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Improving Phonics and Fluency Skills Using a Multisensory Language Intervention

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Improving Phonics and Fluency Skills Using a Multisensory Language Intervention

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Abstract

The purpose of this single case design study was to examine the efficacy of multisensory language instruction, specifically the Wilson Reading System, on the phonetic analysis skills and reading fluency of a single student identified as dyslexic. Data was collected for a period of eight weeks and analyzed using visual representations to determine participant growth in all areas assessed. Data showed growth of 20 words read correctly per minute (WCPM) with a projected gain of 16 WCPM according to Hasbrouk and Tindal’s (2006) reading fluency normative chart. The education implications of the study are discussed and recommendations for further research are given. Overall, the intervention was deemed successful from data collected.

Key Words: Dyslexia, multisensory structured language, Wilson Reading System, Specific Learning Disability
Chapter I
Introduction

Washburn, Joshi, and Binks-Cantrell (2002) state that “Roughly one-fifth of the US Population displays one or more symptoms of dyslexia” (p. 165). Similarly, Shaywitz (2003) asserts an estimated 5-17% of persons identified as learning disabled in the United States are, in fact, dyslexic, and the DSM-IV (American Psychiatric Association (APA), 1994) reports 4% of school-age children as dyslexic. Even though a considerable percentage of students are identified as dyslexic, very little specific legislation has been enacted to screen, remediate, and protect affected individuals (Youman & Mather, 2012). Likewise, the National Center for Learning Disabilities (NCLD) has reported alarming trends regarding individuals with learning disabilities (as cited in Cortiella & Horowitz, 2014). Despite improved public perception, a high percentage of school administrators, educators, and parents continue to believe learning disabilities are caused (a) by home environment, (b) “laziness” (Cortiella & Horowitz, 2014, p.11), (c) coincide with low IQ, and (d) associate these disorders “with sensory impairments like blindness and deafness” (Cortiella & Horowitz, 2014, p.11). Consequently, it is imperative the focus of educators and legislators be founded on the initial principle of IDEA 2004 (as cited in Hale, 2008) when proposing legislation, measures of implementation, and screening for students with dyslexia: “...to ensure that all children with disabilities have available to them a free appropriate public education...designed to meet their unique needs and prepare them for further education, employment and independent living” (p. 8). Recognizing and appropriately supporting students with dyslexia through the use of a multisensory structured language instructional program can improve academic skills, confidence, and life success as demonstrated
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in the numerous and multifarious studies reviewed (Goldstein & Obrzut, 2001; Oakland, Black, Stanford, Nussbaum, & Balise, 1998; Shaywitz, 2003; Shaywitz et al., 2004; Torgesen et al., 2001).

Statement of the Problem

Although dyslexia is not a disease to be cured through traditional medical treatments and procedures, its symptoms can be remediated (Wadlington, 2000). However, according to the Dyslexia Research Institute (n.d.), only 5 in 100 persons with dyslexia will be diagnosed and receive appropriate intervention. Without proper diagnosis and intervention, persons with dyslexia have limited success in all areas of life and often cannot even “function independently within their communities” (Dyslexia Research Institute, n.d., §1, ¶ 1).

Purpose of the Study

This study examined the efficacy of multisensory language instruction with students identified as dyslexic. The purpose of this study was to determine the effectiveness of the Wilson Reading System (Wilson, B. A. & Wilson, E., 1996), a multisensory structured language intervention, on a single dyslexic student’s phonetic analysis skills and reading fluency.

Questions of the Study

The research questions for this study were: 1) Will using the Wilson Reading System, a multisensory structured language intervention, positively affect a single dyslexic student’s phonetic analysis skills? and 2) Will using the Wilson Reading System improve the reading fluency of a single student identified as dyslexic?

Assumptions and Limitations

The assumption for this study was that educators lack adequate training to teach students with dyslexia using best practices due to limited knowledge of multisensory structured language...
intervention methods. Limitations of this study included that as this is a purposive sample designed as single case research, results may be deemed inconclusive due to single participant. Another limitation was the imposed time constraints of the Graduate Seminar Course at Governors State University. Due to imposed time constraints, all research had to be conducted within an eight-week time frame which may have undermined intervention effectiveness.

**Significance of Study**

According to the Illinois State Board of Education, the first Learning Standard for Language Arts is to "read with fluency and understanding" (1997, ¶1), and Kindergarten Common Core Standards demand a high level of phonetic analysis skills (n.d., pp. 4-5). Meeting these standards are extremely difficult for students identified as dyslexic without specific, explicit instruction (Lerner & Johns, 2012, p. 397). This study determined whether a multisensory structured language intervention, The Wilson Reading System (Wilson, B. A. & Wilson E., 1996), could significantly improve the phonetic analysis skills and reading fluency of a single student with dyslexia. The educational significance of this study was to determine the effectiveness of a multisensory structured language intervention in order to enable students with dyslexia to become successful readers, students, and eventually adults. Without present time constraints, this single case study could be the basis of future larger studies.
Definition of Terms

The following terms are essential to the present study. They are listed in alphabetical order for ease of reference to the reader.

Dyslexia. Dyslexia is a neurological, language-based disorder classified under Specific Learning Disability (SLD) in the Individuals with Disability Act of 2004 (IDEA 2004) that impairs reading ability in individuals despite possessing adequate IQ. Symptoms include (a) poor phonemic awareness, (b) encoding, (c) decoding, (d) fluency, (e) vocabulary, and (f) comprehension skills (Williams & Lynch, 2010).

Multisensory structured language intervention. Multisensory structured language interventions are highly structured methods of teaching language using more than one sense to facilitate learning and accomplish the goal of reading with fluency and understanding (Lerner & Johns, 2012). All multisensory structured language teaching methods have the same five common characteristics:

1) Help anchor verbal information by providing links with the visual, auditory, tactile, and kinesthetic pathways for learning;

2) Use highly structured phonics instruction with an emphasis on the alphabetic system;

3) Include abundant drill, practice, and repetition;

4) Have carefully planned sequential lessons; and

5) Emphasize explicit instruction in the language rule systems to guide reading and spelling. (Lerner & Johns, 2012, p. 396)

San Diego Quick Assessment of Reading Ability (SDQA). Initially published in Journal of Reading, the San Diego Quick Assessment of Reading Ability was developed in 1969.
by Margaret La Pray and Ramon Ross (as cited in Barrie-Blackley, 2011) to determine an individual’s reading level and word analysis deficits. This assessment consists of 13 word lists from pre-primer through 11th grade taken randomly “from the glossaries of basic readers and from the 1931 The Teacher’s Word Book of 20,000 Words by E. L. Thorndike” (Barrie-Blackley, 2011, ¶ 3). All lists are comprised of 10 words. Students start by reading a list of words that is two to three years below the individual’s grade level and continue moving forward or backward depending on their results from each list. Levels are determined as follows: (a) independent = 1 error, (b) instructional = 2 errors, and (c) frustration = 3 errors or more. According to Barrie-Blackley (2011), SDQA “is one test that has stood up to examination by numerous researchers” (¶ 2).

Six-Minute Solutions. Six-Minute Solutions (Adams & Brown, 2007) is a reading fluency program in which students perform daily repeated readings with a same-level partner at appropriate instructional levels. In 2000, the National Reading Panel (NPR) found students can be taught fluency and that using repeated oral readings are “appropriate and valuable avenues for increasing reading fluency and overall reading achievement” (as cited in Adams & Brown, 2007, p. 3). Research shows “a high correlation between reading comprehension and reading fluency” (NPR, 2000, as cited in Adams & Brown, 2007, p. 3). Consequently, if a student is struggling to decode words, comprehension naturally declines which supports reading fluency instruction (NPR, 2000, as cited in Adams & Brown 2007).

The Wilson Reading System (WRS). The Wilson Reading System (Wilson, B. A. & Wilson E., 1996) is an explicit, highly structured reading program for students age 8 through adulthood. Originally developed for persons identified with dyslexia, it is now used as a Tier 3 intervention in schools for students “who are not making sufficient progress with their current
intervention” (Wilson Language Training Corporation, n.d., ¶ 1). The Wilson Reading System is a multisensory structured language intervention based on Orton-Gillingham research, and its publishers state that it enables students to become fluent in encoding and decoding the English language. With this program, students are explicitly taught the rules of the English language while working on vocabulary, comprehension, sight words, fluency, and expressive oral language (Wilson Language Training Corporation, n.d., ¶ 2).

**Word Identification and Spelling Test (WIST).** The Word Identification and Spelling Test (Wilson & Felton, 2004) is a functional literacy assessment available in elementary and secondary versions. This test includes norm-referenced and informal assessments to pinpoint specific areas of deficiency in the following areas: (a) sound-symbol knowledge, (b) spelling, and (c) word identification (Academic Therapy Publications, n.d., ¶ 1 & 3).

**Chapter Summary**

Recent research shows that negative connotations and myths persist in public and academic perceptions regarding Specific Learning Disabilities including dyslexia. Dyslexia adversely affects all areas of an individual’s life and even though a large proportion of individuals with learning disabilities in the United States are dyslexic, only 5 in 100 persons will be diagnosed and receive appropriate intervention. Proper diagnosis, early intervention, and addressing the individual needs of dyslexic students is imperative to ensure academic and life success. As evidenced in numerous research studies, symptoms of dyslexia may be remediated through the use of multisensory structured language interventions which stimulate all areas of the brain simultaneously. When appropriate interventions are employed, dyslexic students can achieve academic and life success. Through the implementation of The Wilson Reading System, this single-case design research study shows success is possible for individuals with dyslexia.
Chapter II

Review of Literature

Literacy in the United States, as defined by Congress in 1991, is the ability to “read, write, and speak in English, and compute and solve problems at levels of proficiency necessary to function on the job and in society to achieve one’s goals, and develop one’s knowledge and potential” (National Literacy Act, 1991, § 3, ¶ 1). Like those who are illiterate, individuals with dyslexia struggle to become successful and productive adults (Dyslexia Research Institute, n.d., ¶ 1; Wadlington, 2000). Wadlington (2000) cites one case where an 11-year-old student who had previously “possessed a sunny disposition and looked forward to school” (p. 61), abruptly became “sullen” (p. 61) in his fourth grade year. His entire demeanor mutated and his confidence diminished as academic expectations had increased. All areas of his life were affected; he could not even be successful in physical education due to newly mandated written assessments as he did not possess the ability to read. This has long been a common plight of students with dyslexia (Wadlington, 2000).

This review of literature initially investigates the preliminary and current legislation detailing the struggles of learners with dyslexia and providing rationale for change in diagnostic procedure, early screening measures, and intervention methods. Research is presented on the five essential components of reading (formerly known as the five pillars of reading) according to the National Reading Panel (2000), depicting known deficiencies in individuals with dyslexia. Additionally, theories of dyslexia are investigated including common misconceptions in diagnosis and causational factors while recognizing those paramount in advancing awareness of the disorder as a condition that may be remediated when properly diagnosed and appropriate instructional techniques are employed (Shaywitz, 2003). Next, diagnostic measures, remediation
methods, and research on the effectiveness of using multisensory structured language intervention with struggling readers and those identified as dyslexic are presented. Finally, teacher knowledge, training, remediation efforts, and implications of their misconceptions and typical instructional practices are analyzed to expose ineffective instructional practices and accord educators with concrete evidence and pathways to promote reading achievement in dyslexic learners (Bos, Mather, Dickson, Blance, & Chard, 2001; Cunningham, Zibulsky, Stanovich, K. E., & Stanovich, P. J., 2009; Moats & Foorman, 2003; Washburn, Joshi, & Binks-Cantrell, 2011; Williams & Lynch, 2010).

Legislation

Traditionally, it was compulsory to label students as learning disabled prior to receiving special education services (Hale, 2008). The process required psychologists to administer IQ tests and then compare IQ scores to achievement scores for discrepancies (the discrepancy model) to determine if special education services were warranted. Consequently, students who struggled were forced to “wait and fail” (Hale, 2008, p. 2) prior to receiving any form of intervention. Once identified, educators were compelled to place said students, regardless of need, in the category of Specific Learning Disability (SLD) under the Individuals with Disabilities Education Act (IDEA) of 1975 (Yell, 2012). IDEA was written with four purposes in mind: (a) to ensure a free and appropriate public education and services for all students that meets individual needs, (b) to protect the rights of students and their parents/guardians, (c) to provide assistance to Federal, state, and educational agencies to ensure a free and appropriate education for children with disabilities, and (d) to ensure educational efforts for students with disabilities were assessed for effectiveness (IDEA, 2004, 20 U.S.C. § 1400(d), § 300.1). IDEA has been amended several times since taking effect in 1977 and has 13 categories of eligibility (Yell, 2012). However, students with learning disabilities, including those identified as dyslexic
continue to be compartmentalized under the SLD label despite characteristic differences (Hale, 2008).

**Specific Learning Disability (SLD)**

Dyslexia is included under the SLD “umbrella” (Youman & Mather, 2013, p. 138), along with developmental aphasia, perceptual disabilities, brain injury, and minimal brain dysfunction (Hale, 2008, p. 1). Under IDEA 2004 in Title 20 of the United States Code Section 1401(30), Specific Learning Disability is defined as follows:

> A disorder in 1 or more of the basic psychological process involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. (2004, § 300.8, ¶ 10)

Under IDEA 2004, the criterion for SLD eligibility includes inadequate achievement according to “State-approved grade-level standards” (§ 300.309, ¶ 1), despite being provided with a scientific, research-based intervention, in any of the following eight categories: “a) oral expression, b) listening comprehension, c) written expression, d) basic reading skill, e) reading comprehension, f) mathematics calculation, and g) mathematics problem solving” (IDEA, 2004, § 300.309, ¶ 2). According to Youman and Mather (2013), it is “the inconsistency in terminology and lack of clear definition of dyslexia as a distinct type of SLD” (p. 138) that cause educators to place students with dyslexia in this category and consequently use interventions that do not always remediate symptoms of this disorder (p. 138). Current and pending legislation is attempting to correct this error.

To date, specific law pertaining to dyslexia has yet to be proposed in most states. The state of Texas, the forerunner of dyslexia legislation, began lobbying for dyslexia laws in the mid 1980’s. However, Youman and Mather (2013) found only 21 additional states to have addressed
the issue as of July, 2012. Of those, much of the legislation is pending or has failed to pass into law despite scientific research evidencing the need of reform in methods of identification and remediation for individuals with dyslexia, and even fewer “have mandated universal screening for dyslexia” (p. 138). Nonetheless, the No Child Left Behind Act (NCLB) of 2002 did positively affect data collection and early screening methods of students for deficiencies in the five essential, explicit areas of reading instruction: (a) phonemic awareness, (b) phonics, (c) fluency, (d) vocabulary, and (e) comprehension (NRP, 2000). Research shows students with dyslexia generally fail to make sufficient progress to succeed in all five essential areas of reading (Shaywitz, 2003).

**Essential, Explicit Reading Elements**

After reviewing over 100,000 documents, the National Reading Panel (2000), discerned that optimum reading instruction for all students “incorporates: explicit instruction in phonemic awareness, systematic phonics instruction, methods to improve fluency, and ways to enhance comprehension” (as cited in National Institute of Child Health and Human Development (NICHD), 2013, ¶ 7). Furthermore, the panel concluded programs which delivered effective reading instruction had used a combination of methods in the following six areas: phonemic awareness, phonics, fluency, guided oral reading, vocabulary, and reading comprehension (2013, ¶ 8). Due to the findings of the NPR (2000), the “Gimme Five” movement in reading instruction was conceived and instituted in order to preemptively prevent academic failure (Ming & Dukes, 2010). Henceforth, effective reading instruction for all could be provided and implemented by employing this method which inadvertently produced an effective measure to aid dyslexic individuals according to recent research (Shaywitz, 2003; NPR, 2000).

**Phonemic Awareness**

The smallest units of sound in spoken language are phonemes which are combined to
produce syllables and then words (Lerner & Johns, 2012; National Reading Panel, 2000). In order for an individual to learn to read, they must possess the ability to discriminate the difference in phonemes in spoken language. In essence, “phonemic awareness is the ability to notice, think about, and work with the individual sounds in spoken words” (Lerner & Johns, 2012, p. 364). Lacking the ability to correctly process individual sounds inhibits phonological awareness: “the ability to identify and manipulate larger parts of spoken language” (Lerner & Johns, 2012, p. 364); a necessary component in language development and reading readiness.

According to the 1981 study by Denckla, Rudel, and Broman, a high percentage of students with dyslexia exhibit poor phonological skills, which strongly correlate with success rates in reading. Comparatively, research from the National Reading Panel (2000) concluded the ability to identify phonemes and letter knowledge to be the best two factors in determining educational readiness. In fact, this is the one area in which all researchers from the National Institute for Child Health and Development (NICHD) agree; possessing strong phonemic awareness skills is essential for reading proficiency (as cited in Henry, 1998). However, studies by Oakland et al. (1998) and S. E. Shaywitz and B. A. Shaywitz (2004) found students with dyslexia to have (a) insufficient phonetic skills, (b) poor word decoding, (c) inadequate fluency, and (d) low comprehension essentially guaranteeing reading failure.

**Phonics**

According to Lerner and Johns (2012), the association between sounds in a language and printed letters illustrates the principle of phonics. Ming and Dukes (2010) state phonics “is the natural outgrowth of improved phonemic awareness skills” (p. 24), and those individuals who lack strong phonemic awareness will have difficulty mastering phonetic skills. Studies have shown the most successful readers are those who have mastered the sound-symbol relationship.
of their native language or phonics (National Reading Panel, 2000). Again, research has shown students with dyslexia to have insufficient phonetic skills (Oakland, et al., 1998; Shaywitz, S. E. & Shaywitz, B. A. 2004).

**Fluency**

Fluent readers, as reported by the National Reading Panel (2000), “can read text with speed, accuracy, and proper expression” (p. 3-1, ¶ 1) making reading fluency a precursor for comprehension (Ming & Dukes, 2010). Similarly, a study by Baker et al. (2008) found a strong correlation between oral reading fluency and improved comprehension and standardized tests scores when instructed using scientifically based methods which focused on the five essential elements as evidenced by the NPR (2000). Individuals who lack reading fluency tend to avoid reading which creates a defective continuum as reading fluency is developed through repeated practice (Shaywitz, S. E. & Shaywitz, B. A. 2004). Research has repeatedly found dyslexic individuals to have low reading fluency (Joshi, Dahlgren, & Boulware-Gooden, 2002; Liberman, 1973 as cited in Richardson, 1992; Peterson & Pennington, 2012; Shaywitz S. E. & Shaywitz B. A., 2004).

**Vocabulary**

The process of knowing words, understanding their meanings, and the ability to apply this knowledge encompasses the procedure necessary to develop vocabulary (Lerner & Johns, 2012; Park & Lombardino, 2013). According to the National Reading Panel (2000), vocabulary knowledge and instruction significantly impact comprehension and reading fluency although its full extent is unclear as “phonological and print-related knowledge contribute to this aspect of the reading process” (Ming & Dukes, 2010, p. 25). However, a longitudinal study of first graders by Cunningham and Stanovich (1997) showed a direct link between primary word
knowledge and middle-school comprehension. In addition, a longitudinal study of students from low-income households in pre-school through fourth grade by Storch and Whitehurst (2002) found a high correlation between early oral language skills (vocabulary), code-related (phonological) skills, and their ensuing reading achievement. Although generally deemed a secondary consequence, individuals with dyslexia are often found to possess low vocabularies and/or word retrieval skills (International Dyslexia Association as cited in Bryson, 2013; Shaywitz S. E. & Shaywitz, B. A. 2004).

**Comprehension**

Comprehension is literally the understanding of written and spoken language (Ming & Dukes, 2010). In order for comprehension to occur, an individual “must bridge the gap between the information presented ... and the knowledge they possess” (Lerner & Johns, 2012, p. 373). Due to insufficient reading fluency and low vocabulary, inadequate comprehension is also found to be a secondary consequence in dyslexic individuals affecting standardized test scores and academic success (International Dyslexia Association as cited in Bryson, 2013; Shaywitz S. E. & Shaywitz, B. A., 2004).

Present research clearly shows that all five essential reading elements are interdependent. Data presented also affirms most students with dyslexia do not possess the necessary skills to obtain reading proficiency (Joshi et al., 2002; International Dyslexia Association, n.d., as cited in Bryson, 2013; Liberman, 1973, as cited in Richardson, 1992; Peterson & Pennington, 2012; Shaywitz, S. E. & Shaywitz, B. A., 2004).

**Stages of Reading Development**

According to Ehri (1995), there are four stages in reading development: (a) pre-alphabetic, (b) partial alphabetic, (c) fully alphabetic, and (d) consolidated alphabetic. Children
usually pass through these stages with little difficulty and become fluent readers unless they have a learning disability (Jennings, Caldwell, & Lerner, 2010). Those with learning disabilities like dyslexia “may become ‘stuck’ at a stage and not develop further” (Jennings et al., 2010). In the pre-alphabetic or logographic stage (Jennings et al., 2010), children begin identifying words through their visual clues, i.e., DD will mean Dunkin Donuts. During the second stage, partial alphabetic, children begin to associate sounds to their respective letters focusing on initial and final consonant sounds and often confusing medial sounds. The third stage, fully alphabetic, is associated with vowel pattern recognition. Here children focus on the patterns they see and the sounds associated with them. The final stage, consolidated or automatic word reading (Jennings et al., 2010), is where a child can automatically recognize words without depending on laborious decoding to become fluent readers (Ehri, 1995; Jennings et al., 2010). Research has repeatedly shown individuals with dyslexia to struggle with automatic word reading or fluency (Joshi et al., 2002; Liberman, 1973, as cited in Richardson, 1992; Peterson & Pennington, 2012; Shaywitz, S. E. & Shaywitz, B. A., 2004).

**Historical Background and Theories Regarding Dyslexia**

Even though “researchers have been working on dyslexia and reading problems for about a hundred years now, …we still have not reached a strong consensus as to how to define ‘dyslexia’” (Tonnessen, 1997, p. 88) despite the countless attempts made by numerous professional organizations around the world (Youman & Mather, 2013). This statement is indicative of the dissension dyslexia has invoked for over a century in educators, patients, and researchers (Youman & Mather, 2013; Tonnessen, 1997). Furthermore, Tonnessen states “We need clear and useful definitions” (1997, p. 88) as it is unclear whether the definitions of today are any better than the definitions formulated by our field’s pioneers (p. 88).
When literally translated from its Greek and Latin roots, the term dyslexia means "difficulty with reading and speaking" (Richardson, 1992, p. 40). Although cases of individuals with what is now known as dyslexia have been reported as early as the 17th century, burgeoning growth in dyslexia research did not arise until the late 1800’s and early 1900’s (Anderson & Meier-Hedde, 2001).

Research in the Late 1800’s

Selikowitz (1993) asserts dyslexia was initially termed ‘word blindness’ in 1878 by German physician, Dr. Kussmaul, when describing one of his patients who had been adequately educated, had normal intelligence, and still was unable to read (p. 7). Kussmaul found that “a complete text blindness may exist, although the power of sight, the intellect, and the powers of speech are intact (as cited in Richardson, 1992, p. 41 ). Prior to Kussmaul’s findings, data indicated dyslexia to be a dysfunction caused by a delay in maturity in visual perception and generally advocated the assumption that individuals with this disorder were cognitively low (Griesbach, 1993; The Gale Encyclopedia of Neurological Disorders, 2005).

Additionally, in 1896, ophthalmologist Dr. Pringle Morgan coined the term ‘congenital word blindness’ to describe a young patient who also struggled with reading and spelling despite having normal intellect (Griesbach, 1993). Morgan asserted the patient’s condition was due to a “a congenital defect that resulted in difficulties storing the visual impressions of words” (p. 5).

Research in the Early 1900’s

It was Hinshelwood’s research in 1917 that linked word blindness symptoms in adults who had underwent brain trauma to cases in which several family members exhibited similar symptoms without undergoing such trauma (Richardson, 1992, p. 42). Hence, Hinshelwood also contended this disorder to be congenital. Hinshelwood contended that damage to the “lower parietal lobe, including the supra-marginal and angular gyri, on the left side of the brain in a
right-handed person” (p. 42) via injury during birth, disease, or through faulty development in-utero could produce reading inadequacies. Moreover, he was the first to propose the use of alternate educational methods to promote oral and written language abilities in individuals with word blindness, as he surmised it was possible to eradicate symptoms through “patient, persistent training” (Richardson, 1992, p. 42).

Subsequently, Dr. Samuel J. Orton, considered a pioneer in dyslexia research, coined the term “streptosymbolia meaning twisted symbols” (Griesbach, 1993, p. 5) to characterize those with normal intellect who failed to learn to read through traditional teaching approaches (Griesbach, 1993). In 1925, Orton, as director of the Iowa State Psychopathic Hospital, developed a theory of dyslexia that was not singularly symptomatic in nature. Rather, Orton proposed that dyslexia was “a syndrome with multiple manifestations” (Griesbach, 1993, p. 5) due to subtypes present in the individual. His work also led to the “first testable hypothesis on the defect” (Griesbach, 1993, p. 5) and invalidated the previously held assertion that reading disability coincided with low intelligence (Anderson & Meier-Hedde, 2001).

Recent Research

Recent research has shown dyslexia is, in fact, caused by a breakdown in the circuitry of the brain due to brain trauma or faulty development in utero just as Hinshelwood alleged in 1917 (Shaywitz, 2003). With the development of positron emission tomography (PET) in the 1980’s, it was finally possible to study the working brain of individuals with and without dyslexia and substantiate previous theories of flawed pathways in the brains of dyslexics (Shaywitz, 2003). In studies by Shaywitz et al. (2002) and Simos et al. (2002), children with dyslexia were found to have “disruption in neural systems for reading involving posterior brain regions, including parietotemporal sites and sites in the occipitotemporal area” (Shaywitz et al., 2002, p. 101). Both studies also found that proficient readers “activate neural systems that are mostly in the back of
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the left side of the brain” (Shaywitz, 2003, p. 83) while the brains of individuals with dyslexia are underactivated in those areas and overactivated in the frontal lobes (Shaywitz, 2003). Currently, there appears to be a general consensus that dyslexia is a language-based disorder which requires specific, explicit reading instruction to minimize prevailing weaknesses in accuracy, fluency, and word recognition in reading, inadequate spelling and decoding skills, and its secondary conditions: possible low vocabulary and insufficient text comprehension due to inappropriate neural connections in the brain (International Dyslexia Association, 2002; Lerner & Johns, 2012; Shaywitz, et al., 2002; Shaywitz, 2003; Simos et al., 2002; Youman & Mather, 2013). Youman and Mather (2013) contend these deficits are compounded when more than one type of dyslexia is present in an individual.

Dyslexia Subtypes

After considerable review of literature, it is apparent that there are conflicting views in regards to subtyping dyslexia (Duffy & Geschwind, 1985; Gjessing & Karlsen, 1989; Mather & Wendling 2012; Oakland, Black, Stanford, Nussbaum, & Balise, 1998; Shaywitz, 2003; The Dyslexia Center of Princeton in association with Dyslexia Institutes of America (DIA), 2013). Duffy and Geschwind (1985) contend subtyping initially began in 1963 with research done by Kinsbourne and Warrington on disabled readers using the discrepancy model (p. 13). This study found subjects with differences in verbal IQ versus performance IQ, to demonstrate deficiencies in either expression-receptive language or finger differentiation, mathematics, spatial relationships, and left-right confusion respectively (Duffy & Geschwind, 1985, p. 14). In more recent literature, two subtypes are consistently mentioned: developmental and acquired dyslexia (Oakland et al., 1998; Shaywitz, 2003; The Dyslexia Center of Princeton in association with DIA, 2013). Both subtypes are considered a result of inappropriate brain function in the angular gyrus, Wernicke’s Area, or in combination (Oakland, et al., 1998; Shaywitz, 2003; The
Dyslexia Center of Princeton in association with DIA, 2013).

**Developmental**

Developmental dyslexia occurs during gestation and results in phonologic weakness (Griesbach, 1993; Shaywitz, 2003). Individuals with developmental dyslexia have normal to gifted intelligence quotients but struggle to decode single words and read with accuracy and fluency (Shaywitz, 2003).

**Acquired**

Acquired dyslexia is caused by trauma to the brain either during or sometime after birth and results in the loss of reading ability (Griesbach, 1993; Shaywitz, 2003). Noted causes of acquired dyslexia include stroke, tumors, high fevers, premature birth, and respiratory distress directly after birth (Griesbach, 1993; Shaywitz, 2003). According to Shaywitz, acquired dyslexia is most commonly found in “middle-aged or elderly men and women” (p. 140).

**Deep**

Deep dyslexia appears to be another name for acquired dyslexia as individuals with this disorder have undergone trauma to the brain according to Mather and Wendling in *Essentials of Dyslexia Assessment and Intervention* (2012). It is characterized by acute “impairment in nonword reading” (p. 6) along with visual, derivational, and semantic errors.

**Surface**

Surface dyslexia refers to an individual’s inability to decode phonetically irregular words; words that are not spelled the way they sound, and is considered a less severe impairment than deep or acquired dyslexia (Mather & Wendling, 2012). Individuals with surface dyslexia tend to exhibit deficits in spell and whole word recognition but can decode “phonically regular nonwords” (p. 5).
Auditory

In the Bergen Project, *A Longitudinal Study of Dyslexia* (1989) by Gjessing and Karlsen, auditory dyslexia is characterized by sound discrimination issues between phonemes that are phonologically comparable and deficient phonetic synthesis processes. Consequently, auditory dyslexics will often confuse like sounding letters, reverse letter order, omit sounds, and struggle with phoneme representation even though they have decoded words accurately and efficiently (p. 98).

Dysphonetic

Individuals with Dysphonetic dyslexia learn to read solely through visual memorization of words and do not possess the ability to decode unfamiliar words nor encode words using phonemes. Faulty functioning in Wernicke’s Area of the brain has been linked to Dysphonetic symptoms, and it is categorized as a form of auditory dyslexia according to Gjessing and Karlsen (1989) and The Dyslexia Center of Princeton in association with DIA (2013, p. 1).

Visual

Gjessing and Karlsen (1989) note visual dyslexia to be identified through the following tendencies: persistent, laborious, letter by letter decoding and encoding despite mode of frequency, phonetic spelling of phonetically irregular words, and the inability to recognize irregular words that have been encoded phonetically. Gjessing and Karlsen hypothesize the causation of visual dyslexia to be “deficiency in the orthographic storage system in the inner lexicon” (1989, p. 100).

Dyseidetic

This form of dyslexia is most often associated with dissatisfactory reading fluency, sight-word recognition, and spelling (The Dyslexia Center of Princeton in association with DIA, 2013). Dyseidetic dyslexics encode and decode all words phonetically. Dyseidetic dyslexia is
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considered a form of visual dyslexia caused by malfunction in angular gyrus area of the brain (The Dyslexia Center of Princeton in association with DIA, 2013, p. 1).

With the exception of acquired dyslexia, considerable research has shown that all subtypes are genetically based and are more prevalent in males (Fletcher, 2009; Peterson & Pennington, 2012; Richardson, 1992; Rutter et al., 2004; Shaywitz 2003). Research also shows that with proper diagnosis and appropriate instructional techniques the symptoms of dyslexia can be remediated regardless of subtype (Balido-Dean, Kupczynski, & Fedynich, 2011; Bergeson, 2007; Oakland et al., 1998; Shaywitz, 2003).

**Diagnostic Measures**

Until recently, the discrepancy model was the standard form of identification for all Specific Learning Disabilities (SLD) under IDEA 2004 (Yell, 2012). In the field of education, tensions regarding the use of the DSM-4 (Diagnostic and Statistical Manual of Mental Disorders in children and adults from the American Medical Association, 1994) as a diagnostic tool were noted due to its basis in the medical model (Snowling, 2013). The revision, DSM-5, does not include the discrepancy model for identification of SLD. Instead, it promotes the use of multiple assessment measures for identifying SLD with criterion focuses being on those deficits which impede academic learning such as reading fluency. Additionally, the term dyslexia is initially referenced as a specific form of SLD in the DSM-5 (Snowling, 2013). Consequences of these changes in identification criteria include increased collaboration among clinicians and educators, differentiation in instruction and assessment methods, earlier identification, and improved remediation efforts with instruction specifically addressing the unique needs of individual students with dyslexia (American Psychiatric Association, n.d.; Tannock, 2014).
Multisensory Remediation Methods

The use of multisensory approaches in the remediation of dyslexia began in 1917 with Hinshelwood (Richardson, 1992). Hinshelwood argued that since, dyslexia is a language-based disorder with neurobiological origins, effective intervention would have “simultaneous appeal to as many cerebral centers as possible” (p. 42). Dr. Samuel Orton concurred with Hinshelwood’s assertion and concluded that use of appropriate methods could retrain affected hemispheres in the brain thereby mitigating symptoms. In fact, Orton alleged it was possible to ‘overcome’ dyslexia if treatment was initiated in early childhood (p. 42). Although there are many other teaching methods that have been designed and implemented in effort to remediate the symptoms of dyslexia, i.e., “the Language Experience Approach (LEA), Stauffer, 1951, the whole word method (Betts, 1943) and the linguistic approach (Marsh, Freedman, Welch, & Desberg, 1981)” (as cited in Goldstein & Obrzut, 2001), a number of proven instructional approaches are founded on the multisensory principle originating from the work of Dr. Orton and include (a) The Orton-Gillingham Method, (b) The Fernald Method, (c) The Wilson Reading System, (d) Alphabetic Phonics, (e) The Herman Method of Reversing Reading Failure, and (f) Project Read (McIntyre, & Pickering, 1995; Lerner & Johns, 2012; Shaywitz, 2003; Youman & Mather, 2013). All multisensory structured language methods are based on the Visual, Auditory, Kinesthetic, Tactile Approach (VAKT) using variations to accomplish the same end result.

**Visual, Auditory, Kinesthetic, and Tactile Approach (VAKT).**

The VAKT approach is used to stimulate all senses in order to facilitate learning through a ‘multisensory’ experience (Lerner & Johns, 2012). The educator stimulates the student’s senses by saying a word or sound, having the student repeat it, trace it, and say it again. This allows the student to hear the word or sound, feel it, and see it, thereby simultaneously
stimulating multiple areas in the brain (Lerner & Johns, 2012). Advocates argue that this enables the student to “access learning through all available channels rather than isolate instruction to one of three” (Rooney, 1995, para. 25). In a study by Thorpe, Lampe, Nash, and Chiang (1981), it was reported that reading accuracy increased in three high school students with learning disabilities after implementing VAKT intervention. Furthermore, word retention was tested with three additional probes at 1 week, 3 weeks, and 6 months and the results showed all three students had retained more words after VAKT than when they had been instructed using visual and auditory methods alone (Thorpe et al., 1981). Multisensory methods are also recommended for use with students with dyscalculia but are more commonly associated with reading interventions (Bellonio, 2016). Three specific versions of multisensory structured language interventions for reading are described below.

**Orton-Gillingham Method**

The Orton-Gillingham method was developed in the 1930’s by Dr. Samuel Orton and Anne Gillingham and based on Orton’s neurological theories (Richardson, 1992). This method is a structured, systematic, multisensory approach to language instruction tailored to meet the needs of the individual student in which students choose words of interest to work on (Griesbach, 1993; Lerner & Johns, 2012). The VAKT approach is used to simultaneously activate all senses while learning single letters, their individual sounds, and during decoding and encoding words (Griesbach, 1993; Lerner & Johns, 2012). Orton and Gillingham stated “before the child is asked to write there must be whatever practice is necessary in tracing, copying, and writing from memory to dictation, this last being sometimes carried out with the child’s eyes averted” (Richardson, 1992, p. 46). As with all VAKT methods, the student is instructed to orally state letter names while tracing letters and words to produce a multisensory affect (Lerner and Johns,
This process begins with letter and sound recognition while learning to blend the sounds and continues until the sounds are grouped into small words (Lerner and Johns, 2012).

**The Fernald Method**

The Fernald Method is based in VAKT principles and named after its creator Grace Fernald (Cushenbery, 1981). Developed in 1943, this method employs four stages in which multisensory methods are used to memorize whole words rather than individual letters and their corresponding sounds (Lerner & Johns, 2012). During the first stage, the student chooses a word to concentrate on (Richardson, 1992). The teacher then writes the word for the student to trace and say aloud while tracing. Fernald noted that finger contact with the word is essential in this stage. This procedure is repeated until the student is confident that he or she can write it correctly five times in a row without looking at the model emphasizing syllables while it is being written. If student is successful, the word is typed and placed alphabetically in a storage box for later use. During the second stage, sentences are created following a similar procedure. Phase three focuses on reading isolated word from paragraphs in student selected material while phase four has students read phrases from the paragraphs. Fernald also stated that words must always be used in context to allow for vocabulary development and eventually reading comprehension (Mather & Jaffe, 2002, Richardson, 1992).

**Wilson Reading System**

The Wilson Reading System (Wilson & Felton, 2004), derived from the principles of Orton-Gillingham and developed for individuals in grades two through adulthood, provides multisensory language instruction in a systematic manner targeting reading fluency, decoding and encoding (Lerner & Johns, 2012). Phonological awareness, word structure, and phonology are learned through direct instruction using a 10-part specific, explicit, and multisensory lesson
plan “that addresses phonemic awareness, phonics and word study, encoding, high frequency/sight word instruction, fluency, vocabulary, and listening and reading comprehension in a sequential and integrated fashion” (Wilson Training Corporation, n.d., ¶ 10). This program encompasses 12 steps, includes criterion based assessments to monitor progress and ensure success, and usually is completed within one to three years (Lerner & Johns, 2012, Wilson Language Corporation, n.d., ¶ 11). A comprehension description of a standard Wilson Reading System lesson can be found in Appendix D.

**Computer-Based Interventions**

With recent technological advances, numerous appropriate computer-based intervention programs are available (Shaywitz, 2003; Youman & Mather, 2013). Shaywitz includes comprehensive information and practical application measures for each program recommended.

**Fast ForWord**

Fast ForWord (Scientific Learning, 2015) is a “computer-based reading program intended to help students develop and strengthen the cognitive skills necessary for successful reading and learning” (What Works Clearinghouse (WWC), 2013). It is a scientifically-based and tested program which has been proven to help students “develop a wide range of critical language skills including phonological awareness, phonemic awareness, fluency, vocabulary, comprehension, decoding, working memory, syntax, grammar and other skills necessary to learn to read or become a better reader” (Scientific Learning, 2003). This intensive program is a three-part series intended to be used five days a week for 30-100 minutes a day, and it usually takes four to six weeks to complete. Although originally developed to correct speech and language impairments, its publisher asserts that through modified speech and brain-training games, individuals with dyslexia can benefit from its use (Scientific Learning, 2015). In fact, a study
by Gaab, Gabrieli, Deutsch, Tallal, and Temple (2007) found improvement in the left prefrontal cortex in the brains of children with development after eight weeks of remediation using Fast ForWord. These participants also “showed significant improvements in language and reading skills” post implementation (Gaab, et al., 2007). Likewise, a review of research by WWC found that nine of the studies “both fall within the scope of the Beginning Reading topic area and meet WWC evidence standards” (p. 1). These studies were conducted on 1,390 students in the United States and Western Australia and results indicated medium to large gains in the areas of alphabetics and comprehension (WWC, 2013).

**Read Naturally**

Through the use of teacher modeling, repeated reading, and progress monitoring, Read Naturally (Read Naturally, Inc., 2016) works on fluency skills, comprehension, vocabulary, and sight word acquisition while increasing motivation and self-confidence according to its publisher (Read Naturally, Inc., 2016). Shaywitz (2003) asserts this program follows “the basic principles of effective fluency instruction” (p. 272) as its protocol requires the student to read the story aloud while listening to it multiple times. Classroom and home versions are available (Read Naturally, Inc., 2016).

**Reading Assistant**

Reading Assistant (Scientific Learning, 2015), is another computer-based fluency program that improves fluency and comprehension through vocabulary development. With this program, the child listens to the story and then reads it aloud into a microphone which records the reading. While the child is reading the story, the computer will correct mispronunciations, or the child can ask for pronunciations and definitions (Scientific Learning, 2015). The child is able to select reading passages from fiction, non-fiction, and poetry according to interest and
reading ability (Shaywitz, 2003). When combined with classroom instruction, its publisher states Reading Assistant can improve reading levels up to 50% (Scientific Learning, 2015).

**Read, Write, & Type Learning System**

The publisher of the Read, Write, & Type Learning System (Talking Fingers, 2016) states it is research proven software that teaches keyboarding along with phonics and spelling (p. 1). Shaywitz (2003) asserts that the Read, Write, & Type Learning System “emphasizes writing as a route to reading” (p. 282) and cites one study in which researchers found first graders whose reading instruction had been supported by this program to have increased their reading accuracy and fluency “significantly” (p. 283) over the course of the school year (Shaywitz, 2003).

Many other methods are scientifically-based and have been proven to remediate symptoms of dyslexia (Shaywitz, 2003; Youman & Mather, 2013). However, the most effective measures are phonologically based (NPR, 2000) and implemented using measures which stimulate multiple senses simultaneously according to Shaywitz (2003). For more comprehensive lists, please see Shaywitz (2003) and Youman and Mather 2013.

**Research and Multisensory Structured Language Instruction**

Research on dyslexia has been continuous since the late 1800’s (Anderson & Meier-Hedde, 2001; Griesbach, 1993; Richardson, 1992). Originally perceived as a visual malfunction, it is now believed to be a language-based disorder which can be remediated or possibly overcome with proper intervention (Shaywitz, 2003). Multifarious studies have been conducted in attempt to ascertain the most effective remediation measures; some of which are discussed below (Balido, Dean, Kupczynski, & Fedynich, 2011; Oakland et al., 1998; Scheffel, Shaw, J. C., & Shaw, R., 2008; Shaywitz, 2003; Simos et al., 2002; Snowling, 2013; Young, 2008).
Research on Students with Dyslexia

In a longitudinal comparison study by Oakland et al. (1998), 48 students with dyslexia were selected to investigate the effectiveness of the Dyslexia Training Program (DTP). The DTP is a multisensory structured remedial reading method that focuses on nonsense word decoding, comprehension, word recognition, and encoding. Participants in both the experimental and control groups were comparable in IQ, reading achievement, gender, age, grade, and socioeconomic status. Experimental participants received DTP instruction via classroom educator or a video-taped version, while traditional reading instruction was used with the control group. The researchers performed an ANOVA to check for differences between the intervention versus the control groups and between the two versions of the intervention. Overall, the results of this two-year study show significant gains for experimental participants in comparison to the control group in all tested areas with the exception of encoding: The researchers state that the main effects for the year regarding reading comprehension and word recognition were significant at $F(2, 20) = 8.77, p < .001$ and $F(2, 20) = 23.93, p < .05$ respectively, indicating noteworthy progress in both areas (Oakland et al., 1998). The researchers also reported similar results in the areas of monosyllabic and polysyllabic phonological decoding for the year, i.e., $F(2, 20) = 26.79, p < .0001$ and $(F(2, 20) = 28.19, p < .0001)$ respectively, again suggesting “statistically significant progress in phonological decoding” (Oakland et al., 1998, p. 153). As research has shown individuals with dyslexia to be weak in this area, gains such as these are essential for reading development (Shaywitz, 2003).

Comparable results were found in a study by Balido-Dean et al. (2011) when a multisensory structured language program was instituted in a south central Texas school district which utilized the Texas Assessment of Knowledge and Skills (TAKS) test as a progress
monitoring tool. In this study, the researchers analyzed the effectiveness of the Basic Language Skills program for 427 third, fourth, and fifth graders with dyslexia over a three year period: 2007-2010. Prior to the implementation of this program in 2007, students with dyslexia “were not progressing as they should” (Balido-Dean et al., 2011, p. 1) according to data taken from the reading portion of the TAKS test. Using a two-way contingency table analysis of the student’s reading TAKS scores for all three school years, the researchers found that after implementation of the Basic Language Skills program, “more than the majority of the students were meeting state standards” (Balido-Dean et al., 2011, p. 7). Although the data collected did not show significant gains in the comparisons made between the three school years, the researchers concluded that the Basic Language Skills program was effective as students with dyslexia were now making appropriate yearly progress (Balido-Dean et al., 2011).

Furthermore, in a report to the State Legislature of Washington prepared by Young (2008), four school districts determined The Wilson Reading System and the Lindamood-Bell programs to be effective measures of remediation for students identified with and/or who exhibit symptoms of dyslexia after instituting a pilot program. In the initial 2005-2007 pilot program, 180 students in grades K-6th, received these research-based multisensory structured reading intervention services (Bergeson, 2007). Using data collected from Reading WASL achievement scores, the findings showed that all participants had increased fluency rates and phonological awareness scores, with students in grades two through five “outperforming their grade level peers” (Bergeson, 2007, p. 2) in phonological awareness after five months of intervention. Consequently, funding was extended for an additional two years. In the report prepared by Young (2008) for the years 2007-2009, findings were comparable: Reading and written expression growth was “substantial” (p. iv) in the 135 participants, and with the exception of
those in the third and sixth grade, all had again “outperformed their grade level peers” (Young, 2008, p. 3) in phonological awareness. In fact, students meeting state standards had increased from approximately 17% in 2007 to approximately 40% in 2008” (p. 3) according to Reading WASL scores (Young, 2008). The results of both reports indicate WRS and the Lindamood-Bell multisensory structured programs are effective remediation measures for students identified with dyslexia or its symptoms (Young, 2008).

In another study, Simos et al. (2002) found that after intensive remediation using the Phono-Graphix program and the Lindamood Phonemic Sequencing program, affected areas in the brains of eight dyslexic students, ages seven through seventeen, were normalized. Participants were chosen due to “extremely poor scores on measures of phonological decoding” (Simos et al., 2002) as evidenced through data collected from the Woodcock Johnson III (W-J III). All participants were below the 18th percentile with six of the eight students in the 3rd percentile despite having average to above average IQ’s (Simos et al., 2002). Daily intervention sessions lasted one to two hours over the course of eight week study. Prior to implementation, participants had exhibited over-activation in the right hemisphere and “little or no activation of the posterior portion of the superior temporal gyrus” (p. 1203); the area associated with word form that is necessary to achieve reading fluency as evidenced in S. E. Shaywitz and B. A. Shaywitz (2004). Post implementation, brain function normalized and the participants now scored within the average range of “38th to 60th percentile” (Simos et al., 2002) in phonological processing and decoding skills on the W-JIII (mean, 50 ± 8.8) evidencing significant gains. Through functional magnetic resonance imaging (fMRI), Simos et al. validated Hinshelwood’s assertion that the damaged pathways in the brain of a dyslexic can be remediated through appropriate ‘retraining’ measures (Richardson, 1992; Simos et al., 2002). The findings of
Shaywitz (2003), in *Overcoming Dyslexia*, also support this argument.

**Research with At-Risk Learners**

Analogous results were found in an alternate longitudinal comparison study conducted by Joshi et al. (2002) when Language Basics: Elementary, an Orton-Gillingham based multisensory structured language program, was used to teach first graders from mainly African-American, low-income families. Participants were matched in all areas and tested for phonological awareness, word-attack, and comprehension skills pre and post implementation. The control group was taught using a traditional method: the Houghton-Mifflin Basal Reading Program. Again, significant gains were recorded by the experimental group in phonological awareness and decoding skills, whereas control group gains were reported as miniscule. The researchers stated that the gains were a direct result of adding a multisensory component to reading instruction. Although the participants were not specifically identified with dyslexia, gains made by the experimental group are significant enough to be considered noteworthy and support implementation of a multisensory structured language program as an early intervention measure (Joshi, et al., 2002).

**Research with Treatment Resistors.**

In a study by Campbell, Helf, and Cooke (2008), the efficacy of adding multisensory components to “an explicit, systematic phonics program” (p. 267) with six second grade students who had failed to meet benchmarks from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) despite receiving supplemental reading instruction, was analyzed. The researchers added multisensory components (tracing, tapping, and using magnetic tiles) to the participant’s typical Early Reading Tutor intervention sessions. The intervention took place over a period of four months. Prior to implementation, all participants had nonsense word fluency
scores of under 18 words per minute or “50 correct sounds read per minute divided by 2.75, the average number of letters per word” (Campbell et al., 2008, p. 269) according to the DIBELS benchmark. Although none of the participants met the DIBELS nonsense word fluency benchmark post-intervention, average gains were between 5-10 words per minute. (The researchers noted that the fluency rate of several participants was adversely affected due to the time needed to decode each word through tapping.) During the intervention phase, “five of the six participants approximated or exceeded the DIBELS benchmark of 50 correct sounds recognized within a minute” (p. 275). From the data collected, the researchers found that adding multisensory components to ERT increased reading fluency and sound-symbol knowledge for all participants identified as treatment resistors (Campbell et al, 2008); both of which are essential for reading success (NPR, 2000).

Additional research done by Rowley, McCarthy, and Rines (2014), supports the use of a multisensory structured language intervention with treatment resistors. Two male students from the Perkins School for the Blind who had failed to acquire basic reading skills, were chosen to participate in this qualitative action research study. Prior to the implementation of the Wilson Reading System (WRS), both students had struggled with learning to read due to inadequate phonological skills despite mastering the dot configuration system of Braille. The first participant, a nine-year-old boy, was introduced to WRS after many years of failure through traditional Braille reading methods. The researchers stated that this student was frustrated, lacked confidence, and would “immediately pull his hands away” (Rowley et al., 2014, p. 147) when given reading material. However, after being instructed with WRS, this student’s decoding skills, reading fluency, and confidence increased. The researchers also noted that his frustration decreased, he gradually began to “tolerate tactualy scanning the Braille material” (p. 148),
and is now able to successfully read various types of materials. The second participant, a secondary student, achieved equal success after being instructed using WRS. Having been told by previous instructors that he “would never be a successful reader” (p. 149), he also was frustrated and exhibited low self-esteem. Although he had memorized many sight words, he lacked the ability to decode multisyllabic words. After being instructed with WRS, this student was able to decode words with multiple syllables, eventually attended college, and went on to become an adaptive computer technician. Due to the success of both these students, along with many others from the Perkins School for the Blind, the American Printing House for the Blind conducted a field study of WRS for students with visual impairments and found it warranted publication in Braille and large print formats. The researchers state that all WRS materials will be available in both formats in the near future (Rowley et al., 2014).

**Teacher Knowledge and Training**

Despite dyslexia being “the most common and most carefully studied of the learning disabilities” (Shaywitz, 2003), research shows most educators are not prepared to remediate its symptoms. One study by Cunningham et al. (2009) notes a significant discrepancy between perceived and actual teacher knowledge and perceived and actual instructional practices in reading instruction. Cunningham et al. (2009) found most teachers’ knowledge in the five essential reading elements and/or their implementation procedures, as reported by NPR (2000), to be insufficient. Findings of a longitudinal study by Moats and Foorman (2003) concur; again teacher knowledge of phonemic and phonological awareness and comprehension is lacking. When a comparison of teacher knowledge and student performance was performed, “statistically significant but modest associations between these variables were established” (p. 36) by the researchers. Even though a study by Gwerman-Jones & Burden (2009) found the attitudes of new
student teachers to be more positive toward and confident in their abilities to help students identified with dyslexia, self-professed training and knowledge of how to do so as still considered inadequate.

Implications

In a qualitative study by McNulty (2003), 12 adults diagnosed with dyslexia prior to the age of 14 years, were interviewed about their lives in order to determine “emotional issues connected with living with diagnosed dyslexia over the course of life” (McNulty, 2003, p. 365). All participants experienced some form of trauma at school during childhood, which developed into feelings of inadequacy; most related it to be forced to reading aloud in class, having teachers who labeled them ‘lazy,’ or simply did not understand their disorder. Likewise, all participants had intense feelings of shame about being diagnosed with dyslexia, low self-esteem regarding intellect in areas outside their expertise, and were over-sensitive to “perceived negative feedback” (p. 377). In some cases, parents impeded positive self-esteem growth through their own misconceptions and lack of support. Most had developed compensatory measures and became over-achievers in order to conceal their disability. Barden (2010) found similar results in his single case study of a student with dyslexia. After completing a voice vignette, Barden (2010) concluded that numerous factors influence identity in individuals with dyslexia. Parents, teachers, other students had impacted the participant’s self-perception as she had grown and struggled with reading throughout her life. Initially, the participant described “her experiences at secondary school as ‘horrible’” (Barden, 2010, p. 299). However after completing 12 weeks of Neurological Impress Method Plus (NIM+) intervention, a multisensory approach to reading, her perception changed to one of indifference: the participant had “decided to stop caring and be my own person, and to like that person” (Barden, 2010, p. 299). It was also during this time that
the participant’s reading fluency increased from 14 words per minute to 65 (Barden, 2010) again proving that academic success is imperative in order to achieve life success in individuals with dyslexia. These findings affirm the need of improved dyslexia screening measures, early intervention, and continuous life-long support for dyslexics and their families. As Richardson (1992) argues, “It is incumbent on the educational system to recognize dyslexia and to provide the appropriate alternative instructional approaches to beginning reading for children with developmental dyslexia” (p. 46) in hope of preventing another generation of individuals whom relate success and self-esteem to traumatic academic and life experiences.

Chapter Summary

Individuals with dyslexia struggle to become successful and productive adults. Dyslexics often have low self-esteem equated to academic adversities experienced in childhood as evidenced in McNulty (2003). Although dyslexia has been studied for over 100 years, it continues to be a misunderstood and hidden disorder which contributes to a dyslexic’s feeling of inadequacy. Dyslexia, regardless of subtype, affects all areas of an individual’s life, and although current legislation is attempting to bolster awareness and ameliorate diagnosis and intervention methods, much improvement is still needed. Without early intervention and utilization of appropriate intervention methods, remediation is challenging and often ineffective. However, considerable research has shown that dyslexia may be ‘overcome’ through competent application of a multisensory structured language program (Cushenberry, 1981; Hale, 2008; Joshi et al., 2002; Oakland et al., 1998; Pitrowski & Reason, 2000; Richardson, 1992; Shaywitz, 2003; Shaywitz, S. E. & Shaywitz, B. A., 2004; Simos et al., 2002; Youman & Mather, 2013; Wadlington, 2000).
Chapter III

Methodology

The purpose of this single case experimental research study (Gay, Mills, & Airasian, 2012) was to determine the effectiveness of a multisensory structured language intervention, the Wilson Reading System (Wilson, B. A. & Wilson, E., 1996), on the phonetic analysis and reading fluency of a single student identified as dyslexic. The student’s phonetic analysis skills and reading fluency scores were the study’s dependent variables (performed in A-B and A-B-A formats respectively), and the multisensory structured language intervention was the dependent variable (Gay, Mills, & Airasian, 2012). The student’s response to the intervention was analyzed by obtaining baseline, intervention, and maintenance data and comparing scores from all three phases of intervention and then calculating the growth of words read correctly per minute (WCPM) using the norms from Hasbrouk and Tindal’s (2006) standardized reading fluency chart. Quantitative data were collected using the following assessments: San Diego Quick Assessment of Reading Ability (LaPray & Ross, 1969), the Word Identification and Spelling Test (Wilson & Felton, 2004), and the Six-Minute Solution (Adams & Brown, 2007). Qualitative data collected and analyzed were antidotal records, interviews with parents/guardians and student, and transcripts of the student’s reading before, during, and after implementation of the intervention. This data was collected in order to provide a more comprehensive examination of Student X’s reading ability and attitude toward reading in general.

Participant

One seven-year-old Caucasian male student (Student X) was chosen for this convenience study from a learning facility located in a south suburb of Chicago, Illinois due to his recent dyslexia diagnosis, reading deficits, and because he has not previously received therapy using the
Wilson Language System (Wilson, B. A., & Wilson, E., 1996). This study was a purposive sampling wherein a single participant was chosen to represent the given population of students identified as dyslexic with deficits in reading (Gay, Mills, & Airasian, 2012). There are currently 79 students who attend this learning facility. The majority of these clients are seen for Speech and Language difficulties while approximately 17 attend this facility due to deficits in reading. All other students attending this facility for deficits in reading have previously received reading therapy using the Wilson Language System, and therefore would not qualify for this study.

This study was conducted at the home of Student X in a south suburb of Chicago, Illinois. Student X is currently a second grader at a nearby elementary school in this suburb. This school houses students in grades kindergarten through second, and according to the 2014-2015 Illinois Report Card, there are 486 students presently enrolled with 19 full-time teachers (§ 4, p. 4). The reported student to teacher ratio of 23:1 (§ 5, p. 4) is consistent with the figures from Student X’s class: There are currently 22 students; thirteen boys and nine girls with one full-time teacher and a full-time paraprofessional. The demographic information for Student X’s elementary school is reported as follows: (a) White = 88.1%, (b) African American = 0.9%, (c) American Indian = 0.1%, (d) Asian = 0.5%, (e) Bi-racial = 1.6%, and (f) Hispanic = 8.8% with 15.2% of the current student population receiving special education services (Illinois Report Card, 2014-2015).

According to the United States Census Bureau, the median income per household in this suburb is estimated at $75,806 with 4.1% of “persons below poverty level” (2014, p. 1). Student X has lived in this home since birth and attended this elementary school since kindergarten.

The parents of Student X were given a cover letter (see Appendix A) explaining the purpose and expected outcomes of the study. All parties were in agreement that the study could and should be conducted with Student X as a participant and gave their permission via a consent
form (see Appendix A). Student X’s parents were told they had the right to withdraw him from the study at any time. All parties had access to data collected and analyzed during length of the study.

**Instrumentation**

The effect of The Wilson Reading System (Wilson, B. A., & Wilson, E., 1996) on a single student was measured through three separate mediums. An initial and final assessment of Student X’s reading levels was performed using The San Diego Quick Assessment of Reading (LaPray & Ross, 1969). A second assessment, the Word Identification and Spelling Test (WIST) by Wilson and Felton (2004), was administered to determine Student X’s pre and post phonetic analysis skills. The final medium, Six-Minute Solution (Adams & Brown, 2007) fluency passages, was used to keep data on fluency growth throughout the duration of the study (see Appendix C).

**The San Diego Quick Assessment of Reading (SDQA)**

The San Diego Quick Assessment of Reading (La Pray & Ross, 1969) was used as cursory assessment to gauge Student X’s independent, instructional, and frustration reading levels and identify the appropriate level of Six-Minute Solution fluency passages to be used during the course of the intervention. SDQA was also used to assess Student X’s independent, instructional, and frustration reading levels post implementation of the intervention.

**Validity and reliability.** SDQA was designed as an early curricular measure for reading level placement. After an exhaustive review of literature, reliability and validity figures could not be established. However, content validity (Gay, Mills, & Airasian, 2012) can be established because it is a graded wordlist that has undergone and withstood the scrutiny of many researchers (Barrie-Blackley, 2011). Likewise, the authors of Six-Minute Solution, Adams and
Brown (2007) advocate the use of SDQA as an appropriate assessment to measure independent, instructional, and frustration reading levels and have included all necessary materials to do so in their intervention manual.

**Word Identification and Spelling Test (WIST)**

Student X was also given the WIST (Wilson & Felton, 2004) assessment to determine initial and maintenance phonetic analysis skills. The WIST is a norm referenced assessment with “results (that) can be reported as standard scores, percentiles, age and grade equivalents” (Academic Therapy Publications, n.d., ¶ 8) which includes a composite score: Fundamental Literary Index. The WIST is broken into five areas of assessment: (a) sound-symbol knowledge, (b) spelling (regular and irregular words), (c) real word identification, (d) pseudo word identification, and (e) irregular word identification (Wilson & Felton, 2004). Student X was assessed in all five areas.

**Validity and reliability.** The WIST is a valid and reliable, comprehensive norm-referenced literary assessment used to pinpoint specific areas of deficiency in sound-symbol knowledge, spelling, and real, pseudo and irregular word identification (Academic Therapy Publications, n.d., ¶ 1 & 3). In fact, Wilson and Felton (2004) measured both the elementary and secondary versions of the WIST “to three of Anastasi and Urbina’s (1997) types of reliability coefficients and sources of test error” (p. 56) and found “WIST scores possess little error and that test users can have confidence in the results” (p. 57). Wilson and Felton (2004) also analyzed the WIST on three areas of validity: content-description, criterion-prediction, and construct-identification. Using a three step procedure based on the work of Anastasi and Urbina, Wilson and Felton again found the WIST to be a “valid measure of word identification and spelling and that it can be used with confidence” (p.78). Furthermore, the Colorado Department
of Education advocates using the WIST to identify students in grades nine and above with SLD supporting Wilson and Felton’s conclusions (Ilk, 2010-2011).

**Six-Minute Solution**

Six-Minute Solution (Adams & Brown, 2007) is a reading fluency program in which students perform daily repeated readings on their own individualized levels. Ideally, students perform these readings with a partner on the same level. The students take turns reading their passage orally to each other noting errors. After the student has completed their reading and discussed errors with their partner, the instructor will verify and reinforce concepts. The students then track their progress on their reading chart by coloring the number of words read correctly per minute (Adams & Brown, 2007). As its title implies, the length of this intervention is approximately six minutes per day and should be implemented daily throughout the course of the school year.

**Validity and reliability.** Research has shown Six-Minute Solution to be an effective reading fluency intervention (Martin, Elfreth, and Feng, 2014) in which students perform daily repeated reading with a same-level partner at appropriate instructional levels. The Six-Minute Solution was initially field tested as a summer intervention program by Adams, Brown, and Van Zant (1999) using fifty-two middle students who were determined to be at-risk for reading failure (as cited in Martin et al., 2014). These participants showed average fluency gain of 36% (as cited in Martin et al., 2014). Further studies conducted on the Six-Minute Solution include an action research project by Hanzal (2013) used to determine the effectiveness of the intervention on the reading fluency scores of third and fourth graders in North Dakota (as cited in Martin et al., 2014). Again, the Six-Minute Solution was found to be an effective measure to raise reading fluency scores (as cited in Martin et al., 2014).
**Procedures**

The intervention took place in the home of Student X. The parents of Student X preferred the intervention take place in the family dining room. The dining room is situated in the front of their home and connects to the kitchen and front room in the shape of an ‘L’. Although the room was usually quiet during the intervention sessions, this configuration allowed for several disruptions; as Student X has siblings and a dog, several times during the course of the intervention another family member would walk past, the dog would bark, or the phone would ring in the kitchen. No other interruptions occurred during the intervention sessions.

**Baselines**

Baselines for Student X’s phonetic analysis skills and reading fluency were obtained using the Word Identification and Spelling Test (Wilson & Felton, 2004) and the Six-Minute Solution (Adams & Brown, 2007) respectively. As the WIST is a comprehensive exam, it was administered over two consecutive days to procure valid results due to its exhaustive nature and Student X’s age. Student X’s fluency rate was assessed for a period of two weeks using passages from the Six-Minute Solution to produce a stable baseline measurement. Student X was assessed using a unique, single passage each week for four days.

**Intervention**

The intervention consisted of a four-week multisensory structured language program; the Wilson Reading System (Wilson, B. & Wilson, E., 1996) based on Orton-Gillingham principles (Lerner & Johns, 2012). The Wilson Reading System (WRS) is a 12 step program in which students practice (a) phonetic skills, (b) encoding, (c) decoding, (d) fluency, (e) writing, and (f) comprehension skills through systematic, sequential, multisensory, pre-determined lessons (Lerner & Johns, 2012). Lessons are repetitive with new concepts being introduced as the
student masters previously taught skills. Average session length is between 45 minutes to 1.5 hours and lessons consist of 10 parts. Due to the objectives of this study, the last two parts of a typical WRS intervention lesson were omitted during intervention sessions with Student X. All other sections of the lesson were taught focusing on (a) sound-symbol knowledge, (b) encoding, (c) decoding and (e) fluency. A comprehensive description of a standard Wilson Reading System lesson can be found in Appendix D.

Materials

The materials used to perform the intervention were: (a) WRS grapheme flashcards, (b) WRS magnetic tiles, (c) irregular words printed on white index-cards, (d) magnetic tile board, (e) whiteboard, (f) dry erase markers, (g) eraser, (h) paper, (i) pencil, (j) WRS graphing chart, (k) WRS Dictation Manual Steps 1-6, (l) WRS Student Book One, (m) daily lesson plan, (n) lesson progress sheet, and (o) Six-Minute Solutions passage at Student X’s appropriate level. WRS grapheme flashcards and tiles are colored coded: Cream cards and tiles are used for consonants and peach cards and tiles are used for vowels. The magnetic tile and whiteboard has a white 8” by 11” surface.

Data Collection

Data collection was initiated by interviewing Student X and his parents/guardians (see Appendices E and F) and reviewing his IEP. Next, the San Diego Quick Assessment of Reading (LaPray & Ross, 1969) was administered to determine appropriate reading level for Six-Minute Solution (Adams & Brown, 2007) fluency passages. The Word Identification and Spelling Test (Wilson & Felton, 2004) was then administered to determine phonetic analysis skills. As the WIST is a comprehensive and lengthy assessment, it was administered over a period of two days; day one consisted of sound-symbol knowledge and decoding of real and pseudo words, and on
day two, Student X completed the encoding portion of the assessment and reading of irregular words.

During the initial phase, Student X’s reading fluency was assessed using two separate Six-Minute Solution passages (see Appendix C). For a period of two weeks, Student X read an appropriate level passage; errors were noted, analyzed, and discussed with him. Each session began with word analysis instruction for errors previously noted and the correct pronunciation was given to Student X prior to performing the repeated readings.

For a period of four weeks, the intervention phase, Student X was instructed using the Wilson Reading Program (WRS), a multisensory structured language intervention. WRS was implemented and data were collected on all errors and misconceptions. Antidotal records were kept of each session detailing Student X’s progress to be analyzed at a later time. Additionally, Student X’s Fluency was assessed using a single unique Six-Minute Solution passage mid-point during the intervention phase.

The maintenance phase consisted of two weeks. During this time, Student X’s fluency was assessed using two additional Six-Minute Solutions passages (see Appendix C). Extensive records were chronicled noting errors and words read correctly per minute. The SDQA and the WIST were administered on the final two days of the maintenance phase to assess reading level and progress in phonetic analysis skills.

**Data Analysis**

Overall, quantitative fluency data were recorded in an Excel spreadsheet to provide a comparison of initial, intervention, and maintenance phase fluency scores and then measured against Hasbrouk and Tindal’s (2006) reading fluency assessment chart to determine percentile rank and WCPM growth. Student X’s fluency rate (taken from Six-Minute Solution data) was
calculated. A table was utilized to provide a visual comparison of initial and maintenance phonetic analysis skills. Percentile rank in the areas of phonetic analysis skills; sound-symbol knowledge, (b) spelling, (c) real word, (d) pseudo word, and (e) irregular word identification was taken from WIST assessment data collected and measured using the standard normative tables found in the user’s manual. Additionally, the data collected were displayed in graph presentation to provide a visual representation of Student X’s progress. According to Gay, Mills, and Airasian (2012), this method is typically utilized to analyze data in single-subject research.

Qualitative data i.e., medical and developmental status, family and school situations, and self-perception and attitude toward academics were used to gain background information on Student X and provide a better understanding of his past academic experiences and attitude toward reading.

Chapter Summary

This single case experimental research case study, performed in A-B and A-B-A formats with three phases: initial, intervention, and maintenance, was developed to measure the effectiveness of a multisensory structured language program on the phonetic analysis skills and reading fluency of a single student with dyslexia. The participant (Student X) was chosen for this study due to his deficits in reading and his identification as dyslexic. The specific intervention used with Student X was The Wilson Reading System; a systematic, sequential, multisensory structured language program. Student X was initially tested using The San Diego Quick Assessment of Reading and the Word Identification and Spelling Test to assess appropriate reading level and phonetic analysis skills respectively. After an intervention period of four weeks, Student X was retested using the assessments cited above to determine effectiveness of the intervention. The data were analyzed and recorded into an Excel
spreadsheet, graphs, and tables to visually present effectiveness of the Wilson Reading System on a single student identified as dyslexic.
Chapter IV  

Results

The following chapter presents the results of the current single case experimental design research study developed to determine the efficacy of a multisensory structured language intervention, the Wilson Reading System, on phonetic analysis skills and reading fluency of a single participant identified as dyslexic (Gay, Mills, & Airasian, 2012). According to the National Reading Panel (2000), phonetic analysis skills and fluency are two essential components of reading; both areas are ones in which individuals with dyslexia have been shown to lack the necessary skills to become proficient readers (Shaywitz; 2003). Data was collected for a period of eight weeks, growth rates were analyzed, and all data was placed into figures and tables to provide individual visual comparisons of scores from all three phases of the study: (a) initial, (b) intervention, and (c) maintenance.

Demographics

The seven-year-old male participant from this study was chosen from a learning center located in a southern suburb of Chicago, Illinois. There are approximately 79 students currently attending this facility: 17 of which are seen for reading deficits while the rest are seen for speech and language difficulties. This study was conducted at the home of the student also in a nearby southern suburb of Chicago, Illinois. According to the 2014-2015 Illinois Report Card, the participant’s current elementary school houses 486 students (§ 4, p. 4) and the demographics are as follows: (a) White = 88.1%, (b) African American = 0.9%, (c) American Indian = 0.1%, (d) Asian = 0.5%, (e) Bi-Racial = 1.6 %, and (f) Hispanic = 8.8% with 15.2% of the student population receiving special education services (§ 4, p. 4). The participant was chosen due to his recent dyslexia diagnosis, reading deficits, and because he had not previously received
intervention using the Wilson Reading System. The median income in this suburb is estimated at $75,806; the participant’s household income falls slightly below this range and is considered middle-class (United States Census Bureau, 2014, p. 1).

Efficacy of the Wilson Reading System and Students with Dyslexia

This single case design experimental research study set out to determine the effectiveness of a multisensory language intervention on a single participant identified as dyslexic. Specifically, the purpose of the study was to determine the effect the Wilson Reading System had on the phonetic analysis skills and reading fluency of single participant identified as dyslexic. Both areas are essential in order to be a proficient reader according to the National Reading Panel (2000) and are areas in which students with dyslexia, including the present participant, tend to struggle according to Shaywitz (2003). The participant’s phonetic analysis skills were determined from data collected via the WIST (Wilson & Felton, 2004) and reading fluency was assessed using data from Six-Minute Solution (Adams & Brown, 2007) fluency passages. Reading level was determined using data from the San Diego Quick Assessment of Reading Ability (LaPray & Ross, 1969) to ascertain correct level of Six-Minute Solution reading fluency passages. Data was collected for a period of eight weeks and the results are described and analyzed below.

Reading Levels

The participant’s reading level was determined using the San Diego Quick Assessment of Reading Ability (SDQA) by LaPray and Ross (1969). SDQA determines instructional, independent, and frustration reading levels using graded word lists comprised of ten words for grades preprimer through the eleventh grade level (as cited in Barrie-Blackley, 2011). Data was collected during the initial and maintenance phases of the study. The participant’s grade levels
according to pre implementation of the intervention were: (a) independent = preprimer; (b) instructional = primer; and (c) frustration = first grade. Post implementation of the intervention, the participant’s grade levels were: (a) independent = primer; (b) instructional = first grade; and frustration = 1st grade (see Figure 1).

![Figure 1. Pre and Post Intervention Reading Levels.](image)

Figure 1. Pre and Post Intervention Reading Levels. Figure 1 represents pre (blue) and post (purple) scores for the three levels of reading based on the San Diego Quick Assessment of Reading Ability (SDQA).

**Reading Fluency Rates**

The participant’s reading fluency rate was assessed using passages from the Six-Minute Solution (Adams & Brown, 2007) reading fluency program. The participant read five different kindergarten level passages, four times a week, for a total of five weeks during the present study. Data were collected during all three phases of the study: (a) both weeks of the initial phase; (b) one week during intervention phase; and (c) both weeks of the maintenance phase. Table 1 provides a comprehensive list of data collected during all three phases of the present study from Six-Minute Solution fluency passages.
Table 1

*Reading Fluency Scores for Initial, Intervention, and Maintenance Phases*

<table>
<thead>
<tr>
<th>Week</th>
<th>Day 1 WCPM</th>
<th>Day 2 WCPM</th>
<th>Day 3 WCPM</th>
<th>Day 4 WCPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
<td>13</td>
<td>19</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>Week 2</td>
<td>19</td>
<td>25</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>Intervention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>18</td>
<td>24</td>
<td>29</td>
<td>36</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 7</td>
<td>24</td>
<td>28</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>Week 8</td>
<td>33</td>
<td>37</td>
<td>42</td>
<td>47</td>
</tr>
</tbody>
</table>

With the exception of the intervention week (third week of collecting fluency data), the participant made gains in reading fluency on all days assessed in comparison to all other weeks. During the third week, the participant’s fluency actually decreased on the first two days assessed in comparison to baseline data obtained during week two. However, when fluency was assessed during the maintenance phase of the intervention, the participant’s fluency showed an increase on all days assessed when compared to initial and intervention data. According to the Hasbrouk and Tindal’s (2006) oral reading fluency norms data chart, the participant’s pre intervention fluency Day One score of 13 words read correctly per minute (WCPM) placed him in less than the 10th percentile for the winter assessment. Post intervention, the participant’s Day One fluency score of 33 WCPM placed him in the 10th percentile for winter assessment; initial score of the 10th percentile is 18 WCPM with the cutoff being 42 WCPM (Hasbrouk & Tindal, 2006). Consequently, the participant’s score placed him more than halfway through the 10th percentile.
Additionally, Hasbrouk and Tindal (2006) state an expected gain of 0.6 WCPM is standard for a student in less than the 10\textsuperscript{th} percentile. Using Hasbrouk and Tindal’s formula, the participant should have made expected gain of 16 WCPM over the five weeks assessed. However, the participant’s actual gain was 20 WCPM making his score above the expected average gain. Fluency scores for all weeks assessed were then placed into a separate Excel Spreadsheet to visually represent growth for all three phases of the intervention: (a) initial, (b) intervention, and (c) maintenance (see Figure 2).

\textbf{Reading Fluency}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{reading_fluency.png}
\caption{Figure 2 shows the participant’s reading fluency scores for all five weeks. Weeks assessed are represented as follows: Week 1 = Dark blue, Week 2 = Green (both initial phase), Week 3 = Red (intervention phase), and Week 4 = Purple, and Week 5 = Light blue (both maintenance phase).}
\end{figure}

\textbf{Phonetic Analysis Skills}

The participant’s phonetic analysis skills were assessed using the Word Identification and Spelling Test (WIST) by Wilson and Felton (2004). Assessment data was taken during the initial and maintenance phases of the study. The areas assessed were as follows: (a) sound-symbol
knowledge, (b) spelling (regular and irregular words), (c) real word identification, (d) pseudo word identification, and (e) irregular word identification. The composite score (Fundamental Literacy Index) is taken from reading and spelling real words score. Table 2 provides individual scores for pre and post intervention WIST assessment scores and their accompanying percentile rank.

Table 2.

<table>
<thead>
<tr>
<th>Area</th>
<th>Pre Intervention Standard Score</th>
<th>% Rank</th>
<th>Post Intervention Standard Score</th>
<th>% Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Identification</td>
<td>49</td>
<td>&lt;1%</td>
<td>51</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Spelling</td>
<td>76</td>
<td>5%</td>
<td>78</td>
<td>7%</td>
</tr>
<tr>
<td>Fundamental Literacy Ability Index</td>
<td>58</td>
<td>&lt;1%</td>
<td>62</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Sound-Symbol Knowledge</td>
<td>67</td>
<td>1%</td>
<td>74</td>
<td>4%</td>
</tr>
</tbody>
</table>

The participant made modest but measurable gains in all areas according to data collected during both phases using the WIST. The largest point gains were seen in the areas of fundamental literacy ability index (composite score) and sound-symbol knowledge; the participant’s score went up four points and seven points respectively. In the area of word identification, the participant went up four points; while in the area of spelling, the participant went up two points. The participant’s initial and maintenance word identification and fundamental literacy scores placed him in less than one percentile; his percentile rank for spelling went from the fifth to the seventh; and his sound-symbol knowledge scores went from one percentile to the fourth
Chapter Summary

This study investigated the effects of a multisensory language intervention, the Wilson Reading System, on the phonetic analysis skills and reading fluency of a single participant identified as dyslexic. Appropriate reading level, fluency rate, and phonetic analysis skills were determined during the initial phase consisting of two weeks. During the second phase, intervention, the student was instructed using the Wilson Reading System for a period of four weeks. Reading fluency rate was reassessed midway through the intervention phase. During the last phase, maintenance, the participant’s reading levels, fluency, and phonetic analysis skills were assessed again. According to the data taken, the participant made gains in all areas assessed. Reading fluency gains were greater than expected according to the Hasbrouk and Tindal (2006) oral reading fluency norms chart. Likewise, the participant’s independent and instructional reading levels increased by one grade level although his frustration level remained the same. The participant also went from the first to the fourth percentile in sound-symbol knowledge and the fifth to the seventh percentile in spelling. The participant’s composite score and word identification score also improved although he stayed in less than one percentile range for his grade and age equivalent. Overall, gains made by the participant indicate that the Wilson Reading System is an appropriate intervention to use with said student.
Chapter V

Discussion and Conclusion

This single case design study performed in A-B and A-B-A formats investigated the effectiveness of a multisensory language intervention, specifically the Wilson Reading System, on the phonetic analysis skills and reading fluency of a single student identified as dyslexic. The assessments used for this study were: (a) The San Diego Quick Assessment of Reading Ability (LaPray & Ross, 1969) to determine appropriate reading level, (b) The Word Identification and Spelling Test (WIST) by Wilson and Felton (2004) to assess pre and post intervention phonetic analysis skills, and (c) Six-Minute Solution (Adams & Brown, 2007) to determine fluency rates throughout the duration of the study. Data was collected for a period of eight weeks and analyzed using the following methods: (a) phonetic analysis skill percentile rank was taken from the normative tables in the WIST user manual, (b) fluency rates were analyzed using Hasbrouk & Tindal’s (2006) oral reading and fluency norms data chart, and (c) reading levels were determined from the San Diego Quick Assessment of Reading Ability assessment. Overall, the data presented showed multisensory language intervention, (Wilson Reading System), to be an appropriate method to use with the single participant identified as dyslexic.

Discussion

The data presented in the current study showed multisensory language intervention to be effective in improving the phonetic analysis skills and reading fluency of a single participant identified as dyslexic. The Wilson Reading System (Wilson, B. A. & Wilson, E., 1996) is identified as an effective remediation measure to use with students identified as dyslexic according to the research reviewed (Balido-Dean et. al, 2011; Bergeson, 2007; Lerner & Johns, 2012; Oakland et. al, 1998; Shaywitz, 2003; Young, 2008). Additional research reviewed also
showed multisensory language interventions to be effective with treatment resistors (Campbell et al., 2008; Rowley et al., 2014) and at-risk learners (Joshi et al., 2002). Moreover, multisensory language instruction has been proven to remediate the symptoms of dyslexia in individuals through the use of functional magnetic resonance imaging (fMRI) pre and post intervention as shown in Simos et al. (2002) and Shaywitz (2003).

Conclusion

The present experimental research study conducted an investigation on the effects of multisensory language instruction on the phonetic analysis skills and reading fluency of a single participant identified as dyslexic. The multisensory language intervention utilized, the Wilson Reading System (Wilson, B. A. & Wilson, E., 1996), was implemented for a period of four weeks. Data was collected for eight weeks in total; two weeks during the initial phase to assess phonetic analysis skills, reading levels, and obtain reading fluency baselines; four weeks of intervention along with one week of additional fluency assessment occurred during the second phase; and the two weeks of the maintenance phase were used to obtain post intervention data. Phonetic analysis skills results were compiled and analyzed using normative tables from the WIST user's manual to determine percentile rank and reading levels were determined using SDQA. The participant's reading fluency data was taken from Six-Minute Solutions fluency passages and then compared to Hasbrouk and Tindal's (2006) oral reading fluency norms data chart. Two separate tables were utilized to visually show data results from the WIST and Six-Minute Solutions passages along with two individual figures to present fluency and reading level data. At the conclusion of the study, the participant had made gains in all areas assessed.

Educational Implications

The educational significance of the study was to determine the effectiveness of a
multisensory structured language intervention with a single student identified as dyslexic in order to enable students with dyslexia to become successful readers, students, and eventually adults.

At the conclusion of the study, the participant had made modest gains in all areas assessed with the exception of reading fluency where his gains were above the expected average according to Hasbrouk and Tindal's (2006) oral reading fluency normative data chart. Overall, the data collected during the present study indicates the use of multisensory language instruction is appropriate with individuals identified as dyslexic.

**Recommendations for Further Research**

Although the present study was intensive in respect to days per week that the intervention was implemented, the intervention period itself was only comprised of four weeks at 45 minutes per day, and the Wilson Reading System was designed to be implemented over a period of two to four years with intervention taking place one to two times a week for a minimum of one hour. In order to determine true effectiveness of a multisensory language instruction with students identified as dyslexic, further studies should be conducted utilizing a larger pool of participants and more intensive intervention should be implemented over an extended period of time. Additionally, the study was designed to examine the effects of the Wilson Reading System on the phonetic analysis skills and reading fluency of one seven-year-old male participant which further limited the results of the study. Again, further studies should include a more diverse population of participants to ensure that the results are not limited to a specific group of individuals.

**Summary**

This single case design research study sought to determine the effectiveness of a multisensory language intervention program on the phonetic analysis skills and reading fluency
of one seven-year-old male identified as dyslexic. Both areas addressed in the present study have been shown to be essential areas for reading development and success according to the National Reading Panel (2000). However, research has also shown that individuals identified as dyslexic tend to struggle with both fluency and phonetic analysis skills (Joshi et al., 2002; Oakland et al., 1998; Peterson & Pennington, 2012; Shaywitz, S. E. & Shaywitz, B. A., 2004).

The chosen intervention, the Wilson Reading System, is a systematic, structured, and multisensory intervention originally designed to improve reading fluency, phonetic analysis skills, and comprehension of individuals with dyslexia and is now used as a Tier Three intervention for any student who needs additional reading instruction. Research has shown multisensory language interventions to be appropriate methods to use with students with dyslexia, treatment resistors, and at-risk learners (Balido-Dean et al., 2011; Bergeson et al., 2007; Campbell et al., 2008; Joshi et al., 2002; Lerner & Johns, 2012; Oakland et al., 1998; Rowley et al., 2014). Moreover, in studies by Shaywitz (2003) and Simos et al. (2002), brain function of individuals with dyslexia normalized after intensive remediation using multisensory language interventions as evidenced through fMRI’s.

This study, performed in A-B and A-B-A formats, was conducted for a period of eight weeks. Data was collected during all three of the phases of the study: (a) two initial, (b) four intervention, and (c) two maintenance. During the initial phase, the student’s fluency baseline was determined using Six-Minute Solution (Adams & Brown, 2007); his pre-intervention reading levels were figured using the San Diego Quick Assessment of Reading Ability (SDQA) by LaPray and Ross (1969); and his phonetic analysis skills were assessed via the WIST, (Wilson & Felton, 2004). Initial, intervention, and maintenance fluency rates were identified and then compared to Hasbrouk and Tindal’s oral reading fluency norms data chart. Pre and post
intervention readings levels were determined along with phonetic analysis skills. Data were then placed into figures and tables to provide a visual comparison of the participant’s pre and post intervention scores. Additionally, phonetic analysis skills data were analyzed using norms data charts found in the WIST user’s manual to determine percentile rank. The participant made modest gains in all areas assessed with the exception of reading fluency; here his gain of 20 WCPM was four points above the expected 16 WCPM according to the oral reading fluency norms chart by Hasbrouk and Tindal (2006). At the conclusion of the study, it was determined that the intervention was effective.

Overall, research has shown that dyslexia affects a large percentage of the U.S. population: Washburn et al., (2002) asserts one-fifth of persons in the U.S. displays symptoms of dyslexia while Shaywitz (2003) contends 5-17% of persons identified as learning disabled in the U.S. are actually dyslexic. Research has also shown that dyslexia is often under diagnosed with very little specific legislation having been enacted to screen, remediate, and protect individuals affected by this disorder (Dyslexia Research Institute, n.d., § 1, ¶ 1; Youman & Mather, 2012). Likewise, remediation efforts have often been found to be ineffective due to lack of teacher training in appropriate methods which can produce intense feeling of shame and low self-esteem resulting in constant emotional and life struggles for affected individuals (Barden, 2010; Cunningham et al., 2009; McNulty, 2003; Moats & Foorman, 2003; Wadlington, 2000). However, considerable research has shown that the symptoms of dyslexia may be remediated through competent application of a multisensory structured language program (Cushenberry, 1981; Hale, 2008; Joshi et al., 2002; Oakland et al., 1998; Pitrowski & Reason, 2000; Richardson, 1992; Shaywitz, 2003; Shaywitz, S. E. & Shaywitz, B. A., 2004; Simos et al., 2002; Youman & Mather, 2013; Wadlington, 2000). Consequently, this study set out to determine the
efficacy of one such program, the Wilson Reading System (WRS), on the reading fluency and phonetic analysis skills of a single student identified as dyslexic. At the conclusion of the study, it was determined to be an effective intervention as the participant had made gains in all areas assessed: (a) reading levels, (b) reading fluency, (c) word identification, (e) spelling, (f) fundamental literacy ability index, and (g) sound-symbol knowledge supporting the results of the research reviewed. However, it was also concluded that additional studies should be conducted more intensively utilizing a diverse population of participants to ensure the results are not limited to a specific group of individuals, so henceforth, all individuals with dyslexia may receive appropriate intervention and become successful readers, students, and eventually adults.
References


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Simos, P. G., Fletcher, J. M., Bergman, E., Breier, J. I., Foorman, B. R., Castillo, E. M., Davis,


Appendix A

Ethics Form
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COURSEWORK TRANSCRIPT REPORT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- Name: Lisa Davi (ID: 4975565)
- Email: ldavi@student.govst.edu
- Institution Affiliation: Governors State University (ID: 867)
- Phone: 815-280-8603

- Curriculum Group: Human Research
- Course Learner Group: IRB Social/Behavioral Research
- Stage: Stage 1 - Basic Course

- Report ID: 17074136
- Report Date: 09/01/2015
- Current Score**: 100

REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES

<table>
<thead>
<tr>
<th>Module</th>
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<th>SCORE</th>
</tr>
</thead>
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<tr>
<td>Students in Research (ID: 1321)</td>
<td>06/30/15</td>
<td>10/10 (100%)</td>
</tr>
<tr>
<td>History and Ethical Principles - SBE (ID: 490)</td>
<td>06/30/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Defining Research with Human Subjects - SBE (ID: 491)</td>
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<td>5/5 (100%)</td>
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<tr>
<td>Belmont Report and CITI Course Introduction (ID: 1127)</td>
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<tr>
<td>The Federal Regulations - SBE (ID: 502)</td>
<td>08/30/15</td>
<td>5/5 (100%)</td>
</tr>
<tr>
<td>Assessing Risk - SBE (ID: 503)</td>
<td>08/30/15</td>
<td>5/5 (100%)</td>
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<tr>
<td>Informed Consent - SBE (ID: 504)</td>
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<tr>
<td>Privacy and Confidentiality - SBE (ID: 505)</td>
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<tr>
<td>Research with Prisoners - SBE (ID: 506)</td>
<td>09/01/15</td>
<td>5/5 (100%)</td>
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<tr>
<td>Research with Children - SBE (ID: 507)</td>
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<td>5/5 (100%)</td>
</tr>
<tr>
<td>Research in Public Elementary and Secondary Schools - SBE (ID: 508)</td>
<td>09/01/15</td>
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<tr>
<td>Internet-Based Research - SBE (ID: 510)</td>
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</tr>
</tbody>
</table>

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

CITI Program
Email: citisupport@miami.edu
Phone: 305-243-7970
Web: https://www.citiprogram.org
Appendix B

Parent/Guardian Cover Letter and Consent Forms
February 6, 2016

Dear Parent/Guardian:

I am a Master’s candidate at Governors State University in University Park, Illinois. My program requires that all candidates perform a research project. I would like your permission to include Student X in my study at his school.

My study will investigate a specialized learning technique with a student who has difficulties with reading. My goal is to help Student X increase his phonetic analysis skills and reading fluency. I will be administering two reading assessments both before and after a series of tutoring sessions. The program I will be using is a multisensory structured language reading program. This type of instruction uses visual, auditory, and tactile instructional methods.

During the study, Student X’s classroom procedures will continue as usual. This study will be conducted in the Art room. Student X will work with me, one-on-one, in the Art room every day for five weeks. Tutoring sessions will last approximately 45 minutes per lesson. The initial lessons and testing sessions will be slightly shorter.

The information collected will only be used for this study. Student X’s name will not be used in any of the reports made or on data sheets collected. Student X’s identity will remain confidential.

This study is completely voluntary, and you may withdraw Student X from this study at any time without penalty.

Enclosed please find the Parent/Guardian Consent Form that we discussed. If you have any questions regarding this study, please feel free to contact me at 1-708-481-6103. I will call you back as soon as possible.

Sincerely,

Lisa M. Davi, Special Education Teacher
Master’s in Multicategorical Special Education Candidate, Governors State University, University Park, Illinois

*Form modified from James Breckinridge Davis
PARENT/GUARDIAN – INFORMED CONSENT FORM

Determining if a Multisensory Language Intervention Improves the Phonetic Analysis Skills and Reading Fluency of a Student with Dyslexia

Principal Researcher: Dr. Philip Boudreau, PhD, Associate Professor
Lisa M. Davi, Masters in Multicategorical Special Education

Purpose: Your son is invited to participate in the research project entitle, Determining if a Multisensory Structured Language Intervention Improves the Phonetic Analysis Skills of a Dyslexic Student, which is being conducted at Governors State University under the direction of Dr. Phil Boudreau. The purpose of this study is to increase your son’s reading skills by teaching with a multisensory structured language program.

Description of Procedures: The research will take place in your home for five weeks starting after the new year. Your son will receive daily individualized tutoring in reading. The tutoring sessions will last approximately 45 minutes. The lessons will focus on improving Student X’s phonetic analysis skills and reading fluency. The teaching strategies to be used will be visual, auditory, and tactile ways of learning.

Potential Risks: There are minimal risks to participation in this study, including loss of confidentiality.

Your son may become frustrated or upset during tutoring sessions, but the teacher will provide positive reinforcement to help him with his reading difficulties. Overall, this is little to no chance that any harmful psychological or emotional feelings will be experienced.

Potential Benefits: The direct benefit to your son if he participates in this research study may be that you will learn how a multisensory structured language program helps students learn new reading skills. Your son may also benefit from the intervention by gaining additional phonetic analysis skills and improve his reading fluency thusly becoming a better reader.

Confidentiality: The researcher will make every effort to prevent anyone who is not part of the study from knowing that your son participated in this research and what the results are. The consent forms will be kept separate from the data collected and your son will be identified as Student X only. Although I will make every effort to protect your confidentiality, there is a low risk that this may be breached.

Voluntary Participation: You may refuse to include your son in the study under no penalty or loss of benefits to which you are otherwise entitled. This will not affect your son’s school performance data or your relationship with his school and/or the Governors State University. Additionally, you may remove your son from this study at any time without penalty or loss of benefits.
Contact Information: If you have any questions at any time during this study or prior to implementation of the intervention, please contact me at [__]. If you have any questions regarding your rights as a participant in this research study or concerns regarding the study itself, you may also contact the Co-Chairs of the Governors State University Institutional Review Board (IRB): Renee Theiss, Ph.D. at [__] Praggyan (Pam) Mohanty, Ph.D. at [__]. The IRB reviews research projects to insure the ethical conduct of research with human subjects.

If there is anything that is unclear to you, please contact me before you sign and return this form. Take as much time as needed to review this form.

By signing this consent form, you are agreeing that your son, Student X, may participate in this five-week research study.

________________________________________
Name of Student (please print)

________________________________________  ______________________________________
Name of Parent/Guardian (please print)  Signature  Date

________________________________________  ______________________________________
Name of Person Obtaining Consent  Signature  Date

*All permission forms modified from James Breckinridge Davis
Appendix C

Six-Minute Solutions Implementation Schedule and Sample Fluency Passage

Initial Phase Passages:

Week One Passage: “Hats and Caps”

Week Two Passage: “Kim is Six”

Intervention Phase Passages:

End of Week Four Passage: “Dot’s Job”

Maintenance Phase Passages:

Week Seven Passage: “Mutt the Pup”

Week Eight Passage: “Bess the Hen”
Short "a" Story: Hats and Caps

Decodable Words
- and
- Pat
- Pam
- Sam
- Dan
- pals
- hats
- caps

Automatic Words
- who
- like
- likes
- they
- many
- all
- the
- fun

Hats and Caps

0  Pat and Pam are pals who like hats. Pat likes red hats, and Pam likes blue hats. They have many hats.
12  
21  Sam and Dan are pals who like caps. Sam likes red caps, and Dan likes blue caps. They have many caps.
32  
42  All the pals have fun with hats and caps.
51  

Total Words Read _____
- Errors _____
= CWPM _____
Appendix D

Sample Wilson Reading System Lesson

1) **Quick Drill (2-3 minutes):** of sound-symbol knowledge using sound cards; student says letter-keyword-sound.

2) **Teach/Review Concepts (Approximately 5 minutes):** Teacher introduces/reinforces concepts using sound, syllable, and/or suffix cards depending on the step the student is currently on.

3) **Word Cards (3-5 minutes):** Student practices decoding words presented on colored cards that coincide with concepts taught/reviewed tapping sounds or syllables as needed. When decoding is completed, students are asked to sort cards according to concept and quickly reread them to develop fluency and accuracy.

4) **Wordlist Reading (Approximately 5 minutes):** Teacher selects appropriate list of words from current step for student to decode. Words are read in columns rather than rows and first response counts. Real and pseudo words are used, again depending upon skill mastery. Students are not allowed any errors in real word decoding and two in pseudo word decoding. The teacher keeps a comprehensive running record of errors and student charts his or her progress. Accuracy and automaticity are evaluated; the student may not progress to the next step until both are achieved.

5) **Sentence Reading (Approximately 5 minutes):** Student reads sentences, silently and then orally, corresponding to step tapping sounds and scooping syllables as needed. The teacher may assist as needed and keeps a comprehensive running record of errors, automaticity, and fluency. Concepts are reviewed and student is directed to identify corresponding word(s). Tracking is encouraged during sentence reading, and the teacher should model fluency as needed.

6) **Quick Drill in Reverse (1-2 minutes):** Here the teacher says a sound and directs student to repeat the sound finding the corresponding tile.

7) **Teach/Review Concepts for Spelling (Approximately 5 minutes):** Teacher says a word; student repeats it, tapping or breaking into syllables using manipulatives. The student finds corresponding letter tiles or uses manipulatives to represent syllables and then encodes words orally restating word presented. Throughout this process, the teacher reviews concepts and questions student to ensure comprehension. Irregular words are presented here; the student repeats word after teacher, traces it saying the letters and whole word three times orally, and then turns the card over and repeats the process once.
8) **Dictation of Sounds, Words, and Sentences (15-20 minutes):** Teacher selects new and review concepts and moves from oral dictation of sounds to word to sentences covering five sounds, five real words, five nonsense words, two-three irregular words, and two-three sentences. During each step, the student repeats after the teacher, uses appropriate strategies, and then writes what has been dictated while orally restating letter, word, or sentence. The student does not attempt to encode irregular words; he or she states the word and then writes it. Teacher and student review dictation again discussing errors and concepts.

9) **Controlled Text Passage Reading (10-15 minutes):** Teacher selects a passage from appropriate leveled reader and corresponds to concepts covered. The student will read the passage silently using tracking measures. The teacher then directs to student to retell the story in his/her own words completing this section by reading the story orally. Modeling visualization and retelling is done by the teacher until the student has mastered this skill. Fluency is achieved through repeated, echo, and choral reading of the selected passage.

10) **Listening Comprehension/Applied Skills (10-30 minutes):** Teacher selects non-controlled passages of interest to the student and reads them aloud. The teacher then models visualization and story retelling and has the student repeat the process in his/her own manner and verbiage. (Wilson Language Training Corporation, 2004, pp. 16-22).
Appendix E

Student Interview Questions

1) What do you think of when you hear the word reading?
2) Do you like to read?
3) Do you read at home?
4) Do you have many books?
5) What kinds of books would you like to own?
6) What types of books/stories do you like to read?
7) Does anyone read to you?
8) How do you feel about school?
9) What is your favorite subject?
10) What do you like to do outside of school? Hobbies? Activities?
11) Would you rather play outside?
12) Do you see your friends during the week? Only on the weekends?
13) How do you think you read?
14) Would you like to learn to read better?
15) Do you like to watch TV? What do you like to watch?
16) What is your favorite movie?
17) Do you like to learn/play on the computer?
18) What activities do you like on the computer?
19) Say anything else that you would like me to know.

*Adapted from Denice Hildebrandt’s (2001) “But There’s Nothing Good to Read”*
Appendix F

Parent Interview Questions

(Elaboration will be requested as deemed necessary for all questions asked.)

Family History

How many children are in your family?
Where does he fall in birth order?
Who and how many people live in your home?
Does anyone in your family have reading difficulties? If yes, whom?
Does he enjoy being read to?
Does he like to read at home?
What are some of his favorite activities?

Medical History

Has Student X ever been chronically ill?
Has he ever had a high fever?
Has he ever been hospitalized?
Does he has any physical problems which you felt may cause learning difficulties?
Does he currently take any medications?
Does he appear to having hearing issues?
Does he appear to have trouble seeing?

Cognitive/Academic Ability

Does he need to have things repeated many times to learn something new?
Do you feel he has difficulty with reading in comparison to his other abilities?
Can you tell me about his academic experiences in his home school?
What were his grades like?
When did he first exhibit academic issues?
Did he receive any special services at his home district? If so, what?
Was he ever retained?
What have previous teachers told you about his academic abilities?
What are some of his academic strengths?

Attitude/Self-concept

Does he have many friends?
Does he ever talk about feelings of inadequacy in regards to school work? Anything in general?
Does he appear to like/dislike school?
What are his favorite subjects?
Does he enjoy doing homework?
Does he enjoy learning?

*Adapted from the Parent Interview for Dyslexia, Texas Scottish Rite Hospital for Children.