypothesis for the developmental dyslexias. *Journal of Educational Psychology, 91*(3), 415-438. doi:10.1037/0022-0663.91.3.415

Wolf, G. M. (2015). Letter-sound reading: Teaching preschool children print-to-sound processing. *Early Childhood Education Journal, 44*(1), 11-19. doi:10.1007/s 10643-014-0685-y

Woolley, G. (2010). Developing reading comprehension: Combining visual and verbal cognitive processes. *Australian Journal of Language and Literacy, 33*(2), 108-125.

Words Their Way™ Beginning Reading. (n.d.). Retrieved from https://ies.ed.gov/ncee/wwc/EvidenceSnapshot/622

Xiong, M., Milleville-Pennel, I., Dumas, C., & Palluel-Germain, R. (2013). Comparing Haptic and Visual Training Method of learning Chinese handwriting with a Haptic Guidance. *Journal of Computers, 8*(7). doi:10.4304/jcp.8.7.1815-1820

Young, C., & Rasinski, T. (2009). Implementing Readers Theatre as an approach to classroom fluency instruction. *The Reading Teacher, 63*(1), 4–13. doi: 10.1598/rt.63.1.1

Vitae

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EMPLOYMENT

Kindergarten and First Grade Teacher (2004 – 2019)
Valley Park School District

Adjunct Instructor (2014 – 2019)
Lindenwood University

EDUCATION

Completed coursework to complete reading specialist certification (2011)
Lindenwood University, St. Charles, MO.

Master of Arts and Bachelor of Arts (2004)
Maryville University, Chesterfield, MO, Magna Cum Laude

HONORS

International Dyslexia Association Teacher Scholarship Recipient (2019)
Peabody Leader in Education Award (2012-2013)
Emerson Excellence in Teaching Award (2012-2013)
Valley Park Teacher of the Year (2012)
Top 6 finalist for Missouri Teacher of the Year (2012)
ABC Award (2008)

PUBLICATIONS

Schwartz, S. (2013). Master of Disguise. *The Mailbox*, 20.

CERTIFICATIONS

Missouri: Early Childhood Education (Lifetime)
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