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**AN EVALUATION ON THE WILSON READING PROGRAM FOR STUDENTS WITH
LEARNING DISABILITIES: A LONGITUDINAL STUDY**

By
Rosemarie T. Harrison

A Thesis

Submitted to the
Department of Language, Literacy and Special Education
College of Education
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For the degree of
Master of Arts in Special Education
at
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Thesis Chair: Joy Xin, Ed.D.

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Dedication

I dedicate this manuscript to my family, who shares in my enthusiasm for higher education.

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I would like to express my sincere appreciation to my professor, Dr. Xin, who has guided me on my path to completion of a Masters Degree in Special Education. Thank you for your knowledge, patience and understanding.

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Thank you to my mother, Nancy McGovern, who was always there to take care of my children while I was attending classes.

Abstract

Rosemarie Harrison

AN EVALUATION ON THE WILSON READING PROGRAM FOR STUDENTS WITH LEARNING DISABILITIES: A LONGITUDINAL STUDY

2014-2015

Joy Xin, Ed. D.

Master of Arts in Special Education

The purpose of this study was to examine the effects of the Wilson Reading Program as a supplemental reading program for students with disabilities. A school district's student decoding and comprehension scores in three years were reviewed and synthesized for the program evaluation. The analysis of variance (ANOVA) with a repeated measure was used to compare possible differences of student performance in decoding and word recognition, and overall reading skills at each grade level respectively. It was found that the Wilson Reading Program had a significant effect on students' Word Reading Scores in Year 2 of the intervention, but not significant on Year 3, although their scores were increased compared to Year 1. This indicates that novelty of the program may have a great impact on students' reading performance. Although the findings are not consistent from one group to another, there seems to be some correlation between Word Reading and Measurement of Academic Progress (MAP) scores.

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Chapter 1

Introduction

Statement of Problems

The state of New Jersey recently passed three new law sections with the intention to improve learning outcomes of students struggling with reading. Law P.L. 2013, c.131 requires the state's Department of Education to incorporate the definition of Dyslexia into Chapter 14 of Title 6A of the Administration Code. Law P.L. 2013, c.105 mandates teacher training to understand Dyslexia and ways to teach these children with appropriate instructional methods to improve their reading. Law P.L. 2013, c.210 requires the state providing school districts with information for screening students for Dyslexia (<http://education.state.nj.us>, 2014).

The International Dyslexia Association (IDA) (2002) defines dyslexia as a specific learning disability that is neurological in origin. Children with Dyslexia have difficulties with accurate and/or fluent word recognition, poor spelling and decoding skills. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Further, students with dyslexia also have problems in reading comprehension and vocabulary development because of their limited background knowledge (International Dyslexia Association, 2002). The National Reading Panel (2000) reported that a combination of phonemic awareness, phonics, fluency, guided oral reading, vocabulary and reading comprehension is effective for teaching reading. Phonemic awareness is the understanding of spoken words that consist of separate units of sound blended together for pronunciation. It requires a reader to isolate the different

sound elements in a word, and analyze and interpret these sounds (Spafford & Grosser, 2005). Phonemic awareness is the basis for all other reading tasks. It also requires the reader to notice how letters represent sounds, and prepares for sounding out and decoding a word. Phonics is the relationship between written letters and spoken sounds. It will help children to decode new words and recognize familiar words accurately and automatically (<http://www2.ed.gov/print/parents/read/resources/readingtips/part.html>, 2003).

Fluency requires a reader to recognize words, read text accurately with speed and expression, and to understand what is read. This skill is greatly affected by a reader's decoding skills. Readers who lack fluency often read slowly, relying on decoding individual words rather than recognizing words automatically. As a result, their understanding of the reading text will be affected (National Reading Panel, 2000, <http://www.nichd.nih.gov/research/supported/Pages/nrp.aspx/>, 2010).

Vocabulary development includes learning words by sounding out and understanding meaning. In order to become a fluent reader, written and spoken words should be expanded with understanding of their meanings and applications. Word pronunciation will help children recognize words in the printed text, and understanding of the word meanings will support their reading (<https://education.ucf.edu/mirc/Research/Closer%20Look.pdf>, 2000).

Reading comprehension involves constructing meaning that is reasonable and accurate by connecting what is read to what the reader already knows and to think about all of this information until it is understood. This is the final goal of reading, to understand, remember and communicate what is being read (<https://education.ucf.edu/mirc/Research/Closer%20Look.pdf>, 2000).

In the reading process, a reader often progresses from manipulating sounds (phonemic awareness) to combining phonemes (phonics), then to building higher-level reading skills such as fluency, vocabulary development and reading comprehension. Lacking the foundational skills of phonemic awareness and phonics, a child will have difficulty in reading, and may lag behind his/her peers. Thus, the main focus during the primary grades is “learning to read,” but thereafter it becomes “reading to learn” (Chall, 1983; cited by Leach, Scarborough & Rescorla, 2003, pg. 211).

It is estimated that approximately 85% of students with a learning disability have a primary problem with reading and related language skills (http://www.ldonline.org/article/Dyslexia_Basics, 2010). According to Catts and Hogan (2003), “most poor readers have significant problems learning to decode words and children with reading disabilities (RD) have deficits in phonological awareness and phonics skills” (Bradley & Bryant, 1983; Fletcher et al., 1994; Fox & Routh, 1980; Olson, Wise, Conners, Rack, & Fulker, 1989 as cited in Catts & Hogan, 2003).

Because of the potential impact of literacy problems, educators have actively pursued the development of effective programs for the early identification of reading disabilities and related intervention strategies (Snow, Burns & Griffin, 1998, cited by Catts & Hogan, 2003). The International Dyslexia Association (2014) recommends a multisensory structured teaching approach for instructing students with dyslexia. Multisensory teaching involves the use of visual, auditory, and kinesthetic-tactile pathways simultaneously to enhance a learner’s memory in learning of written language. The Orton-Gillingham approach (<http://www.ortonacademy.org/approach.php>, 2012) to reading is a multisensory approach for instruction with structured and sequential lessons

to teach cumulative skills with flexible adjustments for teachers with visual, auditory, and kinesthetic reinforcements (Spafford and Grosser, 2005).

Based on the Orton-Gillingham approach, another remedial reading program called the Wilson Reading Program was developed in 1988. It focuses on word studies, spelling, fluency and comprehension to support children with reading and language difficulty. According to the description of Wilson Language, the Wilson Reading Program is a research-based reading and writing program. It is a complete curriculum for teaching decoding and encoding (spelling) skills with phoneme segmentation. The purpose of the Wilson Reading Program is to teach students fluent decoding and encoding skills to the mastery level. Further, this program emphasizes the structure of words in the English Language for students to master the coding skills for reading and spelling. Unlike other programs that overwhelm the student with rules, the language system of English is presented in a systematic and cumulative manner for easy management. It provides an organized, sequential system with extensive controlled text to help teachers implement in class (http://www.wilsonlanguage.com/FS_PROGRAM_WRS.htm, 2004).

The effects of the Wilson Reading Program on decoding, fluency and reading comprehension were examined for beginning readers by Torgesen, et al. (2007). Using the Woodcock Reading Mastery Test–Revised (WRMT–R, 1987), a significant increase on scores of word identification and word attack was found. It seems that such a program is helpful to teach basic decoding skills for word identification, however, no significant effect was found on oral reading fluency and passage comprehension. Another study based on the Orton-Gillingham approach called the Dyslexia Training Program (DTP)

followed students over 2 years. Results showed that students demonstrated significantly higher word recognition and reading comprehension compared with a control group. During the program, students who were trained in this Orton-Gillingham-derived method made significant gains in decoding nonsense words, word recognition, and reading comprehension comparing with those who were not taught by such explicit instruction (Oakland, et. al., 1998). It indicated that a longer time period of 2 years would give learners more time to practice an alphabetic decoding strategy, and yield positive results, while short term instruction may not be sufficient time for both teacher and students (Stanovich, 1980; cited by Oakland, et. al., 1998). Thus, a longitudinal study tracing student performance of 3 years seems important to evaluate a reading program such as Wilson Reading Program. To date, little research has been found to evaluate the Wilson Reading Program for children with disabilities. This study attempts to examine student performance data, of a school district, for a period of three years when the Wilson program was provided.

Significance of the Study

The Wilson Reading Program is a supplemental program of reading instruction for learners of all ages. It has been shown to have a positive impact on the reading of students with a reading disability (RD) or learning disability (LD)(Wilson & O'Connor, 1995, cited by Stebbins, Stormont, Lembke, Wilson & Clippard, 2012). However, a longitudinal study tracking students for 3 years to report their learning outcomes is hardly found in research. With all the different theories about struggling readers, as well as all the supplemental programs on the market, teachers and school administrators need to know the effective reading programs for particular student populations. In addition, with

the high cost of supplemental reading programs, resources related to reading programs are needed to address all reading areas such as decoding, fluency, and comprehension to meet students' needs.

The present study was designed to examine the effect of the Wilson Reading Program as a supplemental reading program for students with disabilities. It attempted to review a school district's data to summarize and synthesize the student's learning outcomes in order to provide information to evaluate the program in terms of students' scores of decoding, fluency and comprehension.

It is my hope that the information will be valuable for school teachers and administrators for their decision making to select appropriate reading programs on based on their students' needs.

Statement of Purposes

The purposes of this study are to: (a) examine students' reading outcome using the Wilson Reading Program through a longitudinal review of 3 years of student performance data in a school district and (b) evaluate the effect of the Wilson Reading Program approach on improving student reading skills including word decoding and overall MAP (Measurement of Academic Progress) scores.

Research Questions

The research questions are listed as follows:

1. Will overall reading skills of students in grades 5 to 8, as measured by individual MAP scores, increase when the Wilson Reading Program has been provided for 3 years?

2. Will decoding skills of students in grades 5 to 8 increase when the Wilson Reading Program has been provided for 3 years?
3. Is there a correlation between decoding skills and MAP scores?

Chapter 2

Review of the Literature

Dyslexia is defined as a language-based learning disability resulting in one's difficulties with language skills, such as reading, spelling, writing and vocabulary development. This disability may be found in learners with average intelligence. According to Catts and Hogan (2003), language deficits are considered as the most direct antecedent causal factor to identify a child's problems, while early reading performance is the most important indicator for his/her personal and academic success in school (Plaza & Cohen, 2004; Shaywitz & Shaywitz, 2005; Vaughn & Bos, 2009). Thus, effective reading instruction is important for teachers to provide in class to support students with reading problems.

The National Reading Panel (2000) reported that the best approach to reading instruction is to incorporate explicit instruction in phonemic awareness and systematic phonics in order to improve fluency and enhance comprehension. The International Dyslexia Association (2012) also recommended the use of explicit and systematic practices to remediate reading for students with reading problems. It is found that struggling readers and dyslexic children can be successful when an explicit and systematic approach with skills built cumulatively is involved in instruction (National Reading Panel, 2006). This chapter reviews reading instructional strategies that are research-based to provide effective teaching and focus on explicit and systematic reading programs such as Orton-Gillingham and other multisensory approaches.

The Orton-Gillingham Approach

The Orton-Gillingham approach is a systematic, sequential, multisensory, synthetic and phonics-based approach to teaching reading (Ritchey & Goeke, 2006). It is the basis for many other multisensory reading programs pioneered by Dr. Samuel T. Orton, a physician in the early 1900's. He believed that dyslexia was a language based problem rather than a perception or vision deficit. It is noted that 50% of his patients not only had reading difficulties, but also related language disorders including problems with receptive and expressive language, passage comprehension, spelling and composition. It is found that the cause of dyslexia had a biologic basis, and the treatment should be educational, such as teaching the structure of the English language (Henry, 1998). Orton suggested that "...the logical training for these children would be that of extremely thorough repetitive drill on the fundamentals of phonic association with letter forms both visually presented and reproduced in writing, until the correct associations were built up and the permanent elision of the reversed images and reversals in direction was assured" (1925, p. 614). This is the basis for Orton-Gillingham approach with a systematic and explicit instruction.

Dr. Orton was further interested in the work of Grace Fernald and Helen Keller (1921). They found: "...lip and hand kinesthetic elements seem to be the essential link between the visual cue and the various associations which make word meaning. In other words, it seems to be necessary for the child to develop a certain kinesthetic background before he/she can apperceive the visual sensations for which the printed words form the stimulus. Even the associations between the spoken and the printed word seem not to be fixed without the kinesthetic links" (Fernald & Keller 1921, p. 376). This became the

basis for his theories of a multisensory component for the instruction of struggling readers.

Based upon his neurological theories on language and reading disabilities, Orton was working with Anna Gillingham, a psychologist, to develop an instructional method for struggling readers incorporating a systematic, explicit, multisensory approach to teaching reading. Gillingham, along with her colleague Bessie Stillman, designed and published instructional materials for teaching the 44 sounds or phonemes of the English alphabet and morphemes, such as prefixes and suffixes and created common spelling rules to apply to certain patterns and syllables based upon Orton's theories (Henry, 1998). The book that became known as the Orton-Gillingham manual was titled *Remedial Training for Children with Specific Disability in Reading, Spelling and Penmanship*, and was first published in 1935.

Together, Orton and Gillingham, in collaboration with Stillman, developed what is now known as the Orton-Gillingham approach to teaching reading. This approach incorporates all learning modes including visual, auditory, and tactile-kinesthetic. In their teaching manuals, teachers were provided with numerous visual, auditory, and tactile-kinesthetic opportunities in their instruction, then make connections between the visual (language we see), auditory (language we hear), and kinesthetic-tactile (language symbols we feel) pathways in learning to read and spell (2014).

Many multisensory-based supplemental reading programs have developed based on the Orton-Gillingham (OG) approach. However, a review of the literature regarding multisensory reading interventions shows a dearth of research in this area. What Works Clearinghouse (WWC), established in 2002 as an initiative of the Institute for Education

Sciences (IES) at the U.S. Department of Education, is a resource for informed education decision-making. The WWC identifies studies that provide credible and reliable evidence of the effectiveness of a given practice, program, or policy (referred to as “interventions”), and disseminates reports on the WWC website. The WWC found no studies of the unbranded *Orton-Gillingham*-based strategies that fall within the scope of the Students with Learning Disabilities review protocol meeting WWC evidence standards. The lack of studies meeting WWC evidence standards means that, at this time, the WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of unbranded Orton-Gillingham-based strategies for students with learning disabilities (<http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=528>, 2010)

Despite the widespread inclusion of multisensory techniques in remedial reading programs for dyslexic students, and strong beliefs among practitioners using these techniques, there is little empirical evidence to support the techniques’ theoretical premises (Moats & Ferrell, 1999). Although many of the programs incorporating Orton-Gillingham strategies have been effective according to clinical reports, the specific contribution of multisensory methods to the overall success of these programs has not been adequately documented through rigorous manipulation of instructional conditions, while subsequent measurement of student learning outcomes should be evaluated (Moats & Farrell, 1999).

Alphabetic Phonics-Based Reading Programs

Alphabetic Phonics is an ungraded, multisensory curriculum based on the Orton-Gillingham approach for teaching the structure of the English language. This phonetic program involves instruction on reading, handwriting, spelling, verbal and written

expression, and comprehension by simultaneously engaging the visual, auditory, and kinesthetic modalities (http://eps.schoolspecialty.com/EPS/media/Site-Resources/downloads/program-overviews/s-alphabetic_phonics.pdf, 2014). The What Works Clearinghouse (WWC) identified 13 studies of Alphabetic Phonics for students with learning disabilities published between 1989 and 2009, however, none of these met WWC standards.

Joshi, Dahlgren, and Boulware-Gooden's study (2002) examined the efficacy of the multisensory approach to improve reading skills at the first-grade level. Specific reading skills included phonological awareness, decoding, and comprehension. A multisensory method of instruction called Language Basics, incorporating the Orton-Gillingham-based Alphabetic Phonics Method was provided to 56 students from four first-grade classrooms in a district with approximately 40,000 students. None of the participants had any known hardships in cognitive abilities, uncorrected vision, hearing problems, and none were below average intelligence.

The instruments used included *Test of Phonological Awareness (TOPA)* (Torgesen & Bryant, 1994); Word Attack subtest of *Woodcock Reading Mastery Test-Revised (WRWT-R)* (Woodcock, 1987); and the comprehension part of the *Gates-MacGinitie Reading Test (GMRT)* (MacGinitie & MacGinitie, 1989).

All the students were tested at the beginning of the fall semester. The control group received instruction in the district-approved Houghton-Mifflin Basal Reading Program while the multisensory reading instruction was given to the treatment group. Both groups were taught 50 minutes daily in literacy activities. At the end of the academic year, the same tests were used as post-tests. Results showed that the gain scores

of the treatment group were significantly higher than that of the control. Children in the control group showed statistically significant gains in comprehension but not on phonemic awareness or decoding, while the treatment showed statistically significant gains in all three areas. It could be concluded that a multisensory approach to reading has a more significant impact on the reading skills of struggling readers than the basal approach used by the district.

Another Alphabetic Phonics-based study by Vickery, Reynolds and Cochran (1993) combined the components of Alphabetic Phonics with additional materials. This new approach was called Multisensory Teaching Approach for Reading, Spelling, and Handwriting (MTARSH). The addition of the materials combined principles of Alphabetic Phonics with Orton-Gillingham-Stillman methods for large, homogeneous groups of children as well as with small homogeneous groups of students with dyslexia and learning disabilities.

During the four years of this study, 426 students were trained by the MTARSH Program; of these, 282 were enrolled in the remedial and 144 in the non-remedial classes. Students in grade 1 received 25 minutes instruction and those in grades 2-6 received 55 minutes instruction in both the remedial and non-remedial classes daily. In remedial classes the Multisensory Teaching Approach for Reading, Spelling and Handwriting, MTARSH Program, was provided in reading, spelling, and cursive handwriting while the non-remedial students participated in the same program in lieu of the regular state-adopted spelling and handwriting programs, California Achievement Test (CAT) was administered to all students and their scores were compared to determine their growth. Results showed that mean scores for both groups tended to be higher than that of the

baseline. In both remedial and non-remedial classes, students obtained higher scores after being instructed by the MTARSH Program than the baseline. According to Vickery, Reynolds and Cochran (1993), except for one comparison, CAT scores for classes in remedial spelling were superior to those of the baseline. For the non-remedial spelling, students scored lower in two classes below baseline, and one class below baseline in non-remedial reading.

In both studies, a multisensory alphabetic phonics-based reading program contributed to increases in reading skills. Joshi, Dahlgren and Boulware-Gooden's study (2002) showed positive gains in reading comprehension, phonemic awareness and decoding while Vickery, Reynolds and Cochran's study (1993) showed positive gains in test scores on the California Achievement Test (CAT) for both remedial and non-remedial students versus baseline. There were limitations to these studies. In the first study, the number of participants was small and only included first grade students. Further studies should be conducted to research the gains in reading skills realized by older students in various grades using a multisensory approach to reading instruction. The second study had a significant population size however the study only included data from grades 4 through 6. In addition, there were no control or treatment groups; both groups received the multisensory-based treatment. However, one group consisted of remedial students while the other group consisted of non-remedial students.

Other Multisensory Teaching Approaches

According to Oakland, et al (1998), the Dyslexia Training Program (DTP), is a recent adaptation of the Alphabetic Phonics curriculum. The DTP core curriculum provides a cumulative series of 350 one-hour lessons starting with very basic skills (e.g.,

letter recognition) and extending sequentially to sophisticated levels of linguistic knowledge. Oakland et al 's study (1998) involved 48 students with dyslexia. They were assigned into 2 groups with the experimental group of 22 and the control group of 26. These students were of average intelligence, with standard scores below 90 in reading achievement on the Word Recognition subtest of the Wide Range Achievement Test-Revised (WRAT-R, 1994) and demonstrated at least a 15 standard score discrepancy between their WISC-R Full Scale IQ and their Word Recognition WRAT-R. Students in the experimental group received instruction 5 days per week for approximately 10 months a year for 2 years. Students in the control group received reading instruction as normally provided in their schools. Results indicated that students in the experiment group made significant progress over two years whereas the control group did not. Similar results were found on word recognition, however, initially the experimental group performed lower than the control group but after two years, the students performed better while the control group had little improvement. On the spelling test, the two groups performed comparably and their performance did not improve significantly during the 2-year period (Oakland, et al, 1998). It is found that students who were trained in the Orton-Gillingham-derived method made significant gains in decoding nonsense words, word recognition, and reading comprehension when compared with those without explicit instruction.

Scheffel, Shaw and Shaw (2008) examined the efficacy of an Orton-Gillingham-based supplementary reading program called the Institute of Multi-Sesnory Education (IMSE). This reading program relies on directly teaching the fundamental structure of language, beginning with simple sound-symbol relationships and progressing logically to

phonetic rules and word-attack strategies using the visual, auditory and kinesthetic-tactile learning pathways to decode words. The purpose of this study was to examine the effects of IMSE in the real world setting with teachers in the classroom using IMSE as a supplemental intervention for the treatment group while teachers in the control group used the district-wide reading curriculum only.

This study took place in a school district with approximately 18,000 students in a suburban school district. The treatment group included 224 students while 476 students in the control. Both groups received traditional reading instruction for 90 minutes per day in a core reading program and treatment group students received an additional 30 minutes of instruction in the supplemental reading program. Student progress was measured using the Dynamic Indicators of Basic Early Literacy (DIBELS) reading assessment including Phoneme Segmentation Fluency (PSF), Nonsense Word Fluency (NWF), and Oral Reading Fluency (ORF) (pg. 142). Scores are organized by low risk, some risk and high risk for all assessments. On the Phoneme Segmentation Fluency test, students in the treatment group in the low risk category grew from 42 in the fall to 95 in the spring while students in the treatment group performing in the some risk and high risk group in the fall decreased from 39 to 4 and 18 to 0.9, respectively, in the spring. This showed a significant increase in phoneme segmentation fluency from the fall to the spring for the treatment group. The control group showed similar, but less significant gains, increasing students in the low risk group from 39 to 93, while students in the some risk and high risk had decreases from 39 to 6 and 23 to 2, respectively.

Similar results were found in the Nonsense Word Fluency and Oral Reading Fluency subtests. Results indicated that although both the treatment and control groups

made significant gains on all three subtests, students in the treatment group receiving supplemental multisensory reading intervention made more significant gains than those in the control group.

Both studies, using a multisensory approach to reading, showed significant gains in reading skills. In each study, students in the control group were taught using current district-wide reading programs while the treatment groups received multisensory-based reading instruction. Limitations of both studies include confounding variables such as the Hawthorne effect as students in the treatment group received either an additional 30 minutes of reading instruction or intense multisensory-based instruction. This extra attention from teachers may have had a positive effect on the student's performance regardless of the intervention. Further research needs to be examined, which would eliminate or minimize variables such as the Hawthorne effect.

Wilson Reading Program

The Wilson Reading Program, based upon the principles of Orton-Gillingham, was developed in 1988. It is a highly structured remedial program that directly teaches the structure of the language to students and adults who have been unable to learn with other teaching strategies, or who may require multisensory language instruction. The Wilson Reading Program focuses on word studies, spelling, fluency and comprehension to support children with reading and language difficulty. According to their description, the Wilson Reading Program is a research-based reading and writing program, with a complete curriculum for decoding and encoding (spelling) skills with phoneme segmentation. The purpose of this program is to teach students fluent decoding and encoding skills to the mastery level. Further, this program emphasizes the structure of

words in the English Language for students to master the coding skills for reading and spelling. Unlike other programs that overwhelm the student with rules, the language system of English is presented in a systematic and cumulative manner for easy management with an organized, sequential system with extensive controlled text to help teachers implement in class

(http://www.wilsonlanguage.com/FS_PROGRAM_WRS.htm, 2004).

Although the Wilson Reading Program is currently being used in classrooms across the nation, there have been very few studies examining the effectiveness. WWC found no studies of the Wilson Reading Program that meet their evidence standards for students with learning disabilities. The lack of studies meeting WWC evidence standards means that, at this time, the WWC is unable to draw any conclusions based on research about the effectiveness or ineffectiveness of the Wilson Reading Program for students with learning disabilities (<http://ies.ed.gov/ncee/wwc/interventionreport.aspx?sid=546>, 2010).

Several studies, although not meeting WWC standards, have examined the efficacy of the Wilson Reading Program (WRC). One study, by Wilson and O'Connor (1995), examined the efficacy of the Wilson Reading Program in the public school setting. The purpose of this study was to determine whether the use of WRC significantly improved student's basic reading and spelling skills. A total of 220 students, ranged from grades 3 to 12, were included in the study. Their total reading score on the Woodcock Reading Mastery test was at least two years below their grade placement. Their IQ scores ranged from low to high average. The Woodcock Reading Mastery-Revised (WRMT-R) Word Attack, Passage Comprehension, Word Identification, and

Word Comprehension subtests were used to assess student performance. Each student received two or three 1:1 lessons per week throughout the school year for an average of 62 lessons completed by the end of the year. Results indicated significant gains in Word Attack, where the average gain was 4.6 grade levels. Significant gains in Passage Comprehension were also achieved, where the average gain was 1.6 grade levels. According to the authors, these students had made little or no gain in reading with previous intervention methods despite years of pull-out services in special education services (Wilson & O'Connor, 1995).

Stebbins, et al. (2012) examined the use of the Wilson Reading Program for students with disabilities and evaluated their learning outcomes during two years. The total of 20 students participated in this study with an IEP documenting the need for specialized reading instruction, and their IQ measured one standard deviation below the average. The Scholastic Reading Inventory (SRI) and the Woodcock-Johnson III Tests of Achievement (WJ III) were administered to students three times over two years. These Tests included word attack, reading fluency, basic reading skills, letter-word identification and SRI. Students received four 45-minute sessions per week of direct reading instruction with the WRS in a resource room. Results showed that as the WRS was implemented, the mean scores on Word Attack increased substantially during the first year, plateaued during the summer and fall, then rose slightly again in spring. Results also showed a significant increase in scores from the fall to the spring of the next year in the Reading Fluency, Basic Reading Skills, and Letter-Word Identification subtests of the WJ III. Baseline data showed beginning reading levels below proficiency for first grade, however, students ended as proficient readers at the second-grade level.

This study documented significant growth of the participants in their application of phonetic and structural analysis skills in order to pronounce nonsense words. Over the course of the study, approximately one half of a standard deviation was gained in word attack skills. Students also showed significant gains in their ability to quickly and accurately read simple sentences, and their reading fluency improved significantly. Although the participants' basic reading skills scores changed significantly over time, but the effects were minimal.

In both studies, a significant increase in reading skills was demonstrated. The Wilson and O'Connor's study had a significant number of participants while the Stebbens, et al. study consisted of only 20 students. Both studies did not compare data to a control group, but, rather, tracked student performance over time. Limitations of both studies include the lack of a control group, number of participants, and age of the student population. Further studies should be conducted to determine if significant gains would also be realized by older students using this method.

Summary

Overall, Wilson Reading Program and other Orton-Gillingham-based reading programs had a positive effect on certain reading skills, and the treatment effect ranged from the mildly to significantly effective (National Reading Panel, 2006; Joshi, Dahlgren & Boulware-Gooden, 2002; Vickery, Reynolds & Cochran, 1993; Oakland, et al 1998; Sheffel, Shaw & Shaw, 2008; Wilson & O'Connor, 1995; Stebbens, et al, 2012). The National Reading Panel (2000) identified five major components necessary for success of reading: phonemic awareness, phonics, reading fluency, vocabulary and reading comprehension. The Wilson Reading Program and other multisensory reading programs

have been shown to increase learners' phonemic awareness and phonics skills that may be the basis for other reading skills. Although there are some studies examining the effectiveness of the Wilson Reading Program, limited research was found to evaluate the program based on classroom evidence and student learning outcomes to lay the foundation for more studies examining the effectiveness of such reading programs.

Chapter 3

Method

Context of the Study

Setting. The study was designed to review 3 years of reading performance data of students who were attending a middle school located in southern New Jersey. The school is located in a district identified by the state Department of Education District Factor Group (DFG) for the borough as “CD”. The DFGs represent an approximate measure of a community’s relative socioeconomic status (SES). From lowest socioeconomic status to highest, the categories are A, B, CD, DE, FG, GH, I and J. Therefore, this district is in the 6th highest socioeconomic group of the 8, which means that this school is located in a lower middle class suburban area.

According to Wikipedia database, as of 2011-12, the district had an enrollment of 5,921 students in preschool through 12th grade. The middle school had a total of 1,905 students in grades 5 through 8. Students with disabilities were placed in inclusion, resource, and self-contained settings based upon individual students’ needs. It was the district’s policy to place students homogeneously in classes and to start the Wilson program in the 5th grade. A Wilson program coach was hired to support teachers in their presentation in order to maintain the integrity of the Wilson method across the school and class.

Participants. The Wilson Reading Program was considered a supplement to the Language Arts curriculum in middle school. Students receiving this program intervention in the middle school were included in the data. All students were identified as struggling readers according to their performance on functional reading assessments, such as the

Wilson Assessment of Decoding and Encoding (WADE) or Word Identification and Spelling Test (WIST).

A total of 38 students attending 7th and 8th grades during the 2014-2015 school year were included. Of these, 30 were classified as having a Specific Learning Disability, and 8 were general education students without disabilities.

All students received Language Learning with Wilson Reading Program in a small group within the pull-out classroom setting 5 hours per week. Their teachers were trained within the school district by a Wilson Reading Program consultant and were required to become a Wilson certified teacher in order to start the instruction. The instruction was conducted in a small group format with a student to teacher ratio of 5:1.

Measurement. Students were evaluated either by the Wilson Reading Program's Wilson Assessment of Decoding and Encoding (WADE), or Word Identification and Spelling Test (WIST) at the beginning of the school year. The WADE assessed real word reading, spelling, and nonsense word reading that are regarded as non-words but following predictable phonic patterns. Its subtests cover sounds, and words, and sentence spelling.

The WIST was used to assess word identification and spelling. Word identification measures accuracy of sight recognition and a learner's ability to apply word attach skills, and sight recognition of irregular high-frequency words. Spelling assessment requires a learner's ability to spell words from dictation through recalling correct letter sequences for familiar words or to apply sound/symbol relationships and rules of English orthography, and recalling irregular high-frequency words. Pre- and post WADE/WIST assessments were given to measure individual student's growth with the

Wilson Reading Program intervention. In addition, each student in district was assessed using the Measures of Academic Progress (MAP). Each year, MAP assessments are administered in the fall and spring. The scores present current levels of performance in the following areas: decoding and word recognition, comprehension skills, and an overall reading score called RIT, which is an estimation of the instructional level of a student's progress or growth in reading. MAP assessments are designed to measure individual student's academic performance. The test questions are developed in a multiple-choice format based on the student responses and current achievement level. The test length varies by grade level with a range of 32 to 52 questions. The computer adjusts the difficulty level of the questions as the test progresses. Based on each test score, teachers are able to better assess student progress over the course of the year and determine where students may need additional instruction.

Procedure. Students' data scores were retrieved from the 2012-2013, 2013-2014, and 2014-2015 school year. The scores of WADE/WIST, as well as MAP were reviewed in order to assess the following:

1. comparing student performance scores in each grade level over three years
2. exploring a correlation between scores of decoding real words on the WADE/WIST with performance scores of MAP in the areas of decoding and word recognition
3. examining the correlation between the use of the Wilson Reading Program as a reading intervention and its impact on students' MAP scores

Data analysis. The means and standard deviations of student performance scores were calculated in each area including decoding and word recognition, and overall reading scores at each grade level.

An analysis of variance (ANOVA) with a repeated measure was used to compare possible differences in student scores in decoding and word recognition, and overall reading skills at each grade level respectively.

A post-hoc analysis was used to distinguish if there is a significant difference of 3 years' student performance in each area at each grade level respectively.

Pearson product-moment of correlation coefficients was calculated to examine the relationship between word reading and MAP scores over three years, as well as the relationship of student scores of word reading and MAP.

Chapter 4

Results

Student performance over three years was compared to examine an increase in Real Word Reading Accuracy after receiving the Wilson Reading Program intervention as part of the Language Arts curriculum.

The analysis of variance (ANOVA) with a repeated measure was used to compare possible differences in student reading scores in decoding and word recognition, and overall reading skills at each grade level respectively. Table 1 shows the means and standard deviations (SD) of Real Word Reading for each group of students over the past three years. Students in Group 1 gained significantly higher scores in Year 2, presenting a significant difference from Year 1 to Year 2 ($F=46.7, P<.00$). However, their scores decreased in Year 3, with no difference from Year 1. Students in Group 2 showed a similar pattern, scoring significantly higher in Year 2, with a significant difference from Year 1 to Year 2 ($F=5.8, p<.01$). However, their scores also decreased in Year 3, with no significant difference from Year 1.

Table 1

Means and Standard Deviations of Real Word Reading Scores of Students in Grade 5, 6, 7 and 8 for 3 Years

Group/ Grade	Year 1		Year 2		Year 3	
	Mean	SD	Mean	SD	Mean	SD
1 (5 th , 6 th , 7 th)	41.4	6.4	84*	1.1	41.7	7.0
2 (6 th , 7 th , 8 th)	65.7	4.2	73.5**	2.7	49.2	7.2

*Significant difference from Year 1 and Year 3 (F=46.7, p<.00).

** Significant difference from Year 1 and Year 3 (F=5.8, p<.01).

Table 2 shows the means and standard deviations of MAP scores with each group of students over three years. Students in Group 1 gained significantly higher scores in Year 2, presenting a significant difference from Year 1 to Year 2 (F=9.8, p<.002). However, their scores decreased in Year 3, with no difference from Year 1. Students in Group 2 showed a different pattern, scoring a slight decrease every year from Year 1 to Year 3. However, none of these decreases was significant.

Table 2

Means and Standard Deviations of MAP Sores of Students in Grade 5, 6, 7 and 8 for 3 Years

Group	Year 1		Year 2		Year 3	
	Mean	SD	Mean	SD	Mean	SD
1	194.5	2.7	206.0*	1.7	192.2	13.1
2	196.5	2.2	194.1	2.4	183.5	13.0

*Significant difference from Year 1 and Year 3 (F=9.8, p<.002).

Figures 1 and 2 show the mean scores of Word Reading Accuracy and MAP scores over three years. Both scores of students in Group 1 showed an increase from Year 1 to Year 2, and a decrease from Year 2 to Year 3, with a significant increase from Year 1 to Year 2 in Word Reading Accuracy and a significant increase from Year 1 to Year 2 in MAP scores. However, their scores decreased in Year 3 with no difference from Year 1 for both Word Reading Accuracy and MAP scores. The student scores of Word Reading Accuracy in Group 2 showed an increase from Year 1 to Year 2, with a significant difference, and a decrease from Year 2 to Year 3, with no significant difference from Year 1. Group 2's MAP scores showed a decrease from Year 1 to Year 2 and to Year 3, however, the decrease was not significant.

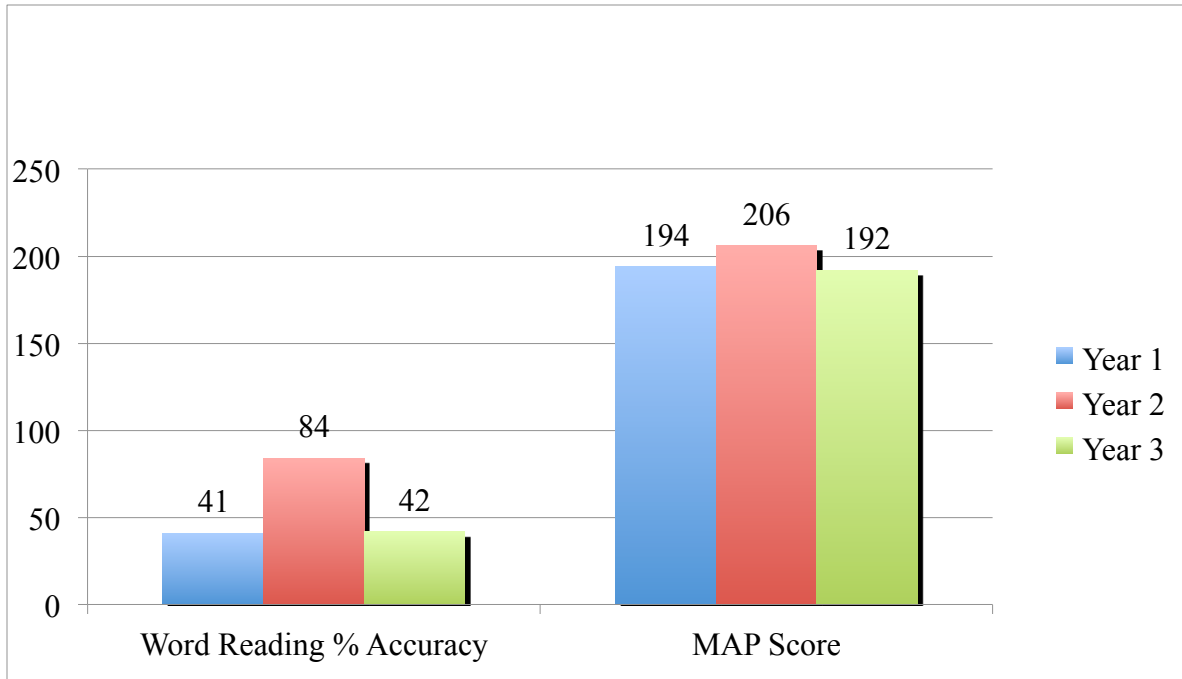


Figure 1. Means of word reading accuracy versus MAP scores of Group 1

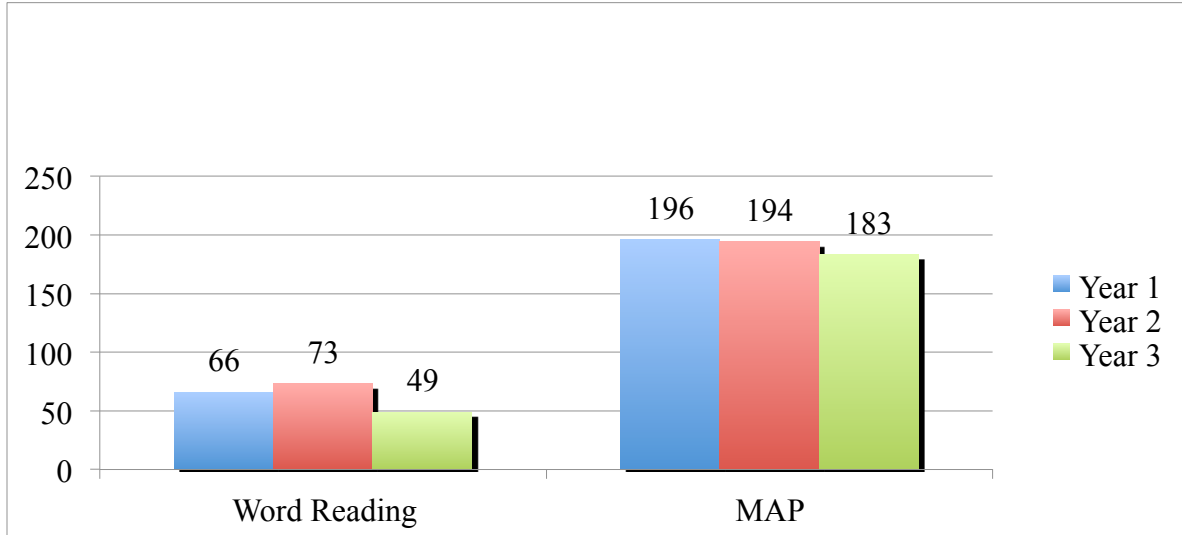


Figure 2. Means of word reading accuracy versus MAP scores of Group 2

In addition, *Pearson product-moment* analysis was used to examine the correlation between the student scores of Real Word Accuracy and MAP for the three years. Table 3 presents the results. There is a moderate correlation between Real Word and MAP scores in Year 1 ($r = .528$) and a strong correlation in Years 2 and 3 ($r = .856$, $r = .770$) for Group 1; while the correlation is strong in Year 1 ($r = .908$) and low in Years 2 and 3 ($r = .013$, $r = .030$) for Group 2.

Table 3

Correlation Coefficients of Real Word Reading versus MAP Scores of Students in Grade 5, 6, 7 and 8 for 3 Years

Group/ Grade	Year 1 r Level	Year 2 r Level	Year 3 r Level
1 (5 th , 6 th , 7 th)	.528 Mode- rate	.856 Strong	.770 Strong
2 (6 th , 7 th , 8 th)	.908 Strong	.013 Low	.030 Low

Table 4 presents the correlation of student scores of Real Word Accuracy and MAP over three years. There is a strong correlation for Group 1 ($r = .834$) and a low correlation for Group 2.

Table 4

Correlation Coefficients of Overall Real Word Reading versus MAP Scores of 3 Years in Grade 5, 6, 7 and 8

Group/ Grade	r	Level
1 (5 th , 6 th , 7 th)	.834	Strong
2 (6 th , 7 th , 8 th)	.027	Low

Chapter 5

Discussion

The purpose of the present study was to examine the effects on the Wilson Reading Program as a supplemental reading program for students with learning disabilities. Students' performance of a school district was reviewed and synthesized to evaluate the program effectiveness in terms of scores of word reading, comprehension (e.g. MAP), and overall reading skills.

The Wilson Reading Program provided as a supplemental reading program for all school-aged children implemented in school since 1989. It has shown a positive impact on the reading performance of students with a reading disability (RD) or learning disability (LD) (Wilson & O'Connor, 1995, cited by Stebbins, Stormont, Lembke, Wilson & Clippard, 2012). A key aspect of the program is to prepare educators for effective implementation of Wilson's multisensory structured strategies with fidelity for successful reading instruction to the target student populations.

A total of 38 students attending 7th and 8th grade during the 2014-2015 school year was included in this study. All students received Language Learning with Wilson Reading Program in a small group within the pull-out classroom 5 hours per week. Their teachers were trained within the school district by a Wilson Reading Program consultant and were required to become a Wilson certified teacher in order to start the instruction. The instruction was conducted in a small group format with a ratio of 5:1 for students and the teacher.

Results showed that students in grades 5 to 8 increased their scores in reading and comprehension when the Wilson Reading Program was provided for 3 years. When

implemented in the second year, the students gained significantly higher scores than the first year. The students in Group 1, who attended grade 7 in the 2014-2015 school year, increased their word reading and reading comprehension scores significantly from Year 1 to Year 2 ($F=46.7, P<.00$), while decreasing slightly from Year 2 to Year 3. However, their scores decreased in Year 3, with no difference from Year 1. The students in Group 2, who attended grade 8 in the 2014-2015 school year, increased their word reading scores from Year 1 to Year 2 significantly ($F=5.8, p<.01$), while decreasing slightly from Year 2 to Year 3. Group 2 showed a different pattern for reading comprehension, as measured by MAP. Their scores decreased in Year 1, Year 2 and Year 3, although the decrease was not significant.

Although Word Reading scores declined for both groups of students in Year 3, their scores increased significantly in Year 2. This indicates that novelty of the program may have a great impact on their reading performance, while in the 3rd year of the intervention, students are familiar with the process, thus the program becomes more of maintenance. Most students included in the study started the program with significant deficits in word reading, while in their 3rd year the deficit has been largely reduced. It is plausible that the Wilson Reading Program has an effect on struggling students to learn word reading skills. Perhaps, it may be better to provide this program as an intervention rather than maintenance for struggling readers.

There are several possible reasons for the significant gain in Real Word Reading scores for Group 1 in Year 2. First, the 6th grade Post-Test, administered in Year 2, was in an Elementary Version while the Post-Test in Year 3 the Secondary Version. The difference of the two versions is that more complex vocabulary words were presented in

the Secondary Version, though the same phonic concepts are applied. However, this same situation did not impact those in Group 2. Therefore, the Elementary versus Secondary Version of the post-test does not seem as a definite explanation for the significant variation in Real Word Reading scores, year over year, for Group 1.

Another possible reason for the significant gain in Real Word Reading scores for Group 1 in Year 2 is the possibility that one of the teachers administering the Post-Test either intentionally or unintentionally inflated scores. When examined at the individual student level, many of the students' scores from this teacher increased significantly from Year 1 to Year 2, then decreased in Year 3, while the scores from the other three teachers increased at a more expected rate. The inflated scores from one group of students might make a significant difference in the mean scores of the entire group.

It is found that overall reading skills of students in grade 5 to 8, as measured by individual MAP scores, did not consistently increase when the Wilson Reading Program was provided for 3 years. Results show that student MAP scores in Group 1 increased significantly from Year 1 to Year 2, while decreasing slightly from Year 2 to Year 3. Student MAP scores in Group 2 show a decrease in Year 1, Year 2 and Year 3, but none of the differences were significant. The significantly increased MAP scores of students in Group 1 may attribute to the Wilson Reading Program intervention. However, there was no significant difference for Group 2. Therefore, it is inconclusive if the Wilson Reading Program has a positive effect on MAP scores to measure reading comprehension skills. As MAP scores predict a product of many aspects of reading skills, such as comprehension and vocabulary, it could be noted that the Wilson Reading Program may not have a direct impact on reading comprehension and vocabulary learning because

students' MAP scores did not increase after 3 years of the intervention with the students in Group 2.

Results also showed a strong correlation between word reading and reading comprehension scores in Year 2 and Year 3, and a moderate correlation in Year 1 for Group 1. A low correlation between word reading and reading comprehension was found in Year 2 and Year 3 but a strong correlation in Year 1 for Group 2. Overall, a strong correlation of student mean scores over three years for Group 1 while a low correlation of student mean scores over three years for Group 2.

One research question was asked about a correlation between decoding skills and MAP scores. Results showed a range from a positive to an inconsistent relationship between Word Reading Accuracy and MAP scores. For example, the Correlation Coefficient of Real Word versus and MAP scores was moderate in Year 1 ($r=.528$) for Group 1, and a strong correlation in Years 2 ($r=.856$) and Year 3 ($r=.770$). However, the Correlation Coefficient of Real Word and MAP scores for Group 2 was strong ($r=.908$) in Year 1 and low in Year 2 ($r=.013$) and Year 3 ($r=.030$). Group 1 showed a moderate to strong correlation between Word Reading and MAP scores while Group 2 showed a very low relationship. Although the findings are not consistent from one group to another, there seems to be some correlation between Word Reading skills and MAP scores. This demonstrates the possibility that the Wilson Reading Program may have an impact on students' overall reading scores, especially for those with learning disabilities.

Results showed an inconsistent correlation between Real Word reading and MAP. The Correlation Coefficient of Group 1 ($r=.834$), was strong between Real Word reading and MAP scores while the Correlation Coefficient for Group 2 ($r=.027$) was very low. It

is noted that younger students show more growth in MAP scores in one year than the older. This may give schools a signal to start reading intervention as early as possible at elementary levels, thus students' comprehension would be enhanced simultaneously with their vocabulary learning.

Limitations

There are some limitations in the study. First, the key element of the Wilson Reading Program is to train and certify teachers so as to maintain the integrity of the program. The school district involved in this study was in this training process. Thus, students involved in the Wilson Reading Program during this study received instruction from teachers who were relatively inexperienced in teaching such a multisensory structured language program. A teacher's experience may play a key role in the success of the students and the implementation of the program.

Another limitation is the method for gathering data. In the study, each teacher was required to administer the post-test to each student at the end of the year. This individual testing administration-and grading may impact student scores because of the teacher's effect. In order to maintain consistency, one staff member should be responsible for evaluating each student, year over year, to keep the consistent grading accuracy.

Problems with data collection in a longitudinal study would be the drop-out rate. By the third year of data collection, several students were removed from the study due to a change in class placement, individual student's program needs, or absence. Thus, these students were missed from the data collection, which might affect the mean scores in both Word Reading and MAP.

In order to assess the effectiveness of the Wilson Reading Program, students should all receive the same quality of instruction. Teacher training to prepare for highly qualified teachers will definitely increase the effect of an intervention program such as the Wilson Reading Program. It is recommended that school administrators should consider appropriate training and time for teachers' professional development when any new programs are implement in the district.

Conclusion

It is estimated that approximately 85% of students with learning disabilities have a primary problem with reading and related language skills (http://www.ldonline.org/article/Dyslexia_Basics, 2010). According to Catts and Hogan (2003), most poor readers have significant problems in learning decoding skills, and children with reading disabilities (RD) have deficits in phonological awareness and phonics skills.

Educators search for interventions to improve the basic reading skills of struggling readers. The Orton-Gillingham approach is one such method to teach basic reading skills. Based upon the principles of Orton-Gillingham, the Wilson Reading Program was developed as a remedial reading program to teach students decoding and encoding skills.

The present study examined the effects of the Wilson Reading Program on overall reading scores over a three-year period measured by Word Reading Accuracy and MAP scores. It was found that there was a significant increase in Year 2 for Word Reading Accuracy ($F=46.7, p<.00$) and MAP scores ($F=9.8, p<.002$) for Group 1, while a significant increase was found for Word Reading Accuracy ($F=5.8, p<.01$) but no

significant increase in MAP scores for Group 2. The correlation between Word Reading and MAP scores was inconsistent, e.g. Group 1 had a moderate to strong correlation while Group 2 had a low correlation.

Further studies are recommended to involve more students. It is also recommended to increase the study to a 4 year study, thus yielding more information about the effectiveness in the maintenance rather than in the intervention.

Results showed that the Wilson Reading Program increased student scores in word reading in Year 2 of the study. This may indicate that the Wilson Reading Program should be used as an intervention for struggling students with word reading deficits. Further research on the effectiveness of the Wilson Reading Program may need to validate the finding to improve word reading and reading comprehension skills of students with reading problems or learning disabilities.

References

- Bradley, L., & Bryant, P. (1983). Categorizing sounds and learning to read—a causal connection. *Nature*, 419-421.
- Campbell, M., Helf, S., and Cooke, N. (2008). Effects of adding multisensory components to a supplemental reading program on the decoding skills of treatment resisters. *Education and Treatment of Children*, 31(3), 267-295
- Catts, H. W. (2003). Language basis of reading disabilities and implications for early identification and remediation. *Reading Psychology*, 24(3-4), 223-246.
- Chall, J. (1983). Literacy: Trends and explanations. *Educational Researcher*, 3-8.
- Fletcher, J. M., Shaywitz, S. E., Shankweiler, D. P., Katz, L., Liberman, I. Y., Stuebing, K. K., ... & Shaywitz, B. A. (1994). Cognitive profiles of reading disability: Comparisons of discrepancy and low achievement definitions. *Journal of Educational Psychology*, 86(1), 6.
- Fox, B., & Routh, D. K. (1980). Phonemic analysis and severe reading disability in children. *Journal of Psycholinguistic Research*, 9(2), 115-119.
- Henry, M. K. (1998). Structured, sequential, multisensory teaching: The Orton legacy. *Annals of Dyslexia*, 48(1), 1-26.
- Joshi, R. M., Dahlgren, M., & Boulware-Gooden, R. (2002). Teaching reading in an inner city school through a multisensory teaching approach. *Annals of Dyslexia*, 52(1), 229-242.
- Leach, J. M., Scarborough, H. S., & Rescorla, L. (2003). Late-emerging reading disabilities. *Journal of Educational Psychology*, 95(2), 211.
- Oakland, T., Black, J. L., Stanford, G., Nussbaum, N. L., & Balise, R. R. (1998). An Evaluation of the Dyslexia Training Program A Multisensory Method for Promoting Reading in Students with Reading Disabilities. *Journal of Learning Disabilities*, 31(2), 140-147.
- Olson, R., Wise, B., Conners, F., Rack, J., & Fulker, D. (1989). Specific deficits in component reading and language skills Genetic and environmental influences. *Journal of Learning Disabilities*, 22(6), 339-348.
- Ritchey, K. D., & Goeke, J. L. (2006). Orton-Gillingham and Orton-Gillingham—based reading instruction a review of the literature. *The Journal of Special Education*, 40(3), 171-183.

- Scheffel, D. L., Shaw, J. C., & Shaw, R. (2008). The efficacy of a supplementary multisensory reading program for first-grade students. *Journal of Reading Improvement, 45*(3), 139-152.
- Shaywitz, S. E., & Shaywitz, B. A. (2005). Dyslexia (specific reading disability). *Biological Psychiatry, 57*(11), 1301-1309.
- Spafford, C.A. & Grosser, G. S. (2005). *Dyslexia and reading difficulties: Research and resource guide for working with all struggling readers (2nd Edition)*, Boston: Pearson Education, Inc. 75 Arlington Street, Boston, MA 02116
- Stebbins, M. S., Stormont, M., Lembke, E. S., Wilson, D. J., & Clippard, D. (2012). Monitoring the effectiveness of the Wilson Reading Program for students with disabilities: One district's example. *Exceptionality, 20*(1), 58-70.
- Torgesen, J., Schirm, A., Castner, L., Vartivarian, S., Mansfield, W., Myers, D., & Haan, C. (2007). National Assessment of Title I. Final Report. Volume II: Closing the reading gap--Findings from a randomized trial of four reading interventions for striving readers. NCEE 2008-4013. *National Center for Education Evaluation and Regional Assistance*.
- Vickery, K. S., Reynolds, V. A., & Cochran, S. W. (1987). Multisensory teaching approach for reading, spelling, and handwriting: Orton-Gillingham based curriculum, in a public school setting. *Annals of Dyslexia, 37*(1), 189-200.
- Wilson, B. A., & O'Connor, J. R. (1995). Effectiveness of the Wilson Reading System used in public school training. *Clinical studies of multisensory structured language education, 247-254*.