THE EFFECTS OF THE FONT DYSLEXIE ON ORAL READING FLUENCY SKILLS IN STUDENTS GRADES 8 THROUGH 12 WITH AND WITHOUT READING DISABILITIES

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8. Oral Reading Fluency (ORF)
9. Dyslexie (DYS)
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11. No Reading Disability Group (No RD Group)
12. Reading Disability Group (RD Group)
13. Attention deficit hyperactivity disorder (ADHD)
14. Special Education (SPED)

ABSTRACT

THE EFFECTS OF THE FONT DYSLEXIE ON ORAL READING FLUENCY SKILLS IN STUDENTS GRADES 8 THROUGH 12 WITH AND WITHOUT READING DISABILITIES

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There has been considerable research studying the symptoms related to reading disabilities as well as the tools and training programs that can be used to remediate such symptoms. One such tool being used to increase fluency for those with reading disabilities is the introduction of a specially designed typeface or font that is different from the commonly used fonts such as Times New Roman, Arial, etc. Several new fonts have been designed to help individuals with reading disabilities read more efficiently and fluently; however, the empirical evidence to support the effectiveness of using different typefaces is lacking in the scientific literature. If proven effective, the use of these different fonts could be an easy and inexpensive intervention for children with reading disabilities. The purpose of this study was to measure the effectiveness of the font "Dyslexie" on Oral Reading Fluency scores in students, grades 8 through 12 with and without reading disabilities. Due to a lower than expected number of participants for the reading disability group, a statistical analysis to calculate the data's significance levels could not be conducted; however, research results and comparisons between groups are provided and suggestions for future research is discussed.

CHAPTER 1: INTRODUCTION

Reading is a process derived from spoken language and is an important skill used in all aspects of our lives as we communicate ideas and information. It is a multifaceted process that begins in early childhood and requires the use of many different skills that grow throughout development. The skills needed for reading involve the use of many different cognitive processes that are needed to help individuals read efficiently while also comprehending the text (Shaywitz & Shaywitz, 2004). The 2001 *No Child Left Behind Act*, an act of the United States Congress outlining educational standards, defines reading as:

> … a complex system of deriving meaning from print that requires all of the following: (A) The skills and knowledge to understand how phonemes, or speech sounds, are connected to print; (B) The ability to decode unfamiliar words; (C) The ability to read fluently; (D) Sufficient background information and vocabulary to foster reading comprehension; (E) The development of appropriate active strategies to construct meaning from print; (F) The development and maintenance of a motivation to read. (Part B, Section 1208)

Reading is a skill that must be learned and, unlike speaking, it is not a natural process for the human brain. Many children have difficulties acquiring all the skills needed for reading even though they are intelligent and have had adequate educational instruction. Children who have difficulty developing any of the skills needed for reading are at an increased risk for having reading deficits (Snow, Burns, & Griffin, 1998). Gone undetected, these reading difficulties can develop into a reading disability.

The National Center for Learning Disabilities defines a reading disability as a neurological, "language processing disorder that can hinder reading, writing, spelling and/or speaking" (What is Dyslexia? 2012, para.1). While the term dyslexia is a well-known and accepted term it is not used by most school psychologists or school systems when diagnosing deficits in reading and thus for the purpose of this paper the term reading disability will be used instead.

The *2004 Individuals with the Disabilities Education Act* (IDEA) identified three skill areas of reading in which a child can be diagnosed as having a disability. These areas include basic reading skills, reading fluency skills, and reading comprehension all of which are subcategories under the diagnosis of Specific Learning Disability (SLD). According to the IDEA, a child may be diagnosed with an SLD if the child is unable to acquire one or more specific academic skills, despite possessing adequate intelligence and receiving appropriate academic instruction (U.S. Dept. of Education, 2004).

A variety of symptoms and characteristics are commonly seen in individuals with reading disabilities. This includes, but is not limited to, deficits in attention and/or hyperactivity (Germano, Gagliano, & Curatolo, 2010), visual and auditory processing deficits (Georgiou, Papadopoulos, Zarouna, & Parrila, 2012; Gibson, Hogben, & Fletcher, 2006), differences in eye movement patterns (Eden, Stein, Wood, & Wood, 1994), language development delays (Catts, Adlof, Hogan, & Weismer, 2005), short-term memory deficits (Perez, Majerus, Mahot, & Poncelet, 2012), working memory deficits (Beneventi, Tonnessen, Ersland, & Hugdahl, 2010), long-term memory deficits (Menghini, Carlesimo, Marotta, Finzi, & Vicari, 2010), motor coordination difficulties (Iversen, Berg, Ellertsen, & Tonnessen, 2005), visual-spatial skill deficits (Winner, et al., 2001), and difficulties with rapid automatized naming (Georgiou, Papadopoulos, Zarouna, & Parrila, 2012; Wolf & Bowers, 2000). Reading disabilities look different for every child because not all children exhibit the same set of symptoms, and these symptoms can range from mild to severe (Reid, 2004).

Reading disabilities affect every aspect of a child's life. Research has shown that a reading disability can negatively impact, not only a child's educational experience, but other areas of his or her development as well. Along with educational difficulties, many children with reading disabilities may also have long-term problems in their personal, social, and emotional lives, with low self-esteem and negative self-concepts (Humphrey, 2002; Humphrey & Mullins, 2002). With more than 2 million children in today's schools receiving special education services for a reading disability (Shaywitz, 2004) understanding the causes and ways in which the negative symptoms can be reduced is at the center of educational research.

Reading disabilities are neurobiological in origin and affect children at all socio-economic levels (Shaywitz & Shaywitz, 2004). They are not caused by low socioeconomic status, developmental delays, speech or hearing impairments, or by having to learn English as a second language; however, these factors may increase a child's risk for developing a reading disorder (Snow, Burns, & Griffin, 1998).

Past research indicates that individuals who have a parent or other family member with a reading disability are at an increased risk of having one as well. However genetics is one, from a long list of, potential risk factors and many children with a family history of reading disabilities are able to acquire the skill of reading with ease (Olson, Wise, Conners, Rack, & Fulker, 1989; Scarborough, 1990; Stevenson, Graham, Fredman, & McLoughlin, 1987).

There has been a plethora of research done to explore the causes of reading disabilities. Despite the vast amount of research, the neurological origins of reading disabilities are still unknown and widely debated. While the etiology of reading disabilities remains unclear, research on how to remediate symptoms associated with the disability continues to grow (Judica, Luca, Spinelli, & Zoccolotti, 2002; Marrs & Patrick, 2002; Marsha & Camahalan, 2006; Reynolds, Nicolson, & Hambly, 2003). One approach being used is that of specially designed fonts said to make the reading process easier for individuals with reading disabilities especially in terms of their reading fluency (Hillier, 2008; Nalewicki,, 2011; To the letter, 2010). Unfortunately, the empirical evidence to support these interventions is lacking in the literature. The purpose of this study is to expand the current literature by analyzing differences in Oral Reading Fluency scores for the font Times New Roman and the font Dyslexie in students, grades 8th through 12th, with and without reading disorders.

CHAPTER 2: LITERATURE REVIEW

Many children of average or above average intelligence struggle with reading even though they are performing well in all other academic areas. This can make a child feel as though he or she is not intelligent and can negatively affect many aspects of his or her life. Fortunately, research is being conducted to better understand the origins of reading disabilities. Additionally, scientifically-based interventions are continually being developed to alleviate negative symptoms associated with reading disabilities (Wright, n.d.). This review of the literature will provide information regarding reading skills, assessment of reading skills, theories related to the neurology of reading disabilities, and research on font type as it relates to reading.

Component Reading Skills

The act of reading is a complex process that involves many skills, which children begin to develop at a very early age and build on as they progress through school. Shaywitz (2004) describes the process of reading as having two major components; decoding and comprehension. Decoding is the ability to break down and analyze words in order to gain an understanding of that word. Comprehension is the ability to understand what is being expressed in a written text. Acquiring skills for decoding and comprehending involves several levels of instruction, many of which develop simultaneously. Based on findings from the 2000 National Reading Panel Report, which reviewed thousands of studies on effective reading instruction, the *2001 No Child Left Behind Act* outlined the following five essential component reading skills needed for effective reading instruction: phonemic awareness, phonics, reading fluency, vocabulary, and reading comprehension. Although the main focus of this study is on reading fluency, information will be provided regarding each of these reading components in order to provide a comprehensive understanding of how reading skills are developed.

Phonemic Awareness and Alphabetic Principle

The first skill needed in the process of learning to read is that of phonemic awareness. Phonemic awareness describes a person's understanding that spoken words are made up of a sequence of individual sounds, known as phonemes (Ball & Blachman, 1991), and includes skills in hearing, producing, and manipulating phonemes (Yopp, 1992; A closer look at the five essential components of effective reading instruction, 2004). It can be a difficult skill for young readers to acquire as it is an abstract concept. When people talk, words are not produced by a series of distinct phonemes, but rather "are folded into one another and are pronounced as a blend" (Harris & Hodges, 1995, p. 185).

The English language has approximately 46 phonemes used to create all of the spoken words that exist in the language (Levy, 1999). Children are taught that letters of the alphabet are used to represent the sounds, or phonemes, of a spoken language. Once they can make the connection between phonemes and their corresponding letter they are said to have an understanding of the alphabetic principle (Joseph, 2006), a concept that is necessary for children to master before they can learn to read (Shaywitz, 2004). A child's ability in phonemic awareness and his or her understanding of the alphabetical principle when first learning to read can be one of the best predictors of how easily he or she will acquire reading skills taught during the first two years of formal reading instructions (Report of the the national reading panel: Teaching children to read, 2000).

Phonics

The next component in reading is phonics which involves developing an understanding of symbol and sound relationships (Weaver, 1994). The rules involved in these relationships build on the alphabetic principle and help young readers make the connection between phonemes and the letter(s) that represent them (Harris & Hodges, 1995). In addition, it teaches children how phonemes and letters are used to create words (Report of the the national reading panel: Teaching children to read, 2000). A child's decoding abilities can be impaired if he or she has difficulty learning phonics rules. This weakness often

impairs more complex language processes such as reading comprehension (Shaywitz, 2004).

Instruction in phonics is a useful tool for children learning to read because it teaches them memory aids that help them remember and apply rules and generalizations for matching sounds and letters (A closer look at the five essential components of effective reading instruction, 2004). The National Reading Panel (2000) found that instruction in phonics significantly benefitted students in kindergarten through grade 6. While phonics rules are generally taught in younger grades, interventions in phonics can also benefit older students as well. Edwards (2008) found significant increases in reading growth for all high-school aged students who participated in a seven week phonics intervention. These students, who were identified as having reading difficulties, continued to show growths in reading when tested at the one year anniversary of the study.

Reading Fluency

Reading fluency refers to an individual's ability to read words from a passage in a flowing, accurate, quick, and expressive manner, putting emphasis on phrases to make what is read sound like spoken language (A closer look at the five essential components of effective reading instruction, 2004). It is a skill that develops over time and is acquired word by word with repeated exposure (Shaywitz, 2004) and is often thought of as being the bridge between decoding and comprehension (Pikulski & Chard, 2005; Rasinski, 2004; Shaywitz, 2004). Many people also include reading comprehension within the definition of reading fluency since in order for a person to read with the appropriate emotion he or she needs to understand the content of what is being read (Wolf & Katzir-Cohen, 2001; Pikulski & Chard, 2005).

Fluent readers are able to automatically recognize words, interpret text, and retain important details of what has been read, with little to no use of their limited attention or cognitive resources. In contrast, people with reading deficits often use large portions of their cognitive resources for other reading skills, such as word decoding and attention, which can impact their ability to read fluently or efficiently comprehend texts (Rasinski, 2004). Because reading fluency encompasses all of the skills

used during reading, oral reading fluency measures are often used to assess a person's overall reading ability.

Vocabulary

Vocabulary refers to the collection of words within a language that are needed to communicate, and includes oral vocabulary and print vocabulary (Report of the the national reading panel: Teaching children to read, 2000). Readers are able to recognize printed words by using the pronunciations and meanings from words in their oral vocabulary to help them (A closer look at the five essential components of effective reading instruction, 2004).

Good vocabulary development is a critical component for reading comprehension. In order for an individual to comprehend what is being read he or she has to be able to decode each word so that he or she can then access the meaning of that word. If a person does not know the meaning of the word(s), comprehending the text becomes much more difficult, thus vocabulary is an essential tool for reading comprehension (Cunningham, 2006).

Vocabulary development should start when a child is young and should continue as he or she advances through school and unlike phonics, vocabulary instruction is a never-ending process (Biemiller, 2003). It is an important element needed for comprehending written text and often times can be used to predict a child's abilities in reading comprehension as the two are highly correlated (Shaywitz, 2004).

Reading Comprehension

Reading comprehension is one of, if not the ultimate goal of reading (Hosp & MacConnell, 2008). Comprehending text is a complex skill that involves accurate and fluent decoding skills, as well as the ability to use syntax, which refers to the organization of words and phrases that help the reader anticipate words in a sentence as well as make inferences based on background knowledge (McGuiness, 2004). Hodges and Harris (1995) define comprehension as an interaction between the reader and the text in which meaning is created through deliberate thinking.

There is a bidirectional relationship between vocabulary and reading comprehension. Research has shown that children who enter school with more vocabulary knowledge have an easier time increasing their vocabulary and comprehending text while students starting school with limited vocabulary knowledge often have a more difficult time expanding their vocabulary and comprehending text. This phenomenon is often referred to as the Mathew Effect in which the rich get rich and the poor get poorer (Kame'enui & Baumann, 2012).

In summary, the act of reading is a complex process that involves many skills, such as phonological awareness and decoding skills at earlier ages, fluency and comprehension at later ages, and vocabulary across all ages (Riccio, Sullivan, & Cohen, 2010). If an individual is unable to master each skill, reading deficits may occur and may lead to a diagnosis of a reading disability.

Reading Disability Theories

New technologies, such as functional magnetic resonance imaging, have helped scientist get a better understanding of the differences between the brains of individuals with reading disabilities and the brains of normal readers. Even with these advancements, the specific neurological etiology of reading disabilities is still unknown and widely debated. This is, in part, because of the various ways in which the disability presents itself. Deficits in cognitive, motor, and sensory processes have all been found in individuals with reading disabilities (Kolb & Whishaw, 2009; Pennington, et al., 2012; Ramus, Pidgeon, Frith, 2003; Seriniclaes, 2006). In order to help link these deficits to those found in reading many different theories have been developed. The three most popular theories include the phonological deficit theory, the cerebellar deficit theory, and the magnocellular deficit theory. Each of these theories provides an explanation for why fluency is a significant difficulty for individuals with reading disabilities.

Phonological Deficit Theory

Phonological awareness refers to a person's ability to differentiate between the variety of sound units in a spoken language including spoken words, onsets and rimes, syllables, and phonemes (Chard,

Pikulski, & Templeton, 2000). The phonological deficit theory (PDT) suggests that individuals with reading disabilities have a specific impairment in the representation, storage, retrieval, and/or processing of phonemes, which prevents them from learning letter and phoneme associations (Germano, Gagliano, & Curatolo, 2010; Ramus, Rosen, Dakin, Day, Castellote, White, & Frith, 2003; Reid, Szczerbinski, Iskierka-Kasperek, & Hansen, 2007). Based on the PDT these difficulties could interfere with a person's ability to quickly access the information needed when sounding out and reading words, and in turn slow down oral reading fluency.

Phonological weaknesses are one of the most common characteristics among those with reading disabilities with at least eighty-eight percent of these individuals experiencing difficulties with phonological awareness (Shaywitz, 2004). Neurological studies also support the PDT. In a study done by Paulesu et al. (1996) significant difference were found in the Broca's area of the brains of individual's with a reading disability and normal controls. This area of the brain is involved in phonological processing and the auditory perception of words (Poldrack, Temple, Protopapas, Nagarajan, Merzenich, & Gabrieli, 2001). Results showed that, in controls, Broca's area and Wernicke's area worked in unison during phonological tasks; however, this relationship was not seen in those with reading disabilities who showed far less activation in these areas. In addition, to being less activated, Broca's area and Wernicke's area did not work in concert with one another as seen in those without reading disabilities.

Those that oppose the PDT say that, while they agree there are clear phonological deficits in individuals with reading disabilities the theory needs to be expanded to include other problems often seen in individual's with reading disabilities, such as deficits in learning, visual/sensory processes, and/or, motor processes (Boets, Wouters, Wiernigen, & Ghesquiere, 2007; Germano, Gagliano, & Curatolo, 2010; Ramus, Pidgeon, & Frith, 2003; Wolff, Cohen, & Drake, 1984).

Cerebellar Deficit Theory

The cerebellar deficit theory (CDT) suggests that difficulties with reading are due to mild developmental abnormaolities of the cerebellum, which can have direct and indirect consequences on an

individual's ability to acquire and maintain appropriate reading skills (Nicoloson, Fawcett, & Dean, 2001). The cerebellum is a structure of the brain that is involved in sending and receiving neurological messages throughout the body, which are necessary for the production of muscle movements and coordination. This includes fine sensorimotor coordination used during reading when the eyes are progressing along the line of a text (Vlachos, Papathanasiou, & Andreou, 2007). In addition, the cerebellum is involved in the learning and maintaning of motor skills, timing of movement, maintaining movement accuracy, time estimation and discrimination, perception/processing of stimuli, as well as initiating and shifting attention (Kolb & Whishaw, 2009; Riccio, Sullivan, & Cohen, 2010).

The cerebellum is most often associated with skills related to motor functioning, such as coordination and learning motor sequences, as well as the automation of skills (Ben-Yehudah & Fiez, 2008; Kolb & Whishaw, 2009); however, recent research suggests that the cerebellum also plays an important role in language processing (Highnam & Bleile, 2011), such as fluency and verbal and working memory (Peterburs, Bellebaum, Koch, Schwarz, & Daum, 2010; Schweizer, Alexander, Gillingham, Cusimano, & Stuss, 2010). Based on the CDT, deficits in fine sensorimotor eye coordination and language processing could impact a person's ability to aquire automaticity with reading (i.e. reading fluency), therefore making the overall process of reading a more difficult one.

Several studies have shown that individuals with a reading disability often display other behavioral symptoms that are associated with cerebellar deficits. For example, many people with reading disabilities also tend to be clumsy, have poor manual dexterity, balance, coordination, linguistics, and/or deficits in eye movements when reading (Fawcett & Nicholson, 1999, 2004; Nicholson, Daum, Schugens, Fawcett, & Schulz, 2002; Nicolson, Fawcett, & Dean, 1995; Ramus, Pidgeon, & Frith, 2003). Many neurological studies further support the CDT as they highlight differences between areas of the cerebellum in normal readers and those with a reading disability (Eckert, et. al., 2003; Leonard, et. al., 2001; Menghini, Hagberg, Caltagirone, Petrosini, & Vicari, 2006). In a study done by Nicolson and collegues (Nicoloson, Fawcett, & Dean, 2001), they suggested that up to 80% of children with a reading disability also suffer impairments related to abnormalities in the cerebellum.

Those that oppose the CDT do so because evidence shows that not all individuals with a reading disability have problems related to cerebellar deficits (Kronbichler, Hutzler & Wimmer, 2002; Ramus, Pidgeon, & Frith, 2003; Wimmer, Mayringer, & Landerl, 1998). Ivry and Justus (2001) argue that cerebellar impairments are correclated, rather than a cause of reading disabilities, citing studies done on patients with acquired cerebellar lesions in which no problems with speech perception or acquired reading disabilities were reported (Ackermann, Graber, Hertrich, & Daum, 1997; Ivry & Gopal, 1992).

Magnocellular Deficit Theory

A third theory that is widely accepted today is that of the magnocellular deficit theory (MDT). Magnocellular neurons are large neurons that can be found throughout the brain and they are used in many visual, auditory, and motor processes (Gibson, Hogben, & Fletcher, 2006; Stein & Talcott, 1999). These large cells are heavily myelinated, which allows them to communicate information quickly (Skoyles & Skuttun, 2004). The MDT postulates that reading disabilities are due to mild abnormalities within the various magnocellular systems and divisions of the brain (Livingstone, 1991; Ramus, et al., 2003; Stein, 2001; Stein & Talcott, 1999).

Magnocellular neurons can be found throughout the brain; however, it is only in the visual system that they are organized into a clear and distinct system, the visual magnocellular pathway (Stein, 2001). Magnocellular neurons within the visual magnocellular pathway (VMP) are highly sensitive to contrast, movement, and rapid stimulus changes (Skoyles & Skuttun, 2004). In addition, they play an important role in the timing of visual events during reading (Stein, 2001). Thus when there are abnormalities within the VMP, difficulties with reading can occur (Stein, 2001). Several studies have been done to support VMP impairments in individuals with reading disabilities. Slaghuis and Ryan (1999) found, when compared to control groups, a subgroup of individuals with reading disabilities had a significant reduction in contrast sensitivity, motion sensitivity, and sensitivity to flicker - all of which are indicative of visual magnocellular deficits. Neurological studies done on the brains of individuals with reading disabilities post mortem by Galaburda and Livingston (1993) found that the magnocellular layers within visual

pathways were disordered. In addition, they found that magnocellular neurons within the studied areas were 30% smaller than in that of control brains, further supporting the MDT.

There is not a clearly defined magnocellular pathway for the auditory system; however, there is an analogous division of magnocellular neurons that are specialized for quickly processing changes in sound frequency and amplitude - a skill needed for distinguishing differences in in phoneme sounds (Stein, 2001). The MDT proposes that abnormalities within these magnocellular neurons can make it difficult for individuals with reading disabilities to distinguish differences between letter sounds, thus interfering with their ability to develop the appropriate language skills needed for reading (Stein & Talcott, 1999). Neurological studies by Galaburda, Menard, and Rosen (1994) found significant differences between the brains of individuals with reading disabilities post mortem and control brains in the medial geniculate nuclei, an area of the brain used during auditory processes. The MDT postulates that motor impairments often seen in individuals with reading disabilities are due to abnormalities within magnocellular systems that send information to the cerebellum (Stein, 2001).

Based on the MDT abnormalities within magnocellular systems and divisions of the brain's visual, auditory, and motor processes could impact an individual's ability to develop the appropriate skills needed for reading. Specific to oral reading fluency, abnormalities in the VMP could impact a person's ability to read text fluently.

While there is evidence to support the MDT, studies indicate that the prevalence rates for individuals with reading disabilities affected by magnocellular deficits is fairly low (Seriniclaes, 2006). In addition, there has been much criticism as some studies have failed to replicate findings of a visual magnocellular deficit among individuals with reading disabilities (Johannes, Kussmaul, Munte, & Mangun, 1996).

Due to the wide range of symptoms that are associated with reading disabilities it may be that all three theories are correct with the origin of a reading disability being dependent on that particular individual. Regardless of the theory being used researchers agree that there are distinct neurological differences between normal readers and those with reading disabilities (Eden, Stein, Wood, & Wood,

1994; Rayner, 1999). These neurological differences can all be connected to language processes used to acquire good oral reading fluency skills.

Assessment of Reading

Reading performance assessments are used to obtain precise information about the reading skills a child possess as well as the skills he or she has yet to master. They include measurements that assess a student's skills in three different areas: reading words in isolation, reading words in connected text, and answering comprehension questions (Joseph, 2006). One, of many, reading performance assessment tools used in schools today are curriculum-based measurements (CBM). CBM refers to a set of standardized, short duration tests, which are based on grade level curriculum and are generally 1 to 5 minutes in length. They are used by educators to evaluate the effects of instructional interventions in the basic skills of reading, mathematics, spelling, and written expression (Shinn, 1989, 2008). Research shows that CBM measures are sensitive to student improvement. In addition, CBMs have been found to be reliable and valid measures of general achievement and when used with progress monitoring help to improve student achievement (Deno, Fuchs, Marston, & Shin, 2001; Fuchs & Fuchs, 2004).

One type of CBM used to assess a student's reading level is that of oral reading fluency (ORF), sometimes referred to as passage reading fluency, which is used to assess an individual's ability to read connected text both accurately and fluently. CBM in ORF requires the student to read a passage out loud, while the examiner or teacher records the total number of words that are read correctly in 1 minute (Hosp & MacConnell, 2008). Reading fluency involves multiple components that develop over time and studies have shown it to be a significant indicator of overall reading competence (Fuchs, Fuchs, Hosp, and Jenkins, 2001; Fuchs, Fuchs, and Maxwell, 1988; Wolf and Katzir-Cohen, 2001; Wood, 2006).

Text Fonts and Reading Disabilities

Many different approaches have been recommended to remediate deficits in component reading skills. One such approach is to change the font, or typeface, being used in the text. Many sources cite the

use of sans serif, over serif, fonts for individuals with reading disabilities; however, the reasons as to why sans serif fonts are suggested are not discussed (British Dyslexia Association, 2014; Evett & Brown, 2005; Rello & Baeza-Yates, 2013). Serif refers to the small lines that project from the edges of letters, such as seen in fonts like Times New Roman. San serif fonts, such as Arial, do not have this projection at the ends of the letter stroke (Brenard, Chaparro, Mills, and Halcomb, 2003). In an eye tracker study by Rello and Baeza-Yates (2013), participants read from passages using 12 different fonts. Participants in the reading disability group had significantly longer fixation durations for serif fonts compared to that of sans serif fonts, suggesting that sans serif fonts may improve reading performance. However, there was not a significant difference on reading time, indicating that the degree in which sans serif fonts improve reading is complex.

Increasingly, new specially designed fonts are being created to help individuals with reading disabilities read better such as Read Regular, Lexia Readable, and Gill Dyslexic (Bates, 2013; To the letter, 2010). While there are many different companies and websites promoting a reading friendly font for individuals with reading disabilities (Mick, 2012; Williams, 2008), three specific fonts found in the literature include Open Dyslexic (Gonzalez, 2014), Dyslexie (Studio Studio, 2014) and Sylexiad (Hillier, 2008). While all three are marketed as fonts that help make reading easier for individuals with reading disabilities, independent research to confirm their effectiveness has been sparse (Leeuw, 2010; Rello & Baeza-Yates, 2013).

Open Dyslexic

Open Dyslexic is a specialized sans serif font that was created by Abelardo Gonzalez. While the font is licensed and copyrighted, it is offered as a free downloadable product. The font is available in several different styles, such as regular, bold, and italics. Their letters have heavy weighted bottoms which are said to help indicate direction (Gonzalez, 2014). According to their website, Open Dyslexic letters are unique from one another which help to prevent the flipping and swapping of letters. While this is the premise in which the product is promoted, other researchers have said behaviors, such as the

mirroring of letters, is a myth associated with reading disabilities that has little to no scientific research to support it (Shaywitz, 2004). In a recent study by Rello and Baeza-Yates (2013), they found that the font Open Dyslexic did not have an effect, either negative or positive, on the reading abilities of individuals with reading disabilities.

Sylexiad

Hillier (2008) also designed a series of serif and sans serif fonts to help individuals with reading disorders known as “Sylexiad”. He found that dyslexic readers preferred his font, Serif Sylexiad, to other fonts used in testing including - Arial, Sassoon Primary, and Times New Roman. The majority of adults tested without a reading disability preferred the font Times New Roman. This study only provided anecdotal evidence, such as reader preference, rather than empirical evidence showing that the font helps those with a reading disability read better; however, in a recent study, Rello and Baeza-Yates (2013) found there was no correlation between reading time and participant preference.

Dyslexie

"Dyslexie", is another specialized font that was created in 2008 by Christian Boer, a graphic designer from the Netherlands. He, like Hillier, suffered from a reading disability. He began designing the font for his thesis while in graduate school at Twente University and subsequently marketed the typeface soon after (Nalewicki, 2011). When designing each letter, Boer used various techniques to help prevent individuals with reading disabilities from mirroring, turning, or switching the letters in a text. For example, he increased the boldness of letters at their bases "to make them appear weighted, causing readers’ brains to know not to flip them upside down" (Nalewicki, 2011, section, para 6).

In 2010 a student from the graduate program at Twente University, Reenske de Leeuw, tested the font “Dyslexie” to see if it helped improve the reading speed and accuracy of individuals with reading disabilities using 2 different reading mediums: the Dutch One Minute Test, which is a word reading fluency test scored in words read correctly in one minute and the Klepel, which is a non-word reading test

in the which the individual is given two minutes to read as many non-words out loud as possible. Leeuw (2010) found that the font "Dyslexie" did not significantly improve the reading speed in those with reading disabilities or with normal readers on either reading medium. However, the number of reading errors on the Dutch One Minute Test, but not the Klepel, was significantly less for those with a reading disability than for normal readers. Normal readers saw no improvements using the font "Dyslexie" and in some cases actually did worse (Leeuw, 2010).

Statement of the Problem

Reading disabilities are a significant issue that can impact a person's reading achievement and may also involve deficits in other cognitive, motor, and sensory processes (Kolb & Whishaw, 2009). Several theories have been developed to explain neurological differences related to reading disabilities, however due to the complexities related to reading disabilities these theories continue to be widely debated (Ramus, et al., 2003). Three popular theories include the phonological deficit theory, the cerebellar deficit theory, and the magnocellular deficit theory (Ramus, et. al., 2003; Reid, et. al., 2007). In each of these theories the reading component of fluency is impacted to some degree.

Many different interventions and training programs have been developed to address reading fluency deficits. The use of specialized font is one approach that has been used. If effective, these fonts would offer individuals with reading disabilities an inexpensive tool for improving reading skills. Dyslexie is one such font (Studio Studio, 2014); however, there is very little empirical research demonstrating the effectiveness of using fonts specifically designed for individuals with reading disorders and research results have varied (Hillier, 2008; Leeuw, 2010; Rello & Baeza-Yates, 2013). The purpose of this study is to add to the current literature regarding the effectiveness of specialized fonts on reading in individuals with reading disabilities.

Hypothesis

If the font Dyslexie is an effective tool for helping individuals with reading disabilities read better, then these individuals will demonstrate better oral reading fluency scores when reading passages using the Dyslexie font compared to Times New Roman font. A similar difference will not be seen for individuals with normal reading skills.

CHAPTER 3: METHOD

Participants

Students in grades 8 through 12 in various counties throughout Virginia, North Carolina, South Carolina, and Georgia were recruited to participate in this study. Techniques for recruitment included placing flyers at community resources, such as libraries, community centers and churches, as well as placing advertisements in local mediums such as the newspaper and social media sites. In addition, local schools, tutoring centers, and other educational resources were contacted. Flyers and advertisements instructed the guardian of interested participants to contact the principle investigator via email or phone as provided on flyers and in advertisements. Participants 18 years old and over did not require guardian consent. After being contacted by guardians and/or students consent, assent, and demographic questionnaire paperwork were given to students and their guardian to be completed before testing could take place. Test sessions took place once paperwork was complete and all parties agreed on a time and place to meet. Test sessions took place in churches, schools, libraries, and in some cases a quiet room in the participant's home. Test sessions took approximately 15 to 20 minutes and each participant received a $10 Wal-Mart gift card.

The target number of participants was set at 120 students in grades 9 through 12 (60 in the control group and 60 with a diagnosed reading disability). Due to difficulties with participant recruitment the grade range was later changed to include 8th grade students as well. Despite this expansion in grade range, participant response remained low; therefore, the final numbers for each group was far less than expected.

For this study, participants were comprised of 34 students in grades 8 through 12. Within the sample, 79.42% identified as White, 11.76% as Black, 2.94% as Hispanic, and 5.88% identified as other or multiple races. Of the 34 participants, 44.12% of the participants identified as male, while 55.88% identified as female.

Materials

Participant Forms

Prior to testing, consent, assent, and demographics forms were completed by the student and their guardian. The "Parent/Guardian Permission for Participation" form was completed by the guardian of students under the age of 18 granting their consent for their child to participate in the study (Appendix A). All students completed the "Participant Research Assent Form" that reviewed their rights as a participant and granted their approval for participation in the study (Appendix B). In addition, a "Demographic Questionnaire" was completed by students and/or their guardians (Appendix C). This form was used in order to collect basic demographic information (e.g. - sex, age, race) as well as information about any known learning disabilities, attention deficits and/or problems with vision.

Curriculum Based Measurements

The reading fluency for each participant was measured using Curriculum Based Measurements (CBM) for Oral Reading Fluency (ORF) obtained via the website Easy CBM (www.easycbm.com). This website is an assessment system designed by researchers at the University of Oregon and is commonly used by educators to measures a student's abilities/progress in various academic areas and provides users with grade level passages that can be used for measuring ORF (University of Oregan, 2006-2012). Six different passages at the 7th grade reading level were chosen from this list (See Appendix D, E, F, G, H, and I). In addition, a stop watch, red pen, and oral reading fluency record sheets were used.

Each of the CBM passages used to assess ORF (labeled 1, 2, 3, 4, 5, 6) was formatted in the Times New Roman font (labeled A) and Dyslexie font (labeled B), for a total of twelve different reading passages (1A, 1B, 2A, 2B, etc.). The font Dyslexie (DYS) was presented in font size 10, while the font Times New Roman (TNR) was set at size 12 as it is a slightly smaller font than DYS. Margins for all passages were set at 1 inch.

Procedures

For this study there were two groups - Group 1 (No RD Group), which consisted of individuals without a reading disability, and Group 2 (RD Group), which consisted of individuals previously diagnosed with a reading disability through the school or by a private practice. Test sessions began by the examiner reviewing the purpose of the study. Individuals in both groups were presented with the same six passages, three formatted in TNR and three formatted in the font DYS, with passages randomized by font and passage order. Before each passage, the examiner instructed the participant to read aloud from 6 different passages. Participants were given the same set of instructions before each passage. During each passage the examiner marked errors as the participant read aloud using the following guidelines (Wright, 2013):

- Scored as Correct = Words read correctly; self-corrections; repetitions; and dialectic variations of words; words red to the student by the examiner after three seconds;
- Scored as Incorrect = Mispronunciations, substitutions (e.g., house for home); omissions; transpositions of word-pairs are counted as a single error;
- Inserted words were ignored;

Oral reading fluency (ORF) scores were calculated for each passage by subtracting the number of errors from the total number of words read in 60 seconds. A median ORF score was calculated for the three passages read in TNR as well as for the three passages read in DYS. Median scores were used instead of mean scores in order to control for effects of difficulty between passages that may create extreme scores (Shapiro, 2011). More recent research suggests that using the mean may also be an effective measure; however, for the purpose of this study, the median was used as it is a common calculation for measuring an individual's ORF skills (Barth et al., 2012).

In addition to finding the median ORF score for each font, the percentage of errors made when reading passages in TNR and passages in DYS by dividing the number of errors across all three passages by the total number of words read across all three passages, multiplied by 100.

Results

Final participant numbers were much lower than expected, particularly in the RD Group. For the No RD Group, there was a total of 26 participants, ages 13-18 ($\tilde{x}$ = 15.08), in grades 8 through 12. Within the No RD Group, 80.76% identified as White, 11.54% as Black, 3.85% as Hispanic, and 3.85% identified as other or multiple races. Of those participants, 38.46% identified as male, while 61.54% identified as female.

For the RD Group, there was a total of 8 participants, ages 13-19 ($\tilde{x}$ = 15.75), in grades 8 through 12. Within the RD Group, 75% identified as White, 12.5% as Black, and 12.5% identified as other or multiple races. Of those participants, 62.5% identified as male, while 37.50% identified as female. There was much variability in the RD Group regarding Special Education (SPED) placement information as well as with the presence or absence of other comorbid characteristics (Table 1).

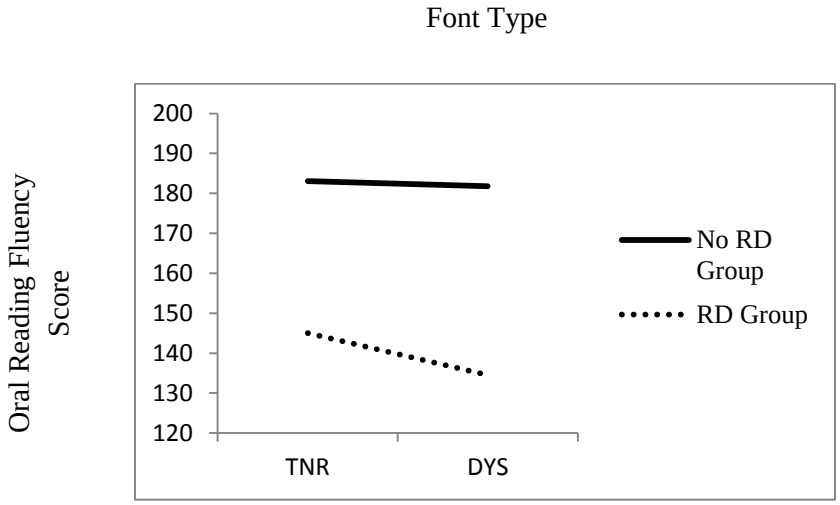
Table 1 - Demographic Information- Reading Disability Group

Participant	1	2	3	4	5	6	7	8
Gender	Male	Male	Male	Male	Female	Male	Female	Female
Race/Ethnicity	Black	White	White	White	White	White	Other	White
Grade	12th	12th	11th	9th	10th	10th	12th	8th
Grade Placed into SPED	4th	4th	1st	1st	5th	3rd	8th	3rd
Grade Exited from SPED	8th	9th	N/A	N/A	N/A	N/A	N/A	N/A
Academic Areas Served in SPED	RC	RC	RC, RF, BR, LC, OE, MC, MP	RC, RF, BR, LC, OE	RC, RF, BR	RC, RF, BR	RC, RF, BR	RF
ADHD	No	Yes	No	No	No	Yes	No	No
Vision Problems	No	No	Yes	Yes	No	No	Yes	No

RC - Reading Comprehension; RF - Reading Fluency; BR - Basic Reading; LC - Listening Comprehension; OE - Oral Expression; MC - Mathematics Calculation; MP - Mathematics Problem Solving

Due to the low number of participants and the wide range of characteristics within the RD Group, statistical analysis of the data could not be conducted; therefore, results are compared and discussed without statements of statistical significance. Between both groups, 50% of participants obtained a higher ORF median score for the font TNR, 38.24% obtained a higher score for the font DYS, and 11.76% obtained equal scores. As expected, the mean for ORF median scores was higher in the No RD Group compared to that of the RD Group (Figure 1).

Figure 1 - Impact of Font Type on Oral Reading Fluency Scores for Students in Grades 8 through 12 with and without a Reading Disability



For the No RD Group (Table 2), the mean for median ORF scores in the font TNR ($\tilde{x}$ = 183.08) was slightly higher than the mean for median ORF scores in the font DYS ($\tilde{x}$ = 181.38). Based on median scores, 42.31% of participants obtained a higher ORF score for the font TNR; 42.31% of participants obtained a higher ORF score for the font DYS; and 15.38% of participants obtained equal scores for both fonts. In regards to the number of errors made, 53.85% of participants made fewer errors when reading passages in TNR, while 46.15% of participants made fewer errors when reading passages in DYS. In regards to participant preference, 26.92% reported finding the font TNR easier to read, 42.31% reported finding the font DYS easier to read, and 30.77% reported no preference between the fonts; however, participant preference did not always correlate with the participant's higher ORF score.

Table 2 - Results for the No Reading Disability Group

Participant	TNR ORF Median Score	TNR % of Errors	DYS ORF Median Score	DYS % of Errors	Participant Preference
1	193	0.17	197	0.52	DSY
2	212	0.30	212	0	None
3	187	0	189	0.52	DYS
4	207	0.64	211	0.62	None
5	213	0.62	207	0.16	DYS
6	187	0.36	199	0.50	TNR
7	186	0	186	0.36	TNR
8	146	1.99	142	1.86	DYS
9	156	0	113	0.27	TNR
10	160	0.62	160	0.41	DYS
11	153	0	166	0.20	None
12	202	0	187	0.18	TNR
13	174	1.31	173	1.16	TNR
14	207	0	200	0.17	DYS
15	162	1.03	169	0.59	DYS
16	182	2.26	200	1.47	DYS
17	186	2.24	170	1.33	None
18	187	0	198	0.17	None
19	205	0.48	213	0.62	DYS
20	229	0.29	213	0.16	DYS
21	184	0	175	0.19	TNR
22	230	0.15	211	0.16	None
23	182	0.54	176	0	None
24	197	0.33	203	0.65	DYS
25	120	1.27	133	0.71	TNR
26	113	0.29	113	1.77	None

For the RD Group (Table 3), the mean for median ORF scores in the font TNR ($\tilde{x}$ = 145) was higher than the mean for median ORF scores in the font DYS ($\tilde{x}$ = 134.5). Based on median scores, 75% of participants obtained a higher ORF scores for the font TNR, while 25% of participants obtained a higher ORF scores for the font DYS. In regards to the number of errors made, 50% of participants made fewer errors when reading passages in TNR, while the other 50% made fewer errors when reading passages in DYS. In regards to participant preference, 37.50% of participants reported finding the font TNR easier to read, 37.50% reported finding the font DYS easier to read and 25% reported no preference between fonts; however, participant preference did not always correlate with the participant's higher ORF score.

Table 3 - Results for the Reading Disability Group

Participant	TNR ORF Median Score	TNR % of Errors	DYS ORF Median Score	DYS % of Errors	Participant Preference
1	152	2.53	140	1.92	DYS
2	145	0.89	141	0.23	DYS
3	135	2.68	146	0.91	TNR
4	122	2.41	97	4.23	TNR
5	147	0.69	134	1.42	None
6	148	0.67	129	0.75	None
7	145	0.91	110	1.92	DYS
8	166	1.57	179	0.90	TNR

Discussion

Individuals with reading disabilities often have difficulty reading texts fluently. Many interventions and techniques have been created to help ameliorate these difficulties (Wright, n.d.). One such method is to use specialized fonts aimed at making the reading process more efficient for individuals with reading disabilities. Despite the development of such fonts there has been very little scientific research to support the effectiveness of specialized fonts (Leeuw, 2010; Rello & Baeza-Yates, 2013). Furthermore, many of these studies only provide qualitative evidence, such as font preference, rather than more measureable, quantitative measures (Hillier, 2008; Vrugt, 2012).

The hypothesis for this study proposed that if the font Dyslexie was an effective tool for helping individuals with reading disabilities read better, then these individuals would demonstrate better oral reading fluency scores when reading passages using the Dyslexie font compared to Times New Roman font; however, this difference would not be seen in the No RD Group. Due to a lower than expected number of participants, statistical analysis could not be done and this hypothesis could not be accurately tested. Therefore, results are compared and discussed without statements of statistical significance.

The mean for median ORF scores was higher in the font TNR than for the font DYS in both groups. This difference was slightly larger in the RD Group compared to that of the No RD Group. One reason for this could be due to the participant's familiarity with the font TNR as it is a widely used font. Previous research has indicated that an individual's familiarity with a font can positively impact their

ability to read that font (Hillier, 2008). However, an analysis of each participant's performance provides conflicting evidence to this theory as only half of the 34 participants obtained higher median ORF scores when reading in the font TNR, while 38.24% obtained higher scores when reading in the font DYS. 11.76% read both fonts equally as well.

Although the results for this study are limited, it did raise some questions that should be taken into consideration for future studies. For example, for the RD Group, 25% of participants obtained higher median ORF scores when reading in the font DYS, with 75% performing better when reading in the font TNR. This suggests that individuals may respond differently to different fonts and while there is no evidence that one is better than another for all individuals with a reading disability, it is possible that certain fonts work best for specific subgroup of individuals with reading disabilities (e.g., individuals with magnocellular deficits, individuals with a comorbid diagnosis of ADHD, etc.).

Results regarding participant preference are consistent with previous research which indicates that people's perceptions regarding which font they read best with does not always correlate with their actual reading abilities (Rello & Baeza-Yates, 2013). This indicates that appropriate assessments should be done when deciding what font works best for each individual, rather than basing decisions solely off of individual preference.

The varying results from research on font type and reading disabilities is consistent with the idea that there are multiple neurological causes for reading disabilities. Therefore, future research in this field should focus on differences in font type and reading disability subgroups based on reading disability characteristics (e.g., presence of ADHD, presence of additional problems related to motor functioning, etc.). In addition, researching differences between the readability of fonts on the computer versus paper for individuals with reading disabilities may be beneficial. Furthermore, incorporating eye tracking components might add to the quantitative and qualitative information being collected so that a more comprehensive picture regarding a person's reading abilities could be developed. Such assessments would lead to more appropriate and effective interventions.

Limitations

There were many limitations for this study. Individuals with reading disabilities vary greatly in skills and symptom presentation that should be controlled for, to include: cognitive ability, decoding skills, vocabulary skills, the presence of comorbid disorders such as ADHD, visual and/or auditory deficits, etc. In addition, past education experiences, home environment, and social economic status should also be considered. However, due to a low number of participants in the RD Group, such differences could not be controlled for.

Despite extensive recruitment efforts, participant response to flyers and advertisements was much lower than expected, particularly in the reading disability group. This may have had an impact on statistical measures that were done. In addition, the use of school age children required parental consent which may have contributed to the difficulty in attracting participants for the study.

For this study, only one serif font and one sans serif font were used. This made it difficult to determine if the presence of serifs impacted the readability of the fonts; therefore, having more than one serif and sans serif font may have provided additional information regarding their impact.

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APPENDIX A: PARENT/GUARDIAN PERMISSION FOR PARTICIPATION FORM

PARENT/GUARDIAN PERMISSION FOR PARTICIPATION

WESTEREN CAROLINA UNIVERSITY

COLLEGE OF EDUCATION AND ALLIED PROFESSIONALS

Parent/Guardian Permission for Participation Form

Title of Project: The Effects of the Font Dyslexie on Oral Reading Fluency Skills in Students Grades 8th Through 12th

Principal Investigator: Jessie Ramsey

Faculty Advisor: Dr. Lori Unruh, Professor of Psychology, Western Carolina University

Purpose: The purpose of this study is to see if a specialized font designed for individuals with a reading disability can help improve the speed and accuracy in which they read passages aloud (oral reading fluency). *This study presents no potential safety risks or discomfort for your child.*

Procedures: Upon consent and assent, your child will be asked to read aloud from six different passages (presented one at a time) formatted in either the font Times New Roman or the specialized font, "Dyslexie". The examiner will instruct your child to read each passage for one minute as quickly and accurately as possible, while the examiner records reading errors. The total time for completing this activity is approximately ten to fifteen minutes. Arrangements regarding the date and time in which the test session will take place should be determined by the guardian and principal investigator.

Consent: By signing this form I agree with all of the following statements:

- I have been given an opportunity to ask questions about this study and all answers were provided were satisfactory.

- I have been informed of and understand that my name or my child's name will not be mentioned anywhere in the data or results of this study and that my child's participation in this study is completely voluntary.
- I understand that myself or my child can stop participation with this study at any point without penalty.

Please check one of the boxes below to indicate whether or not you would like to participate in this study.

☐ I agree to participate in this study on the effects of font on Oral Reading Fluency.

☐ I do not agree to participate in this study on the effects of font on Oral Reading Fluency.

If you have any questions in regards to this study please discuss them with me at this time. If you have questions or would like to discuss this study at another time you may contact me at (919) 351-5675 (jessieramsey@wcu.edu) or you may contact my faculty advisor, Dr. Lori Unruh, at (828) 227-2738 (lunruh@wcu.edu). Additionally, if you have any concerns regarding the treatment of participants of this study, you can reach the Chair of the Western Carolina University Institutional Review Board through WCU's Office of Research Administration at (828) 227-7212.

By signing below, I understand what is expected of my child and give consent for their participation in this study. Individual's 18 years and older do not require parent/guardian signature for participation.

_____

Participant's Name (Please Print) Participant's Signature Date

_____

Parent/Guardian Name (Please Print) Parent/Guardian Signature Date

_____

Principal Investigator's Name Principal Investigator's Signature Date

APPENDIX B: PARTICIPANT RESERACH ASSENT FORM

PARTICIPANT RESERACH ASSENT FORM

WESTEREN CAROLINA UNIVERSITY

COLLEGE OF EDUCATION AND ALLIED PROFESSIONALS

Participant Research Assent Form

Title of Project: The Effects of the Font Dyslexie on Oral Reading Fluency Skills in Students Grades 8th Through 12th

Principal Investigator: Jessie Ramsey

Faculty Advisor: Dr. Lori Unruh, Professor of Psychology, Western Carolina University

Important things to know:

(1) You get to decide if you want to take part in this study.

(2) You can say 'No' or you can say 'Yes'.

(3) No one will be upset if you say 'No'.

(4) If you say 'Yes', you can always say 'No' later.

(5) You can say 'No' at any time.

Why are we doing this study? We are doing this research to find out more about how to make the reading process easier for people with reading disabilities. One area of research being done centers around specially designed fonts said to make reading easier for those with reading disabilities. One of these fonts is known as "Dyslexie". In this study we will be looking at the speed and accuracy in which a person reads passages using the font, Dyslexie and the font Times New Roman.

What would happen if I join this research? If you decide to join this research we would ask you to do the following: (1) Work with your parent/guardian to schedule a time in which the test session will take place. The test session should no more than 15 to 20 minutes. For more information regarding

appropriate times for testing, see the Parent/Guardian Consent form. (2) During the test session you will be asked to read six passages from a handout as quickly and accurately as possible. You will have one minute to read from each passage with a one minute break between passages.

Can this research help me? This study may be able to help you depending on the results. If the font Dyslexie is shown to make reading easier for individuals with reading disabilities then these individuals would greatly benefit from this study.

What do I get for participating? Each participant will be provided with the results of this study, per request. In addition, each participant will receive a $10 Wal-Mart gift card.

Consent: By signing this form I agree with all of the following statements:

- I have been given an opportunity to ask questions about this study and all answers were provided were satisfactory.
- I have been informed of and understand that my name will not be mentioned anywhere in the data or results of this study and that my participation in this study is completely voluntary.
- I understand that I can stop participation with this study at any point without penalty.

Please check one of the boxes below to indicate whether or not you would like to participate in this study.

☐ I agree to participate in this study on the effects of font on Oral Reading Fluency.

☐ I do not agree to participate in this study on the effects of font on Oral Reading Fluency.

Participant's Name (Please Print)	Participant's Signature	Date
Parent/Guardian Name (Please Print)	Parent/Guardian Signature	Date
Principal Investigator's Name	Principal Investigator's Signature	Date

APPENDIX C: DEMOGRAPHIC QUESTIONAIRRE

Participant Demographic Questionnaire

Name of parent filling out form:_____ **Date:** _____

Name of child/adolescent: _____**D.O.B.** _____
Grade Level: _____

Race/Ethnicity: White _____ Hispanic_____ African American_____
American Indian _____ Other _____

Gender: Male _____ Female _____

Has your child ever received special education services for a learning disability in the area of reading? Yes _____ No _____

If yes, at what grade level were they placed?_____

Are they currently receiving services? Yes _____ No _____

If no, at what grade level were they exited?_____

Has your child ever received special education services in any other academic areas?
Yes _____ No _____

If yes, in what area(s)? Check all that apply. Specific Learning Disability in:

Listening Comprehension _____ Oral Expression _____

Basic Reading Skills _____ Reading Fluency Skills _____

Reading Comprehension _____ Mathematics Calculation _____

Mathematics Problem Solving _____

Has your child ever been identified as have an Attention Deficit/Hyperactive Disorder (ADHD)?

Yes _____ No _____

If yes, are they currently taking medication for their ADHD?

Yes _____ No _____

Does your child have any problems with vision? Yes _____ No _____

If yes, have these problems been corrected with glasses or contact lenses?

Yes _____ No _____

APPENDIX D: PASSAGE 1

Sarah had lived in the same small town her whole life, attending the same small neighborhood school and wishing she could think of a way to stand out from the crowd. Now it was the year before she went off to high school, and Sarah knew that it was time she left her mark on the world. She longed to be president of her eighth grade class. She had been planning her election campaign since she started middle school two years before. She had many ideas about how to make her school a better place. For starters, she wanted to create team-building activities and add new, interesting electives. Sarah knew she would be a great class president. She had been thinking about essential improvements to school for years, and she was extremely enthusiastic about her ability to take charge.

Unfortunately, most of the eighth grade class didn't take school politics as seriously as Sarah. In fact, her opponent, Joshua, hoped to win votes by giving out free candy at recess and promising less homework. Sarah was disgusted by his campaign strategies. When rumors spread that some students were going to vote for Joshua because they hated homework, Sarah's friends suggested she bake cookies to win her classmates over. But Sarah refused. As much as she wanted to be president, she wanted to win because she was committed to improving her school. Bribery was not something she wanted to be a part of.

The day before the election, Sarah and Joshua had to give speeches to the entire class. Everyone gathered in the gym to listen to the two candidates share their ideas. Sarah stuck to her values and confidently shared her thoughts about school improvement. She talked about plans to reduce the trash left in the courtyard after recess. She discussed ways her classmates could earn money to sponsor a really great dance to celebrate graduation. Joshua didn't have much to say, especially since his English teacher had already announced that there was no way he was going to eliminate homework. When the votes came in the next day, Sarah won by a landslide.

APPENDIX E: PASSAGE 2

Ben was in seventh grade by the time his parents finally decided he no longer needed a babysitter when they went out. Ben couldn't have agreed more. He figured he could take care of himself and looked forward to having some time alone at the earliest opportunity. Ben was thrilled when his parents said they were going out for dinner and dancing to celebrate their anniversary. Now he could finally watch the scary movie his parents wouldn't permit him to watch. He'd been hiding it in his room ever since his friend Timothy had loaned it to him.

Ben's parents departed for their anniversary celebration around seven that evening. It would be dark soon, and he could barely contain his enthusiasm. He could eat junk food for dinner, play on the computer for hours, and of course, watch the horror flick his parents had said "no" to many times. Ben knew they were just being protective, but he wasn't concerned about being too frightened. He was a lot braver than his parents thought. Ben satisfied his growing appetite with leftover pepperoni pizza, potato chips, and nearly a whole gallon of ice cream. Then he played on his computer until it was pitch black outside. "Now it's time for the movie," he said to himself as he settled in on the couch.

The movie started out just a little creepy, but about halfway through it got really spooky. Ben felt himself getting more and more frightened. Suddenly, after a particularly terrifying scene, he started shaking and tears filled his eyes. He instantly turned off the movie, but he still couldn't stop replaying the scenes in his mind. He was so scared that he didn't move until his parents returned, and he promised himself that he would never again watch a movie his parents cautioned him against.

APPENDIX F: PASSAGE 3

Sunnyview Middle School had several rules that were heavily enforced. Most of them appeared to be reasonable enough, such as no chewing gum in class and no cheating on exams. However, one rule seemed absolutely ridiculous to the middle schoolers - no soda permitted on campus! Christopher and Gregory, two seventh graders at Sunnyview, were especially annoyed by the rule. They enjoyed drinking soda, and their parents let them drink it at home whenever they wanted. They were determined to do the same at school. The two boys started sneaking soda to school in their lunch sacks. When the lunchtime teachers were distracted, they would guzzle it. Other students were jealous. They wanted to sneak soda in their lunches too, but most of their parents didn't purchase it.

Then Gregory got what he considered to be a brilliant idea. He told Christopher his plan for making some money by having a secret soda sale at lunchtime. Gregory couldn't resist the opportunity to make a few bucks, and he and Christopher came to school the next day with backpacks full of soda cans. They stored the soda in Christopher's locker and spread the word for classmates to stop by at lunch to purchase a soda for a dollar. When Christopher opened his locker at lunch to start selling to the growing line behind him, the soda was missing! Then he saw a note taped to his Spanish book. It read, "Meet me in my office ASAP, Christopher and Gregory!" The note was signed by Principal Patterson. Rumors of the soda sale had spread farther than the boys anticipated!

The principal acted quickly, rebellion was squelched before it could really start, and that was the last day soda made its way onto Sunnyview's campus. Now even Christopher and Gregory guzzle juice at lunch.

APPENDIX G: PASSAGE 4

It was the final day of seventh grade and all the students were preparing for the end-of-the-year dance. Almost everyone was thrilled. The eighth graders had attended several dances that year, but this was the first one to include seventh graders. Jeremy Farmington, however, wasn't looking forward to the celebration. He had no idea how to dance and was petrified of embarrassing himself. He was also too timid to ask any girls to dance (even though he really liked Gabriella Lancaster) and was certain that no girls would be interested in asking him. Ultimately, though, he gave in to his buddies' peer pressure and ended up at the dance.

Jeremy spent the first half of the dance hanging out with his friends at the snack bar. He watched other kids dance, but still didn't think he could pull off their moves. Then, his friends decided to be courageous and ask girls to dance. None of them were turned down. Jeremy found himself alone, wishing he had refused to come. It didn't help that he had watched Gabriella dance with five guys who obviously were much braver than Jeremy.

Finally, the disc jockey announced he was about to play the final song of the evening. He instructed the audience to find someone really special for the final dance. Jeremy felt totally self-conscious; he could hardly believe how humiliating it was to be standing around awkwardly by himself while everyone else was on the dance floor. Suddenly, he felt a gentle tap on his shoulder. "I've been waiting to dance with you," Gabriella smiled. Jeremy felt a wild grin spread over his face as the girl of his dreams led him to the dance floor where he fell in love for the first time, in the process completely forgetting about how foolish he looked dancing!

APPENDIX H: PASSAGE 5

Martin's parents were always embarrassing him. Every time they went out in public, his mom would act really silly and his dad would tease him in front of complete strangers. Martin knew they were only trying to be funny, but he hated being the source of their entertainment. One night Martin's parents took him to his favorite Mexican restaurant. The restaurant was well known for its delicious enchiladas, and it was always crowded. Martin hoped his parents would behave themselves that night and not do anything to embarrass him.

Martin and his parents were seated at a table right in the middle of the restaurant. Because it was Friday night, the restaurant was absolutely packed. Martin spotted Melanie, a girl from his science class, sitting at a nearby booth. He smiled at her and waved quickly so his parents wouldn't notice. He had a secret crush on Melanie and didn't want his parents to make a scene. Martin excused himself to use the restroom after he and his parents had ordered their meal. When he returned to the table, his parents had suspicious grins on their faces. Martin hoped they weren't playing a trick on him, but he was distracted and forgot about the incident as soon as the food arrived.

Martin's meal was so delicious that he ate until it felt like he was absolutely going to burst. After their plates were cleared, he took a deep breath and asked his parents if they were ready to go. But before they could respond, several waiters gathered around Martin and started singing "Happy Birthday." They even pulled him out of his chair and made him dance with them. Martin was mortified when he turned around and saw that the entire restaurant, including Melanie, was laughing hysterically. It wasn't even his birthday! His parents had really done it this time!

APPENDIX I: PASSAGE 6

Roberto really wanted a summer job. His family didn't have a lot of extra money, and he wanted to earn some cash to spend at the arcade and snack shop with his buddies. The problem was that he was only thirteen. That was too young to get a work permit for a regular job, so Roberto decided to start his own business. He put up flyers around town offering to do odd jobs such as mowing lawns and tutoring younger kids.

Before long, Roberto had more jobs than he could handle. Apparently, the community was really in need of services like his. Roberto spent his mornings mowing lawns and doing other yard work. In the afternoons, he helped little kids with their reading and mathematics. Pretty soon all the neighbors were bragging about their hometown self-made businessman. His parents were incredibly proud of him, and the money was rolling in, but Roberto didn't even have time to spend it. Besides, he missed seeing his friends. He didn't want to give up his jobs, but he longed for some leisure time to spend at the arcade and snack shop.

Meanwhile, Roberto's friends were running out of their spending money because all they did was spend time playing video games and buying pizza and sodas. One morning, as he was finishing up his third lawn-mowing job for the day, Roberto had a brilliant idea. His friends could take over some of his jobs. Then they would all have time and money to spend together. Roberto and his friends put the plan into effect immediately, and soon they all divided their time between working and hanging out. The lawns all across town had never looked better, the younger children were mastering math and reading, and Roberto and his friends knew they were making a difference.