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IMPACT OF THE ORTON-GILLINGHAM PROGRAM ON THE READING  
OF STUDENTS WHO ARE READING BELOW GRADE LEVEL

by  
Diana M. Sweeney

A Thesis

Submitted in partial fulfillment of the requirements of the  
Master of Arts Degree  
of  
The Graduate School  
at  
Rowan University  
April 29, 2009

Approved by \_  
Dr. Jay Kuder

Date Approved 4/29/09  
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## ABSTRACT

Diana M. Sweeney  
IMPACT OF THE ORTON-GILLINGHAM PROGRAM  
ON THE READING OF STUDENTS WHO  
ARE READING BELOW  
GRADE LEVEL  
2008/09  
Dr. Jay Kuder  
Masters of Arts in Learning Disabilities

This study investigated the effectiveness of the Orton-Gillingham supplemental tutoring program on third grade students. Participants were struggling readers who read at a slow rate. These students are in regular education, Basic Skills Improvement Program, or special education classes. Students received tutoring in groups which consisted of four to five students in each group and were homogeneous. The Dynamic Indicator for Early Basic Literature Skills assessments were used as a baseline in September, and posttest in January and February, to measure abilities in fluency, decoding, and story retell/comprehension. Results indicate that the Orton-Gillingham Program was effective at improving the fluency and decoding skills of the regular education students, Basic Skill Improvement Program students, and special education students. The results were inconclusive for the story retell/comprehension subtests. Students in the regular education, Basic Skills Improvement Program, and special education classes were able to read more words per minute and decode at a higher rate after the tutoring indicating that this program is effective for all three groups.

## TABLE OF CONTENTS

List of Figures	iv
<b>CHAPTER</b>	<b>PAGE</b>
I. Introduction	1
Statement of the Problem	2
Significance of the Study	3
Definitions	3
II. Literature Review	5
III. Methodology	18
Participants	18
Methods/Instrumentation	19
IV. Results	24
V. Summary, Conclusions, and Recommendations	37
Summary	37
Conclusions	38
Recommendations	40
References	43

## LIST OF FIGURES

FIGURE		PAGE
Figure 1	Comparison of Results For Fluency of Regular Education, Basic Skills, and Special Education Students	24
Figure 2	Comparison of Results For Decoding of Regular Education, Basic Skills, and Special Education Students	25
Figure 3	Comparison of Results For Story Retelling of Regular Education, Basic Skills, and Special Education Students	27
Figure 4	Individual Results of Fluency Scores of Regular Education Students	28
Figure 5	Individual Results of Fluency Scores of Basic Skill Students	29
Figure 6	Individual Results of Fluency Scores of Special Education Students	30
Figure 7	Individual Results of Decoding Scores of Regular Education Students	31
Figure 8	Individual Results of Decoding Scores of Basic Skill Students	32
Figure 9	Individual Results of Decoding Scores of Special Education Students	33
Figure 10	Individual Results of Story Retell Scores of Regular Education Students	34

FIGURE		PAGE
Figure 11	Individual Results of Story Retell Scores of Basic Skill Students	35
Figure 12	Individual Results of Story Retell Scores of Special Education Students	36

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## CHAPTER 1

### Introduction

As an educator, it is difficult to watch any child struggle with reading. School is a major part of their lives, and reading is a major component of school. Reading difficulties may have a lifelong impact on an individual. Reading problems may lead to academic difficulties, depression, low self esteem, behavioral problems while in school, and increased dropout rates which will have an impact on an individual's earning potential. Improving a child's reading skills could have positive outcomes that are life changing. Because this is such a significant aspect of a child's life, more research needs to be completed to determine which reading programs are beneficial, and for whom are they most beneficial.

One approach to improving the reading skills of struggling readers is the Orton-Gillingham reading program. Orton-Gillingham is a multisensory approach used to teach reading to dyslexic students that was developed by Samuel Orton and Anna Gillingham. I have been trained in the Orton-Gillingham approach and have found that it is a useful tool for teaching students with dyslexia and decoding issues.

The Orton-Gillingham instruction process begins with teaching letter-sound relationships, then progresses to syllables and continues with multi-syllable words. Instruction is to vary at the child's own pace. The students learn "hand signs" to help



them remember the short vowel sound. There are spelling rules also taught in this natural progression. These rules include the "Floss" rule (doubling the letters F, L, and S when they follow a short vowel) and the "Magic E" rule which shows the CVE pattern and how the "E" changes the vowel from short to long. All with a systematic scope and sequence that is in a natural progression of difficulty levels. The advanced levels of instruction include word origins and the study of Greek and Latin Roots.

Orton-Gillingham methods have been used as the foundation for many other multisensory reading programs. These programs are being used to teach small groups, or for whole class instruction.

For this research project, data will be collected to examine the effects of the supplemental Orton-Gillingham tutoring on students who are reading below grade level. The students will be from the general education classes, the Basic Skills Improvement Program class, and the special education classes. The students will be given a pretest and a posttest to measure reading fluency, decoding skills, and comprehension.

#### Statement of Problem

Research Question:

Does the Orton-Gillingham program significantly enhance the fluency rates, phonics skills, and comprehension of regular education, Special Education, and Basic Skills Improvement Program students who are reading below grade level?

Hypothesis:

The Orton-Gillingham program significantly enhances the fluency rates, phonics skills, and comprehension of regular education and Basic Skills Improvement Program

students who are reading below grade level, Special education students will also show improvement but not at the higher rates of the students in the regular education and Basic Skills Improvement groups.

#### Hypothesis:

The Orton-Gillingham program will have a greater effect on the decoding skills than on the fluency rates for all students.

#### Definitions:

Reading skills will be measured by assessing decoding skills, fluency, and ability to retell what was read in a passage as a comprehension indicator.

#### Significance of the Study

As an educator I would like to see all students reading on grade level. Reading is the foundation of a student's academic career and one of the major indicators of his/her ability to succeed in school. Reading difficulties are not limited to the reading class itself. The students reading below grade level are at a disadvantage throughout the school day. These students have difficulties following along with the text book in social studies classes, cannot read word problems in math class, and are unable to decode enough words to comprehend a story in reading class. These difficulties may lead to the student acting out due to frustration or to divert the attention from his/her disability.

With "No Child Left Behind" (NCLB) the stakes for schools are increased. Schools with a given percentage of students reading below grade level are identified publicly, and may be given monetary sanctions as a consequence.

Students who struggle with reading may also suffer from issues with self esteem and depression. Students with reading difficulties have higher suicide and dropout rates than that of their non-disabled peers (Daniel S., Walsh A., Goldston D., Arnold E., Reboussin B., Wood F. 2006). Students that do dropout have a more difficult time in the job market and are paid less than their peers with a high school diploma. This may lead to an array of social-economic problems such as higher rates of drug abuse, incarceration, and increased health issues due to lack of information and access to health care.

Our society is based on the written language. The written word is vital for communication in today's world. In everyday life we use words for many reasons including sharing information, entertaining, stating opinions, warning of danger, giving directions, and keeping records. An individual that has difficulty reading is at a disadvantage not only for his/her academic career, but throughout his/her entire life.

#### Summary

As educators, we are constantly searching for the perfect technique that will miraculously teach all students how to read at what is considered to be "grade level." Reading programs come and go, then return again. Veteran teachers tell about the "swinging pendulum" and how everything comes back around. The problem is that at any given time we have a group of students who have difficulties learning to read. If Orton-Gillingham works, then how should it be used in the classroom? If it works for some groups, but not others, then how can we identify those students who would benefit? How could the Orton-Gillingham program best be delivered to these students?

## CHAPTER 2

### Literature Review

Reading difficulties are quite common among today's schoolchildren accounting for approximately 80% of initial learning disability diagnosis (Lyon, 1996). The use of the term "dyslexia" to describe reading difficulties raises debates and is not universally accepted among professionals who prefer the term "reading disability" (Siegel, 1999; Torgesen and Wagner, 1998). Even experts in the field have slightly different definitions of dyslexia. Dyslexia, according to Berninger (2001), is characterized by uneven development between word reading and higher level processes within the functional reading system. Berninger states that reading difficulties occur due to phonological processing deficits, orthographic-phonological connections, or limitations of fluency. Padget, Knight, and Sawyer (1996), define dyslexia as a specific type of reading disability, distinguished by decoding and spelling difficulties. Comprehension difficulties may be present, but are considered to be as a result of the problems with decoding. Researching the etiology of dyslexia, Shaywitz (1998) provided compelling support for a physiological basis for dyslexia. Using a functional magnetic resonance imaging (fMRI), participants with and without dyslexia were given a reading task and the blood flow in the brain was monitored and studied. While reading, the brains of readers with dyslexia performed differently from those individuals without dyslexia.

Research indicates that phonological awareness skills and emergent print knowledge are the strongest early predictors of word reading development (Adams, 1990;

Scarborough, 1998). Phonological awareness skills facilitate the attainment of spelling-to-sound translation routines that form the basis of early decoding skills, and therefore are strongly associated with the development of early word reading skills. Phonological awareness has typically been assessed using a variety of tasks such as rhyming, blending of syllables, segmenting of syllables, segmenting of speech sounds, and manipulation of syllables and of speech sounds. When assessing phonological awareness tasks, it is important to make sure that the task used on a screening measure is age appropriate. Schatschneider, Francis, Foorman, Fletcher, and Mehta (1999) reported that blending tasks are more accurate predictors of phonological awareness skills in younger children, whereas deletion tasks are better determinants in older children.

The primary intervention for students with dyslexia focuses on phonemic awareness and phonics instruction. Phonemic awareness teaches students to notice, think about, and manipulate the sound of spoken language. Students focus on phonemes and identify and manipulate these sounds. Phonics instruction teaches children the relationship between the letters of written language and the individual sounds of spoken language. Although phonemic awareness and phonics instruction are foundations for many reading programs, using direct instruction with multi-sensory techniques to reinforce these skills, may be crucial for students with dyslexia.

One program that uses these multi-sensory intervention techniques for phonemic awareness and phonics instruction is the Orton-Gillingham program. The Orton-Gillingham program to improve the reading skills of dyslexic students is based on the theoretical work of Samuel Orton and developed by Anna Gillingham. It is a highly structured reading method that stresses a multi-sensory approach with repeated associations of individual phonemes with their sound, name, and systematic multi-sensory phonics instruction. The Orton-Gillingham approach

starts with individual sounds, then uses these sounds to build words. While the students are building words, they are also directly instructed on the close association or link between what the student sees in print (visual), what the student hears (auditory), and what the student feels as he or she makes the sounds of letters and writes (kinesthetic-large muscles movements, and tactile-sensations in the mouth and on the fingertips). This multi-sensory approach is referred to as the “language triangle.”

A brief overview of the careers of Samuel Orton and Anna Gillingham gives insight to how their program was developed. Samuel Orton was a pathologist, neuropathologist, neurologist, and psychiatrist. In 1917, Orton read Hinshelwood's manuscript on "Congenital Word Blindness" and was intrigued by the discussion of reading problems in bright children. His interest in this paper was a first step towards his work with children having what Orton later called "strephosymbolia" (Henry, 1998). Orton spent many years researching this phenomenon. He was fascinated with the differences between the discrepancy between listening comprehension and reading comprehension, and with the consistent error patterns found in the decoding of words (Henry, 1998). Orton concluded that this was not a perceptual problem but rather a problem of language. He used the phrase "specific reading disability" in 1928 to describe this phenomenon. He noted that 50 percent of his patients not only had reading difficulties, but also had related language disorders including problems with receptive and expressive language, passage comprehension, spelling, and composition (Henry, 1998). Orton was also credited with observing the high rate of related disorders in the families of his patients such as the frequent clumsiness associated with dyslexia, and the accompanying poor spelling (Henry, 1998). One pattern that Samuel Orton noted was the frequency in which children with dyslexia showed deficiencies and delays in the acquisition of spoken language. This is

noteworthy, given today's emphasis on early speech, early identification/remediation, and phonological awareness (Henry, 1998). Waiting to identify students who will experience difficulties in reading and language arts is a costly mistake that contributes to ongoing reading problems. Without early intervention, children who experience reading problems in the first and second grades most likely will continue to have these reading problems over time (Speece , Mills, Ritchey, and Hillman, 2003).

In 1925, as early as six years before Samuel Orton began his work with Anna Gillingham, Orton suggested that the child with dyslexia needed an extremely thorough repetitive drill on the basics of phonic associations both visually and in writing, until correct associations were in place and reversals were corrected.

In 1931 Samuel Orton and Anna Gillingham began their professional collaboration. Dr. Orton designed the Language Research Project funded by the Rockefeller Foundation and became acquainted with Anna Gillingham. Anna Gillingham was a psychologist at New York's Ethical Cultural School and had read Orton's theories of cerebral dominance and strephosymbolia, and of his interest in both diagnosis and instruction. Orton requested that Gillingham set up instruction that would conform to his neurological hypotheses. He requested that it was carefully structured but adaptable to individual needs (Henry, 1998).

Gillingham and her colleague, Bessie Stillman insisted that children with specific reading difficulties could not read by a sight word method. Instead they believed that the constant use of associations in how a letter or word looks, sounds, and what it feels like when being written or spoken. In their manuals, Gillingham and Stillman direct the teacher to assist the children

linking numerous visual, auditory, and kinesthetic-tactile senses portrayed by their "language triangle" (Henry, 1998).

The Orton-Gillingham process begins with letters, progresses to syllables and continues with multi-syllable words. Instruction is to vary at the child's own pace. The students learn "hand signs" to help them remember the short vowel sound. There are spelling rules also taught in this natural progression. These rules include the "Floss" rule (doubling the letters F, L, and S when they follow a short vowel) and the "Magic E" rule which shows the CVE pattern and how the "E" changes the vowel from short to long. All with a systematic scope and sequence that is in a natural progression of difficulty levels. The advanced levels of instruction include word origins and the study of Greek and Latin Roots.

The Orton-Gillingham methods have been used as the foundation for other multisensory reading programs. These programs are being used to teach small groups, or for whole class instruction. Some of these programs include: Project Read (Enfield & Greene, 1997), The Wilson Reading System (Wilson, 1996), Alphabetic Phonics (Cox 1992), The Slingerland Approach (Slingerland and Aho, 1994-1996), and The Spalding Method (Spalding & Spalding, 1990 ) to name a few.

A number of parents of learning disabled students have also taken interest in the Orton-Gillingham method of teaching reading. Many different techniques are used to teach students with learning disabilities. Orton-Gillingham is one technique that is requested and in some cases demanded from school districts by parents. It is one of the three most popular techniques requested in litigation against public schools (Katsiyannis & Maag, 2001). Most cases typically address requests for reimbursement for expenses associated with services by private providers.



Parents are likely to receive such reimbursement if the district's program is determined not to provide a student with an appropriate education whereas the private services do. Courts tend to examine each case to determine whether an IEP is appropriate for a student that needs a certain type of methodology, whether a student has benefited academically from the method used by the school, and whether the student received an appropriate education (Katsiyannis & Maag 2001). Tessie Rose and Perry Zirkel researched court cases in the past 30 years in which Orton-Gillingham methods of programs derived from the Orton-Gillingham approach were named as a preferred method of reading instruction. Parents are requesting specific programs whereas many districts are offering instruction that incorporates these techniques but do not necessarily offer the specific program being requested. These cases have been increasing, with 77% of these cases occurring within the last ten years (Rose & Zirkel, 2007). In these cases, districts won an overwhelming majority of the cases (75%). With the 2004 reauthorization of IDEA parents may benefit in Orton-Gillingham methodology disputes because of the additional terms of “peer-review research” and “scientifically based research” although at this time it is uncertain whether or not it will have an effect.

Ritchey and Goeke (2006) reviewed the effectiveness of Orton-Gillingham based reading instruction programs. They identified twelve studies that included elementary students, adolescents, and college students. The outcome of this review showed mixed results. Of the twelve studies, five concluded the Orton-Gillingham Method was more effective than the control interventions for all measured outcome, four studies reported that the Orton-Gillingham instruction showed gains in at least one (but not all) measured outcomes when compared to other interventions, two stated that the Orton-Gillingham instruction was less effective than alternate

instruction, and one, Westrich-Bond (1993), reported no differences. These studies were further reviewed and the results are as follows:

Westrich-Bond (1993) conducted an elementary school-based study. This was a quasi-experimental design to examine the effects of Orton-Gillingham instruction compared to basal reading instruction using the Ginn basal series. The students were identified as having learning disabilities and received instruction in the resource center or self-contained special education classrooms. The study compared a total of four conditions (resource room with Orton-Gillingham reading, resource room with basal reading, self-contained with Orton-Gillingham reading, and self-contained with basal reading). Outcomes were measured by the Woodcock Reading Mastery Test (Woodcock, 1989) Word Identification and Word Attack subtests. There were significant gains scored from pretest to posttest scores but no significant differences were measured for type of reading instruction.

Stoner (1991) conducted a study on school-based interventions. Project Read (Enfield & Green, 1997) was compared to a traditional basal reading program for first, second, and third-graders who were considered at risk for reading problems. Project Read work begun in the Bloomington Public Schools by two outstanding educators, Mary Lee Enfield and Tori Green. Enfield's 1976 doctoral dissertation on Project Read, "An Alternate Classroom Approach to Meeting Specific Learning Needs of Children with Reading Problems," showed that children with specific language disabilities reach or exceed grade level in language arts in the regular classroom, when taught by general education teachers trained in her adaptation of the Orton-Gillingham approach (Enfield 1988). Instruction is multi-sensory and follows the phonetic patterns of Orton-Gillingham. Instruction was implemented in the general education classroom, and the progress of students was compared to students who had received traditional basal reading

instruction the previous year. The outcomes were measured by the Stanford Achievement Test (SAT), subtests included: Word Study, Word Reading, Comprehension, and Total Reading Scores. For first-grade students the Project Read group outperformed the traditional basal instruction on all subtests. The significant differences on these subtests included, Word Study ( $d=1.15$ ), Word Reading ( $d=1.06$ ), Comprehension, ( $d= .93$ ), and Total Reading Scores ( $d=1.15$ ). For the second and third grade students, there were no significant differences on any of the outcomes measured.

Foorman, Francis, Beeler, Winikates, and Fletcher, (1997) conducted a study with 113 second and third graders identified with reading disabilities. This study compared the effects of Cox's (1992) Alphabet Phonics (a synthetic phonics instructional program) with a sight word program (Edmark Reading Program, 1984) and an analytical phonics program ( a modification of the Recipe for Reading; Traub, & Bloom, 1992) that taught word identification at the onset-rime. Students received one of these three reading programs for 60 minutes per day and were assessed four times during the intervention. Outcomes measured were phonological processes, orthographic processing, and word reading. When controlling for age, Alphabet Phonics instruction significantly outperformed analytical phonics instruction in all areas assessed. Alphabet Phonics instruction was superior to sight word reading but not or orthographic processing. When other covariates were controlled for, there were no significant differences between the three instructional conditions, ethnicity being a significant correlate.

Hook, Marcaruso, and Jones (2001) conducted a elementary-school-age study in a summer program to compare the efficacy of Fast ForWord (a computer-based instructional program designed to improve auditory processing skills) to Orton-Gillingham instruction. The two groups were matched by age, IQ, phonemic awareness ability, and reading level. Pretest and

posttests assessments included phonemic awareness, word identification, and word attack. At the end of the summer program both groups made significant growth in phonemic awareness. The Orton-Gillingham group made significant growth in Word Attack, whereas the Fast ForWord group did not. There was no significant growth in Word Identification from either group.

The Dyslexic Training Program (DPT), a remedial reading program derived for Orton-Gillingham methods and the Alphabet Phonics curriculum, emphasizes the alphabetic system. Drill and repetition are used to compensate for short term verbal memory deficits, and multisensory methods are used to promote non-language mental representations (Oakland et al. 1998). The DPT core curriculum provides a cumulative series of 350 one-hour lessons starting with very basic abilities and extends sequentially to sophisticated levels including syllabifying and coding polysyllabic words. This system can be taught one on one or in a small group. It can also be taught with a teacher or by video.

Oakland, Black, Stanford, Nessbaum, and Balise, (1998) conducted a study of the Dyslexic Training Program with forty-eight students with dyslexia. Students in the experimental group received the DPT as their primary form of reading instruction and their only code-emphasis method. These students received instruction from either a teacher-directed method or through video. The control group received reading instruction as normally provided in their schools. The study was conducted over two years. Outcomes were measured by the Gates-MacGinitie Reading Test, Decoding Skills Test- Monosyllabic and Polysyllabic Words, and the Wide Range Achievement Test for Reading and Spelling. The Dyslexic Training Program was found to be effective in promoting the reading development of students with dyslexia (Oakland et al. 1998). Students receiving DPT significantly outperformed the students on the control

group on measures of comprehension ( $d=.65$ ), word reading ( $d=.73$ ), spelling ( $d=.24$ ) and decoding polysyllabic words ( $d=.80$ ) and monosyllabic words ( $d=.45$ ). Moreover, students made comparable progress when the DPT was presented either on videotape or through live teaching (Oakland et al. 1998). The results however were not as significant when compared to the control group with just one year of instruction. There was also no significant difference in the spelling scores either group (Oakland et al. 1998).

Joshi, Dahlgren, Boulware-Gooden, (2002) studied the use of Language Basics: Elementary Curriculum based on Alphabet Phonics, Cox (1992), an Orton-Gillingham based program. The study was conducted on first grade students from an inner-city school in a southwestern city. Both the control group and the experimental group received 50 minutes of daily instruction on literacy activities. The control group received the district-approved Houghton-Mifflin Basal Reading Program, and the daily lessons were taught strictly according to the scope and sequence of the instruction manual. The experimental group received multisensory reading instruction from teachers that received 42 hours of training in the multisensory techniques. They were certified as Academic Language Therapists because they completed a structured, sequential, Orton-Gillingham based curriculum. When the gain scores of the two groups were compared by using repeated measures multivariate analysis of variance, it was found the gain scores of the treatment groups were significantly higher than that of the control groups (Joshi et al. 2002). The results of this study showed that first-grade children taught with the multisensory teaching approach based on the Orton-Gillingham principles performed better on tests of phonological awareness, decoding, and reading comprehension than the control groups (Joshi et al. 2002).

After reviewing the twelve studies on the effectiveness of the Orton-Gillingham program, Ritchey and Goeke (2006), found evidence that supported, as well as evidence that fails to support the effectiveness of Orton-Gillingham instruction. When averaged, the greatest positive effects in these studies were documented for word attack or non-word reading, this was seen in seven studies. The other results were varied by the individual study. Positive results were found for word reading(Guyer & Sabatino, 1989; Hook, Macaruso, & Jones 2001; Litcher & Roberge, 1979; Stoner, 1991), word/attack/decoding(Hook et al., 2001; Joshi, Dahlgren, Boulware-Gooden, 2002; Litcher & Roberge, 1979; Stoner 1991), spelling (Guyer, Banks, & Guyer 1993; Oakland, Black, Stanford, Nussbaum, & Balise 1998), and comprehension (Joshi et al., 2002; Litcher & Roberge, 1979; Oakland, Black, Stanford, Nessbaum, and Balise, 1998; Stoner, 1991). Positive results were reported for beginning readers in first grade general education populations, elementary children at risk or identified with reading disabilities in public schools, and elementary-age children in clinical settings. There were two studies of college students with learning disabilities that also reported positive effects (Guyer et al., 1993, Guyer & Sabatino, 1989). There were also studies in which the findings were not positive in favor of the Orton-Gillingham instruction. One study (Chandler et al., 1993), reported that alternative instructional programs were more effective than Orton-Gillingham instruction. Non-significant results were reported by Westrich-Bond (1993) for all participants, and for participants in second and third grade by Stoner (1991). There were no significant gains reported for specific outcomes by Oakland et al. (1998) and by Hook et al. (2001). Only two studies reported the effects of vocabulary and only one reported results for fluency. This was noted because of the current emphasis on fluency as one of the major components of reading.

The Ritchey and Goeke (2006) review was limited because of the small number of extant studies that employed experimental or quasi-experimental designs. Methodological issues were present in many of the reviewed studies that complicated the conclusions. This study highlighted the need for rigorous scientifically based research of Orton-Gillingham. The limitations for this review were many. Several studies were considered but rejected because they were described as a pilot study, had only pretest and post test data, or included only a small number of participants (Ritchey & Goeke 2006). Of the 12 studies that were reviewed limitations were noted for several reasons including: several studies were published in the 1970's and 1980's when technology for statistical analysis was not readily available and there were less stringent standards for educational research, small sample sizes, (total samples  $n < 50$ ), and quasi-experimental designs in which groups or classrooms of students (instead of individuals) were exposed to experimental conditions (Ritchey & Goeke 2006). These older studies also lacked components that are considered essential in any high-quality research report today (Gersten, Fuchs, Compton, Coyne, Greenwood, Innocenti 2005).

The conclusion of this review reveals that the research in this area is currently insufficient in both the amount of studies and the quality of the research conducted. The results at this point are mixed and there are several limitations to this study. Instead of having irrefutable evidence proving or disproving the effectiveness of the Orton-Gillingham instruction, there are still questions remaining.

1. For which children the Orton-Gillingham instruction is most effective?
2. Which components of reading does Orton-Gillingham best address?
3. Does the frequency and duration of Orton-Gillingham intervention effect growth?

Other studies on the Orton-Gillingham have been completed. Unfortunately, as was stated on the literature review, many studies are limited and not current. Many of these studies have been completed on programs that have been derived from the Orton-Gillingham program.

Although Orton-Gillingham instruction is one method that has been requested by many parents, current research has found mixed results. The question of the effectiveness of supplemental Orton-Gillingham instruction on regular education students, students receiving Basic Skills instruction, and classified students will be explored to not only identify the effectiveness of the program, but to identify which students this program will benefit.



## CHAPTER 3

### Methodology

#### I. Participants

There were a total of 50 students in this study. Participants in this program consisted of 8 students from the Regular Education class, 20 students who are enrolled in the Basic Skills Improvement Program, and 22 students who are classified and receive special education services. The subjects were third grade students who read less than 50 words per minute on the Dynamic Indicator for Basic Early Literature Skills (DIBELS) assessment. The group consists of eight and nine year old students. When the program began four students had recently reached nine years of age, the remaining 46 students were eight years old at the time of implementation. The students are third graders in a predominantly lower to middle-class rural school district. The school has a total of 492 students in third and fourth grade. The district is located inland surrounded by several resort areas. Many of the families of these students are employed in the seasonal tourist industry. A total of 54.4% of the students receive free or reduced lunches. Of the 50 students in this program, 36 students are Caucasian, 6 students are African American, 7 are Hispanic, and 1 child is Asian. The study consisted of 23 males and 27 females.

The program was offered to the parents of a total of 60 students. The parents of four students declined the offer. Three of the students began the program then transferred out of district. Three other students began the program but withdrew before the study was completed.

## II. Setting

### Classrooms

The school district uses a balanced literacy approach to teaching reading with Guided Reading and Core Literature Instruction. The average classroom has 21 students. The students are periodically assessed for fluency using the DIBELS assessment. When a student does not make benchmark for fluency, a phonic screener is used to assess the need for additional phonetic instruction.

### Tutoring Groups

Students are placed in tutoring groups of four to five students. The groups are homogeneous, with regular education, Basic Skills Improvement Program, and special education students combined. The tutoring programs were offered before or after school and transportation was provided. Parents were given the opportunity to enroll the students in the supplemental tutoring program at no cost to the students.

## III. Method

Materials and Instruments: The Dynamic Indicator for Basic Early Literature Skills (DIBELS) assessment was used to evaluate the reading fluency, decoding, and comprehension skills of the students in the study. This is an assessment designed to quickly assess a student's ability to read fluently. The assessment is completed one-on-one. If a student is not reading fluently, further assessments and screenings are used to determine the causes of difficulties.

The DIBELS Reading Fluency assessment requires students to read 3 different passages for one minute. All words read correctly were counted to assess how many words per minute a student read. The median score is recorded.

The DIBELS “Quick Phonic Screener” (QPS) was used to measure decoding skills. The QPS contains actual words and pseudowords which contain short vowels, consonant diagraphs, consonant blends, long vowel/silent e patterns, r- control vowels, vowel teams, multi-syllable words, and prefix and suffixes.

The DIBELS test contains a story retell component. After a student reads a passage for fluency, he/she is asked to retell the story in his or her own words. The number of words that were in the story then used in the retell are counted. That number is divided by the total number of words read correctly and a percentage is assigned. The number of words a child produces on the story retell is intended to provide a comprehension check on the passage read. According to the DIBELS manual, a score of at least 25% of words in a retell is needed to meet the benchmark standard.

Procedure: In late September, all third grade students were evaluated for fluency using the Dynamic Indicators for Basic Early Literature Skills (DIBELS) assessment. Students reading 50 words per minute or less were eligible to participate in the supplemental Orton-Gillingham tutoring program. The parents of these students were offered free tutoring using the Orton-Gillingham Program. Participants were grouped according to their fluency level, and were placed into groups of four to five students. Students were tutored using the Orton-Gillingham Lesson Plan twice a week for approximately 40 minutes each session. The students were transported to school before school began for tutoring sessions, or stayed after

school had dismissed. This is an established program offered by the district. The students began the tutoring program in October, approximately one month after the school year began.

The student's September score was used as a baseline to measure reading fluency. The students were given a different passage to read in February and those results were recorded. The number of words read per minute from September and February were compared to measure growth in reading fluency.

Decoding skills were measured by the DIBELS "Quick Phonics Screener." The students were asked to read pseudowords in isolation. The pseudowords contained short vowels, consonant digraphs, consonant blends, and long vowel/silent e patterns. The percent of pseudowords read correctly were used as a baseline score. The students were given a posttest with these pseudowords in February and the scores were compared to measure growth in decoding abilities.

The September score on the story retell was used as a baseline for this study. In January a posttest was given on a different passage and the percent of words from the story that were used in the retell were compared to measure growth.

Tutors were teachers trained in The Orton-Gillingham Methods. The teachers met before the program began, and reviewed the "Orton-Gillingham Lesson Plan" to be followed. The teachers were given an Orton-Gillingham based lesson plan along with a sequential list of phonograms to be introduced.

Periodic evaluations using the DIBELS assessment were made to measure growth. Tutors met midway through the year to determine if adjustments were necessary.

The study evaluated the effects of The Orton-Gillingham Tutoring Program on reading skills of students in the regular education, Basic Skills Improvement Program, and special education classes.

### Orton-Gillingham Lesson Plan

Each lesson begins with a review of a phoneme previously taught then instruction begins for new skill.

1. Sound Drill
  - Review flashcards with letter or letters previously taught. Students say each sound aloud in unison.
2. Sound Dictation:
  - Using the above cards, dictate the sounds. Students echo each sound while simultaneously writing it in their notebook. Check student's work after each sound.
3. Introduce New Skill: \_\_\_\_\_ Card Pack Skill \_\_\_\_\_
  - Using carpet squares, students name the letter while simultaneously writing on the carpet and then say the sound.
  - Using real and nonsense word cards from box set, students read quickly, in round robin fashion. If not automatic, student finger pops the word.
4. Spelling Dictation of New Skill:
  - Dictate five real words from the above card pack. For each word, students say the word, finger pop the word, and write the word in their notebooks. Tutor checks after each word.
5. Fluency:
  - Reading Down The Lane-Using the word list corresponding with the target skill, students read quickly, in round robin fashion, say the words in each column. Each student points to the words as they are read.

## CHAPTER 4

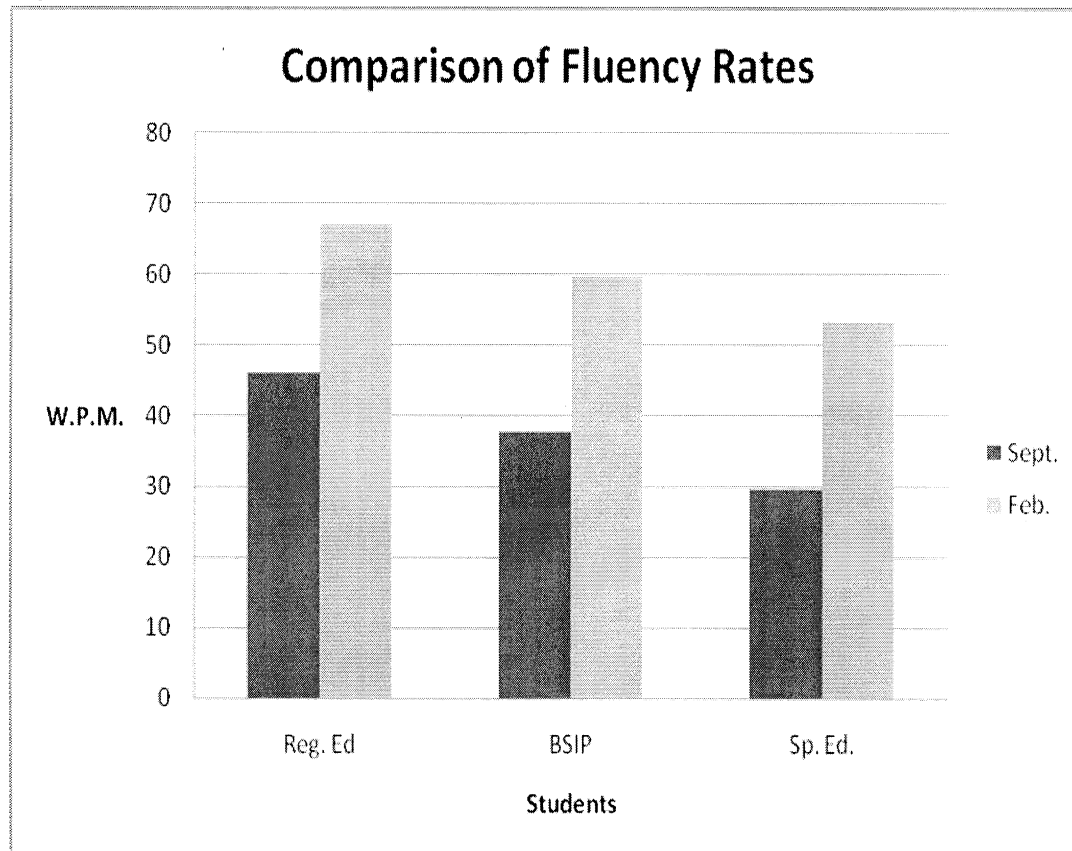
### Results

The Dynamic Indicator for Basic Early Literature Skills (DIBELS) assessment was used to evaluate the reading fluency, decoding, and comprehension skills of the students in the study. Fifty students reading below 50 words per minute on the DIBELS assessment received supplemental tutoring using the Orton-Gillingham Program. These students were in the regular education, Basic Skills Improvement Program, or special education classes. A baseline measurement for fluency, decoding and story retell (comprehension of text) was completed in September. The students received supplemental tutoring, in heterogeneous groups of four to five, using the Orton-Gillingham Program for 40 minutes a day, twice a week. A posttest for story retell was given in January, while posttests for decoding and fluency were given in February. A comparison was made to measure the gains for each group.

Fluency was examined by counting how many words per minute a child read correctly on a third grade passage. A baseline was taken in September, Orton-Gillingham instruction began in October, and a posttest evaluation was taken in February. All groups made gains in reading fluency from September to February. The students from all three groups made comparable gains in fluency. The mean increase in scores for fluency in regular education, Basic Skills Improvement Program, and special education were 21 words per minute, 21.9 words per minute, and 24 words per minute respectively (see figure 1). The regular education students had the highest pretest and posttest scores of 46.25 and 67.25

words per minute respectively. The Basic Skills Improvement Program students had the next highest pretest and posttest scores of 37.8 and 59.7 words per minute respectively, while the special education students had the lowest pretest and posttest scores of 29.5 and 53.5 words per minute respectively. Although the groups differ in posttest scores, the overall increase is consistent in this subtest.

Figure 1

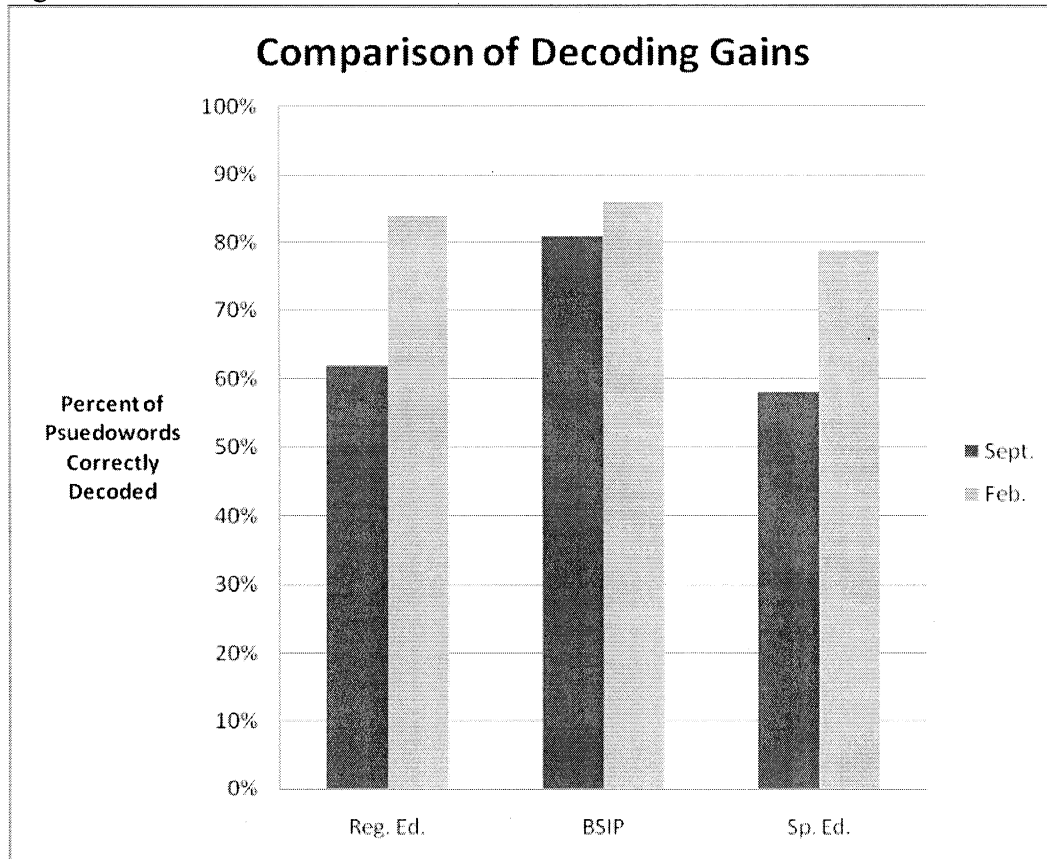


Decoding skills were measured by having students read psuedowords containing CVC patterns, consonant diagraphs, consonant blends, and long vowel CVCe patterns. The percentage of words read correctly was given as a baseline in September. These psuedowords were given again as a posttest on February and the results were compared. All three groups exhibited growth in decoding, yet there was some variation with this component

of the reading assessment. Special education and regular education students demonstrated a growth in decoding skills of 22% and 21.25% respectively, while students in the Basic Skills Improvement Program had an increase of 9% (see figure 2). Although there is a variation in the percent of gains, the actual posttest mean scores of the regular education, Basic Skills Improvement Program, and special education were similar at 84%, 86%, and 79% respectively.

A closer examination of the data indicated that the Basic Skills Improvement Program group, which demonstrated the least amount of improvement, actually had initial scores that were approximately 19% higher than the regular education students and 23% higher than the students receiving special education instruction. The overall actual posttest scores were comparable.

Figure 2



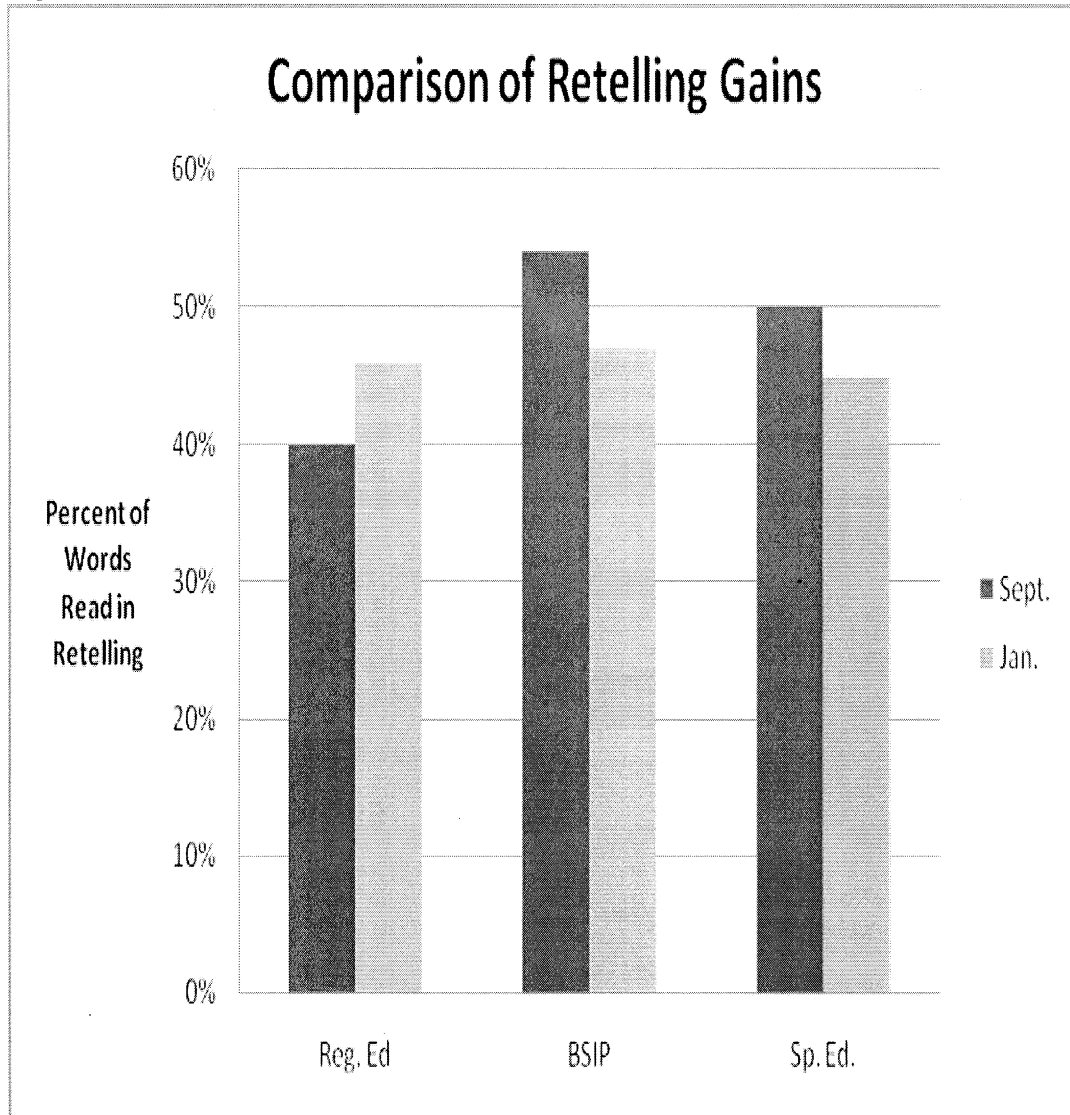


The Story Retell was used to measure comprehension of a passage. Students read a third grade passage then retold the story in his/her own words. The students retell the story and the examiner counts how many words from the original passage are used in the retelling of the story. The number of words in the retell is divided by the number of words read to assign a percentage score. In January, another assessment was completed with different passages and the scores were compared.

The Story Retell Subtest had results that indicate a reduction in the percent of words from the story used in the retelling of the story for the Basic Skills Improvement Program and special education students. The regular education students had a slight increase in the percent of words used in the retelling.

The Basic Skills Improvement Program group had a decrease of 7% of words used in a story retell while the special education group had a decrease of 3%. The regular education students had an increase of 5% more words read in the passage used in the retell (see figure 3). The mean posttest scores for all three groups were similar with 46% for regular education, 47% for Basic Skills Improvement Program, and 45% for special education. This subtest was further examined to determine if it was a valid indicator of comprehension.

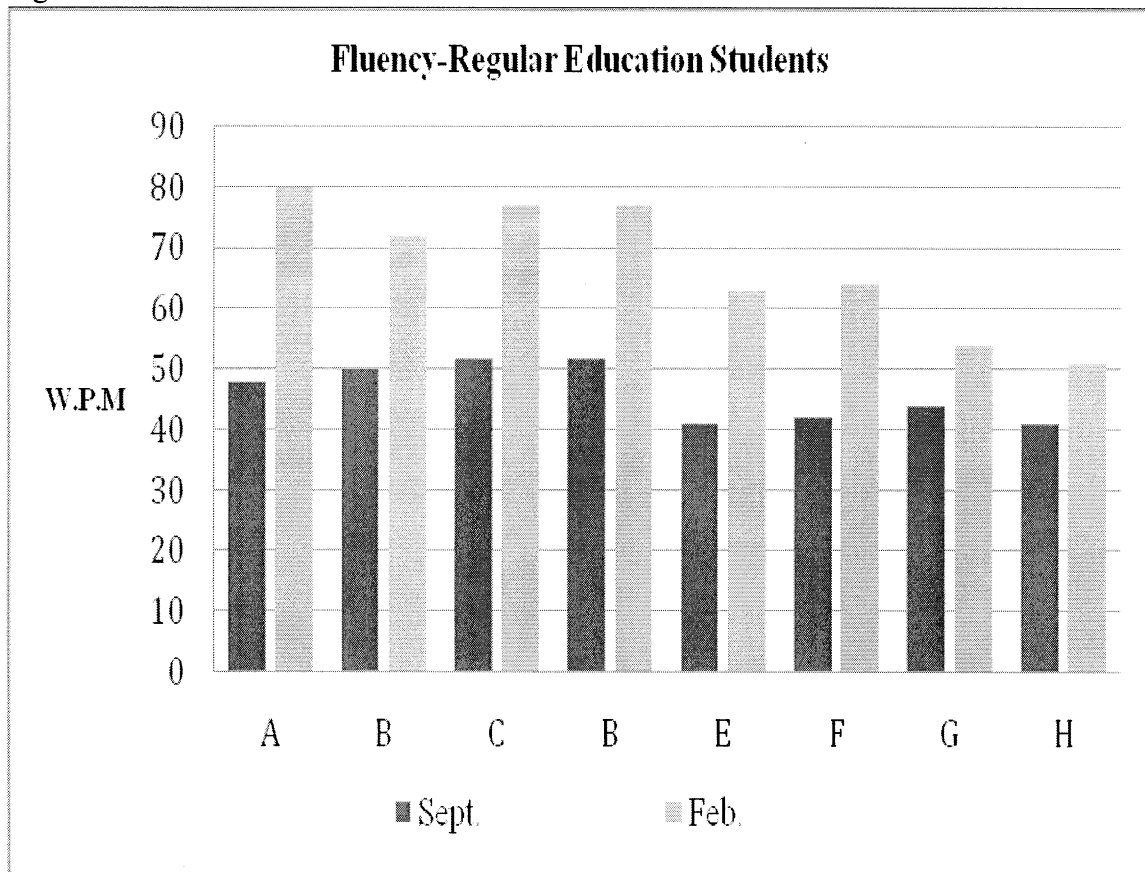
Figure 3



Data was further examined to assess the pretest and posttest scores of individuals in regular education, Basic Skills Improvement Program, and special education classes.

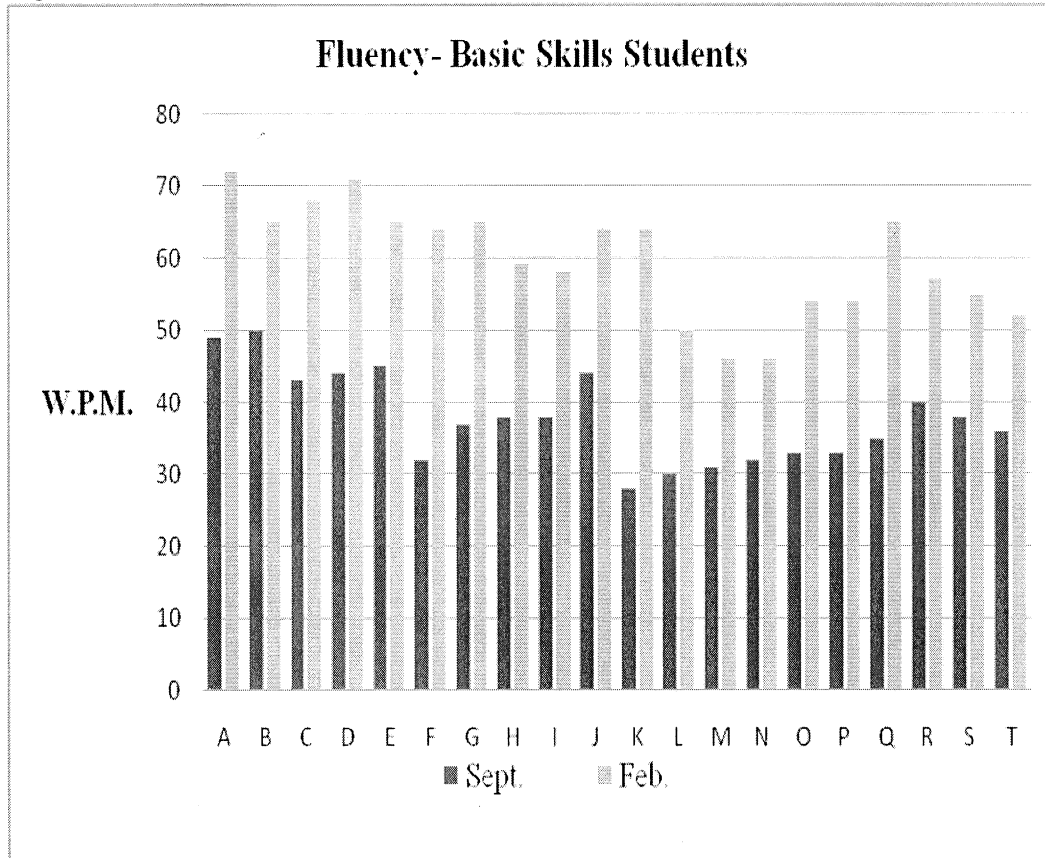
An examination of the regular education group revealed a mean average gain of 21 words per minute. These students had a range of 41-52 words per minute read, with a mean score of 46.25 (SD 4.8) on the initial test and a range of 51-80 words per minute with a mean score of 67.25 words per minute (SD 10.9) on the posttest (see figure 4).

Figure 4



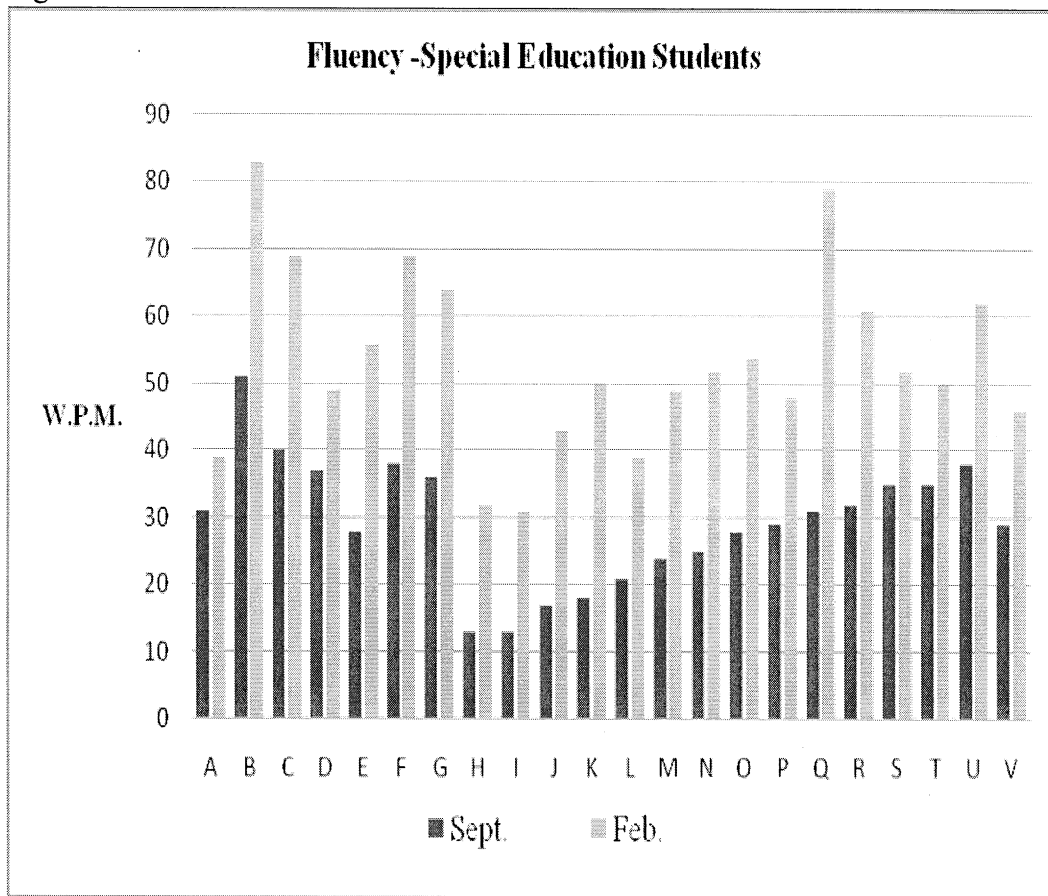
The students in the Basic Skills Improvement Program began the study with a fluency range of 28-50 words per minute and a mean of 37.8 words per minute (SD 6.33), and had a posttest range of 46-72 words per minute, and a mean average score of 59.7 words per minute (SD 7.75). This group had a mean average increase of 21.9 words per minute (see figure 5).

Figure 5



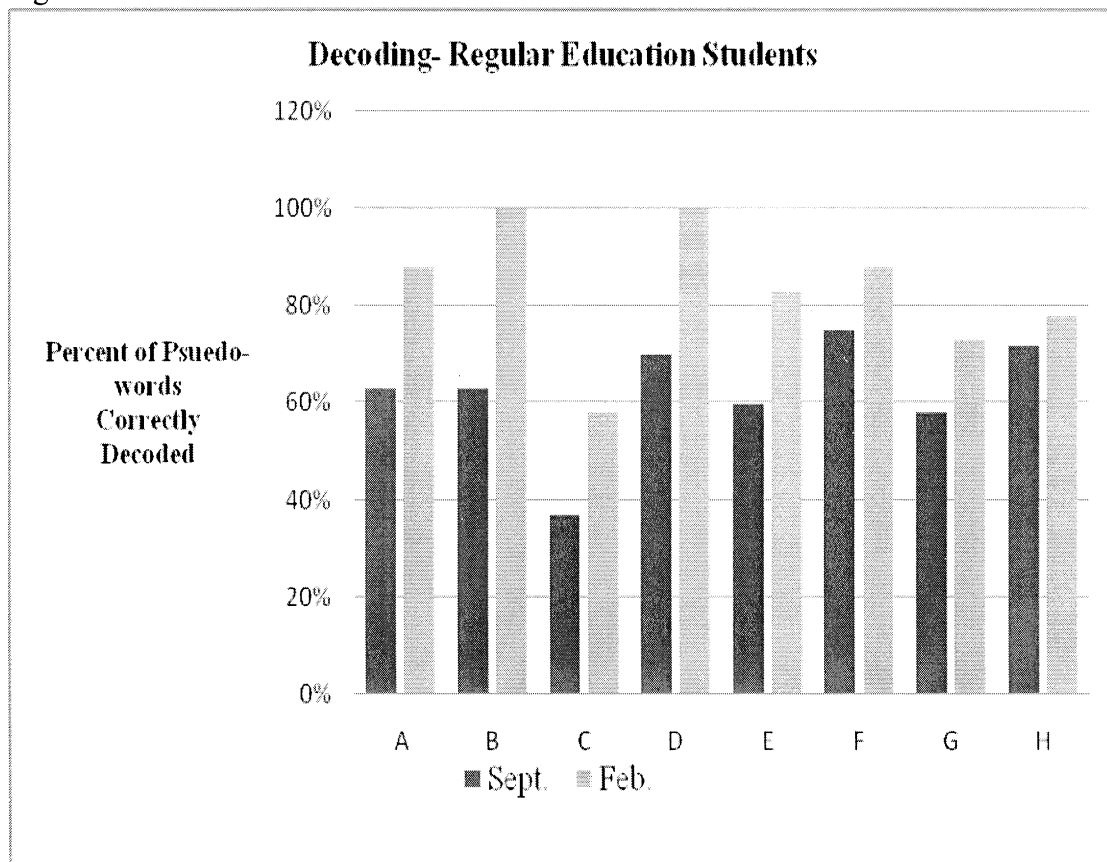
The special education group exhibited the most growth with 24 words per minute, but overall still read fewer words than the regular and Basic Skills Improvement Program groups. The fluency scores for the baseline for students in special education ranged from 13-51 words per minute with an average of 29.5 (SD 9.37). The range for the posttest was 31-83 with an average of 53.5 words per minute (SD 13.6) (see figure 6).

Figure 6



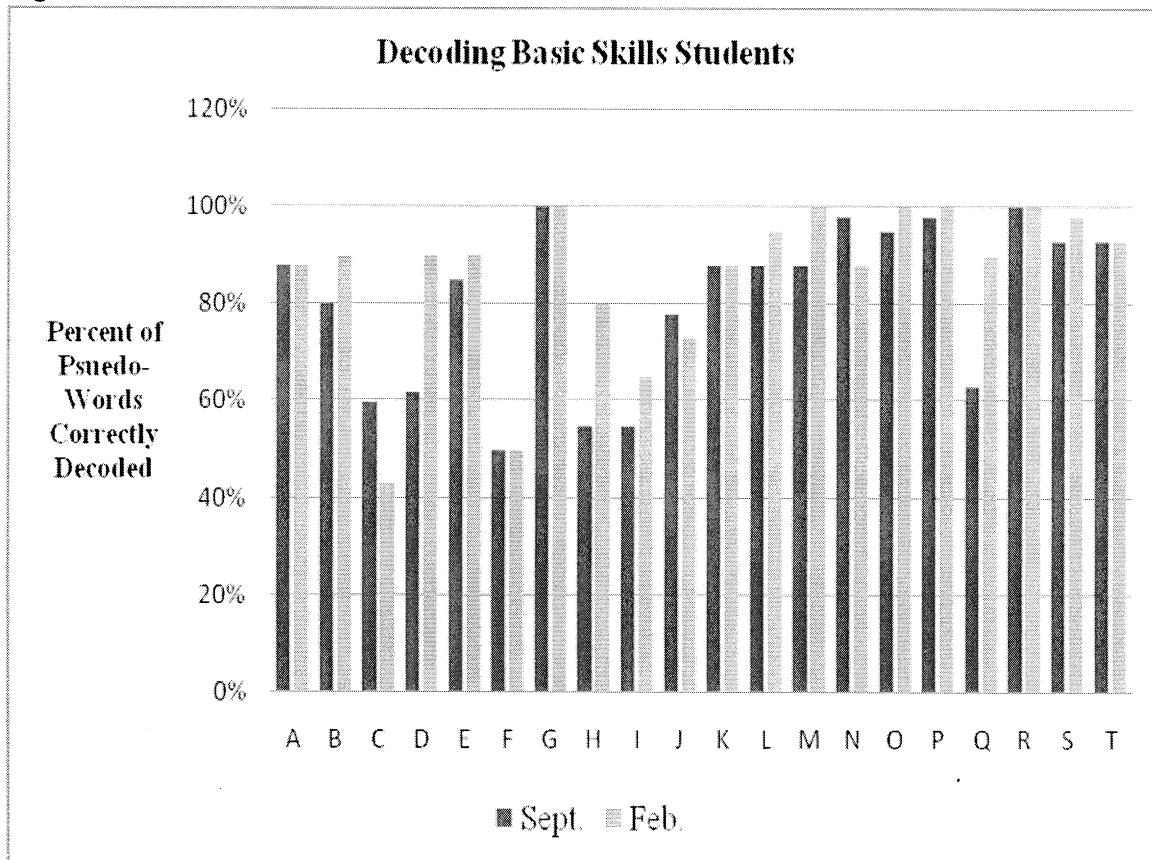
Data on fluency scores for the students in the regular education program was examined. The overall mean increase was 22% more psuedowords decoded on the posttest than on the pretest. The regular education students had a pretest mean score of 62% with a range of 37%-75% correct (SD 12%). The posttest score for this group was 84% with a range of 58%-100% (SD 14%) (see figure 7).

Figure 7



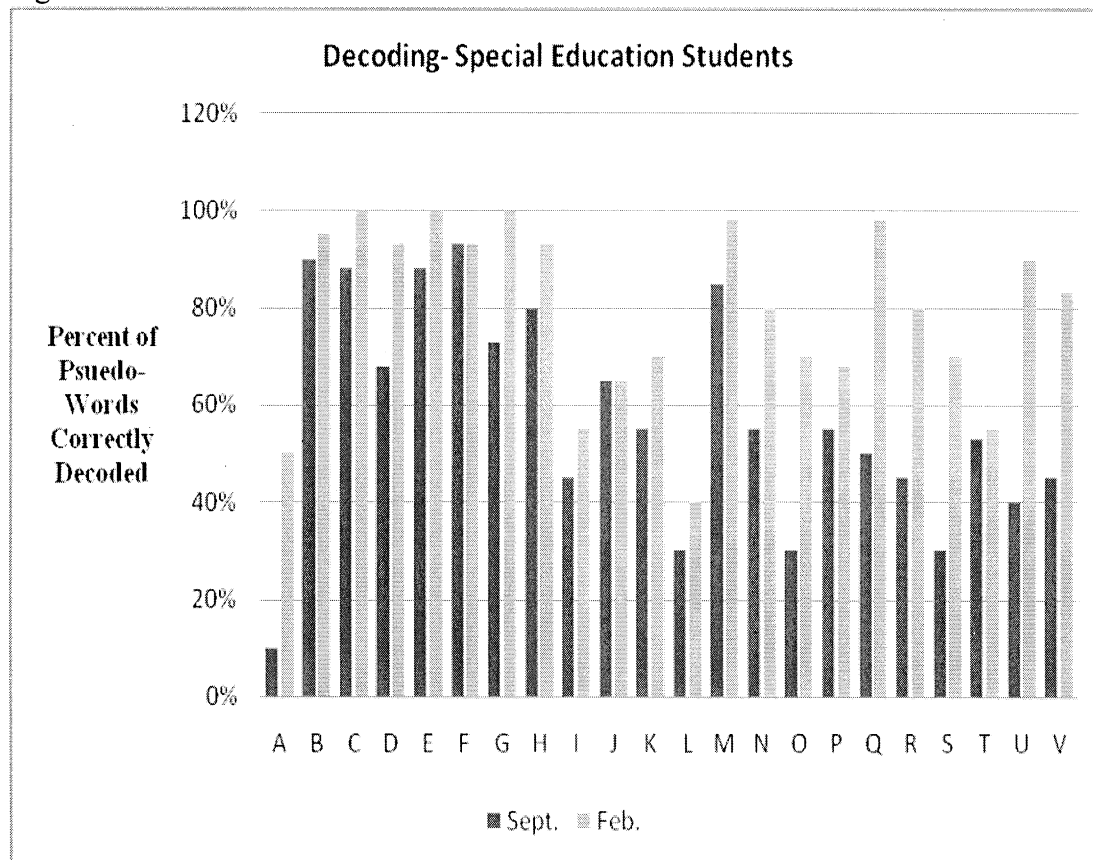
Data from the decoding assessment indicates students in the Basic Skills Improvement Program had a mean score increase of 9% more psuedowords read correctly on the posttest. This group had an initial mean score of 81% with a range of 50%-100% (SD 17%) and posttest scores of 86% for the mean average with a range of 43%-100% (SD 16%)(see figure 8).

Figure 8



The students receiving special education services had the largest percent increase in words decoded with a mean increase of 22%. In September, this group had a pretest mean score of 58% percent of psuedowords read correctly, with a range of 10%-90% (SD 23%) and posttest scores that had a mean of 79% with a range of 40%-100% (SD 18%) in February (see figure 9).

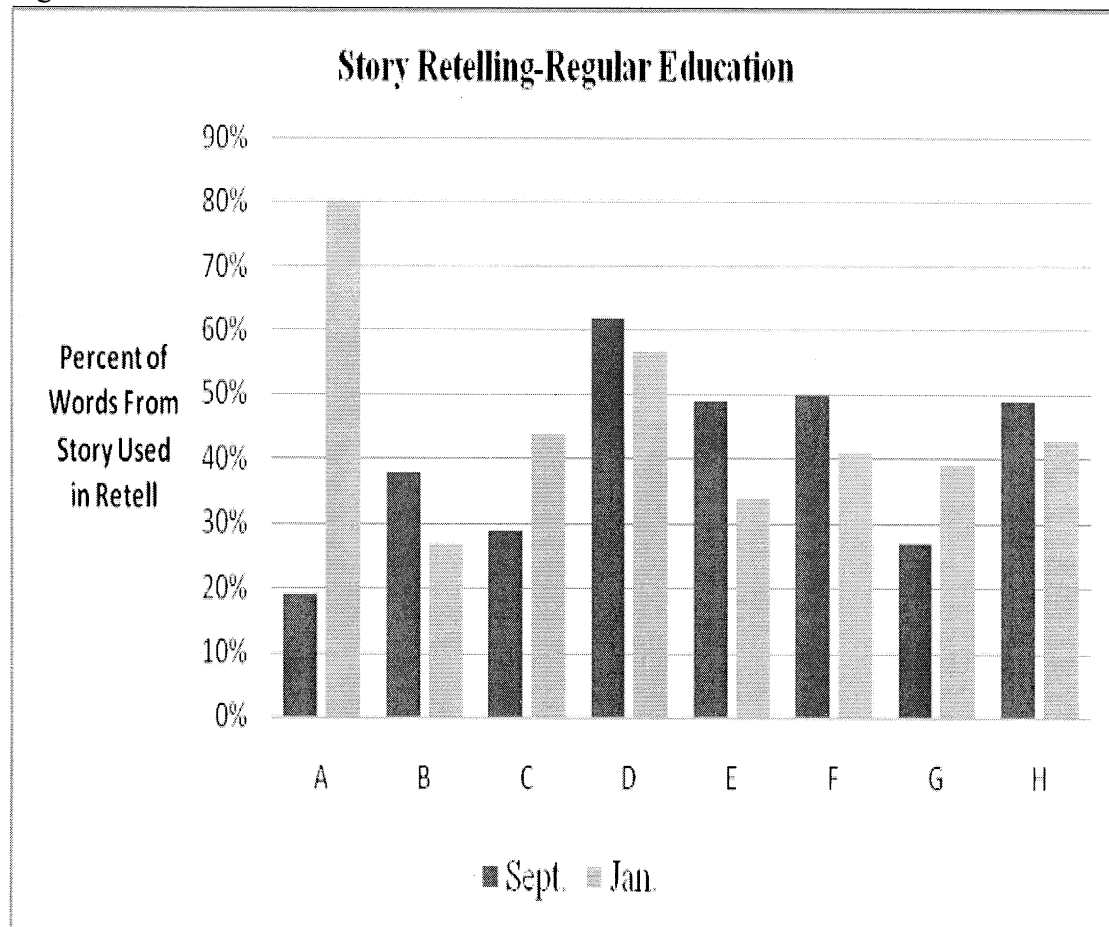
Figure 9





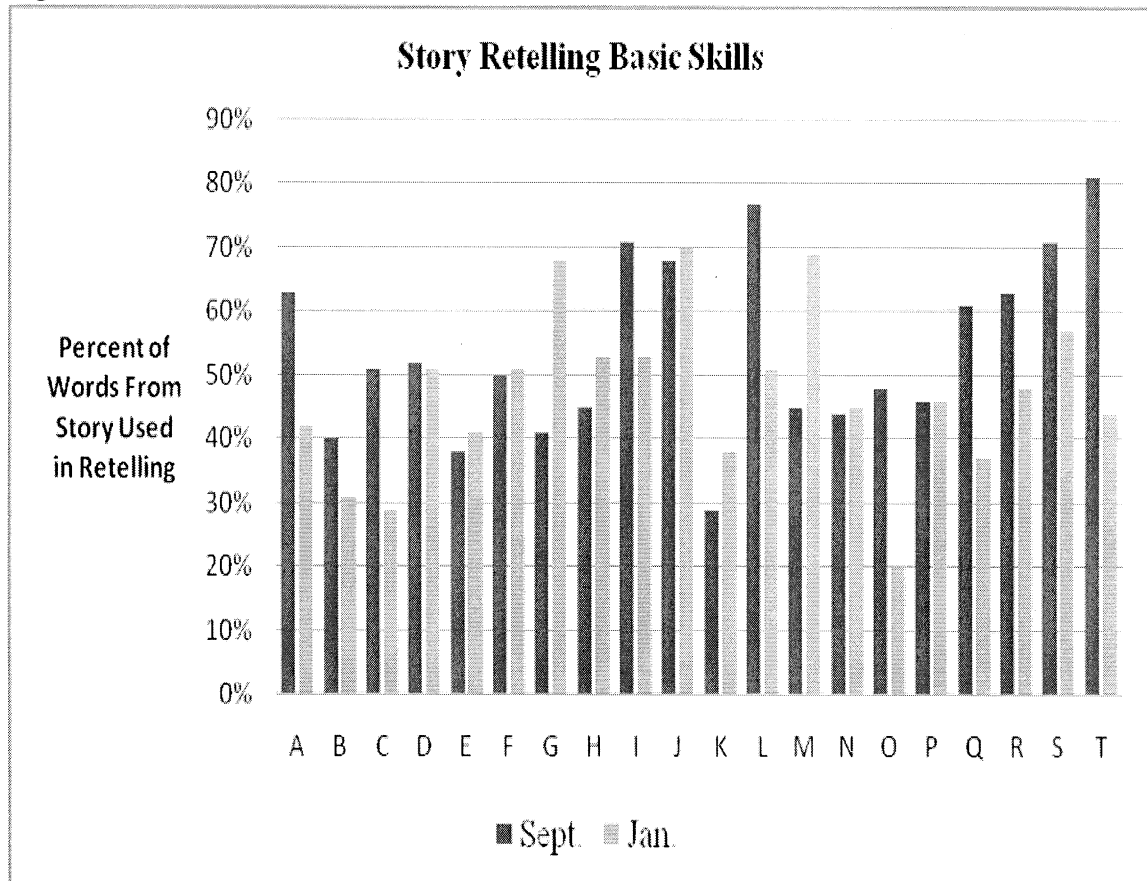
Individuals from each group were examined to assess the gains and validity of retelling component of the study. Students read a passage then retold the story. The number of words from the story that were used in the retelling were counted and compared to the number of words read. A percentage was assigned for the pretest and posttest. Regular education students had a mean average of 40% of words in the retell for the pretest (SD 15%). On the posttest, data indicated a mean average of 46% of words from the passage used in the retell (SD 15%). The range of scores on the pretest was 19%-62% while the range of scores for posttest 27%-80% (see figure10).

Figure 10



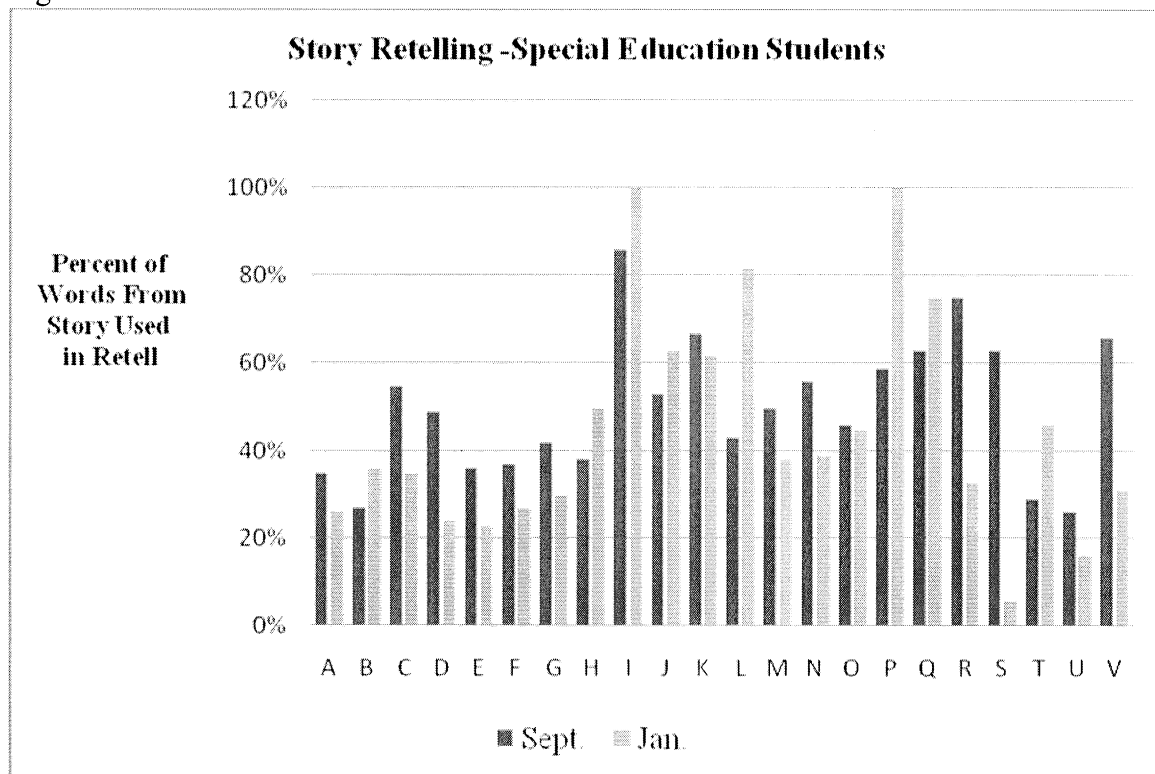
The results for the students in the Basic Skills Improvement Program were examined for story recall. These students had a baseline mean score of 54% of words retold from the passage, with a range of 29%-81% (SD 14%) and a posttest mean score of 47% of words retold from the story, with a range of 20%-70% (SD 13%). This group had a decrease of 7% of the words used from the story in the story retell on the posttest assessment (see figure 11).

Figure 11



An examination of the story retell component of the study indicates the group of special education students had an initial mean score of 50% of words used from the story in the retelling, with a range of 27%-86% (SD-16%) and a posttest mean score of 45% of the words from the story used in the retell, with a range of 6%-100% (SD-26%). This group had a decrease of 3% or words used on the story retell (see figure 12).

Figure 12



## CHAPTER 5

### Summary

This study examined the effectiveness of the Orton-Gillingham supplemental tutoring program on the reading skills of students in third grade who were reading below 50 words per minute. All third grade students in the district were assessed with the DIBELS fluency test and any student reading 50 words per minute or below were eligible to receive supplemental Orton-Gillingham tutoring twice a week for approximately 40 minutes. The school district is in a rural setting, inland from a summer resort area. Over 54.4% of the students in the school district receive free or reduced lunch.

The students in the study were assessed with the DIBELS assessment for fluency, decoding and story retell/comprehension. Students were given a third grade passage and words per minute read correctly were counted to obtain a score for fluency. Students then retold the story in their own words. The examiner counted the words from the story used in the retelling. A percentage was derived from the number of word a student read, and the number of words from the story in the retelling. The DIBELS assessment included a Quick Phonic Screener (Q.P.S.) that contains psuedowords to evaluate decoding skills.

The students were in the regular education classes, Basic Skills Improvement Program, or special education classes. The study examined the effectiveness of this program on all three groups and compared the growth of each group to evaluate if the program is more effective for a particular group. By the end of third grade the benchmark goal for fluency is 120 words per minute read correctly. The students reading 50 words per minute or less in

September are well below benchmark. Many of these students have already been identified as struggling readers and are enrolled in the Basic Skills Improvement Program or receiving special education instruction. Because many of these students have previously been identified, the Basic Skills Improvement Program and special education students in this study outnumber the regular education students.

Each group, (regular education, Basic Skills Improvement Program, and special education), was evaluated to determine the effectiveness of this program on each group. To examine the overall effectiveness of the Orton-Gillingham Program on reading, an analysis was completed on fluency, decoding, and story retell/comprehension.

#### Conclusions

##### Fluency

The overall gains in fluency for all three groups were examined. The results indicate that all three groups made gains in fluency rates. On this measure of reading, it is apparent that the Orton-Gillingham tutoring was effective in helping to improve fluency rates for all three groups with the most growth in the special education group.

##### Decoding

Overall all three groups made gains in the decoding component of this reading study with the students from the special education group having the largest percent increase. Although when examining growth alone, it appears that the students in the Basic Skills Improvement Program groups did not make significant gains. Yet when we examine the mean average of the words read correctly on the posttest the scores are comparable. The Basic Skills Improvement Program group had the highest score of 86% (yet made the least

improvement), the students in the regular education program had a mean score of 84%, and the students in special education were able to read 79% of the words correctly.

From the data recorded, it is evident that the Orton-Gillingham Program has assisted in improving the decoding skills of the students in this study with the special education students making the greatest amount of growth.

#### Story Retell/Comprehension

An overall examination of the data indicates an increase of 5% in story retell for the regular education group while the Basic Skills Improvement Program group had a decrease of 7% of words in the story retell and the special education group had a decrease of 3% of words used in the story retell.

A further examination of the data revealed that the story retelling was not a valid measure of story comprehension. One example that challenges the validity of this component was a student in the special education group that was only able to read 16 words from a passage then used 16 words in his retelling. Clearly this student was not able to understand the passage by reading only 16 words but he had a retelling score of 100%. Another student in the regular education group read 54 words in those same passages and used 21 words in his retelling and his score was 39%. A comparison of the two scores alone would indicate that the student reading fewer words had actually comprehended the story a higher rate than the student reading more words which again, makes it apparent that there is a flaw with this component of the assessment.

A further problem with this reading component was the timing of the posttest. The posttest was given in January after the winter break. The students had 14 days off from school in December and were tested shortly after they came back in January.

The problems with the validity of this subtest make it difficult to assess if the students made gains in comprehension based on the retelling of a story.

#### Recommendations

Reading difficulties may have a lifelong impact on an individual. These problems may lead to academic difficulties, depression, low self esteem, behavioral problems while in school, and increased dropout rates which will have an impact on an individual's earning potential. Improving a child's reading skills could have positive outcomes that are life changing.

The Orton-Gillingham Supplemental tutoring program was effective in improving fluency, and decoding skills of students in the regular education, Basic Skills Improvement Program, and special education classes. The students from all three groups made comparable gains in fluency. The mean increase in scores for regular education, Basic Skills Improvement Program, and special education groups were 21, 21.9 and 24 words per minute respectively. Students also showed improvement in decoding skills. Special education and regular education students demonstrated a growth of 22% and 21.25% respectively, while students in the Basic Skills Improvement Program had an increase of 9%. Although there is a variation in the percent of gains, the actual posttest mean scores of the regular education, Basic Skills Improvement Program, and special education were similar at 84%, 86%, and 79% respectively.

These conclusions are consistent with the findings of Hook, Marcaruso, and Jones (2001). The study was conducted with elementary students in a summer program to compare the efficacy of Fast ForWord to Orton-Gillingham instruction. Pretest and posttests assessments included phonemic awareness, word identification, and word attack. At the end

of the summer program both groups made significant growth in phonemic awareness. The Orton-Gillingham group made significant growth in Word Attack, whereas the Fast ForWord group did not.

Another study with similar results was conducted by Joshi, Dahlgren, Boulware-Gooden, (2002). The study compared the use of Language Basics: Elementary Curriculum based on Alphabet Phonics, Cox (1992), an Orton-Gillingham based program with the Houghton-Mifflin Basal Reading Program . The subjects were first grade students in an inner city school. When the gain scores of the two groups were compared by using repeated measures multivariate analysis of variance, it was found the gain scores of the treatment groups were significantly higher than that of the control groups (Joshi et al. 2002). The results of this study showed that first-grade children taught with the multisensory teaching approach based on the Orton-Gillingham principles performed better on tests of phonological awareness, decoding, and reading comprehension than the control groups (Joshi et al. 2002).

#### Limitations

Further studies on comprehension need to be completed. The story retelling assessment to indicate comprehension was flawed. Students' scores were based on his/her ability to use words read from a story in the retelling of a story. This subtest was deemed not valid when examining results across the board. A student reading 13 words in a story then using 13 words in a retell was assigned a score of 100% for retelling while another student read 54 word in the passage and used 21 words in the retell was assigned a score of 39%. Further studies should be completed to examine the effectiveness of the Orton-Gillingham Program on the reading comprehension of students.



Although we cannot derive conclusive information from the retelling assessment, it is evident that the students from all three groups have increased fluency and improved decoding skills. Students who are reading more words per minute and able to decode at a higher rate should theoretically be able to focus more attention on the meaning of a passage and therefore have increased comprehension.

#### Implications

Overall the Orton-Gillingham supplemental tutoring program was effective at raising the fluency rates and decoding scores of all three groups. The Orton-Gillingham tutoring program enables students to decode more words and read at a faster rate. While comprehension of a text is the ultimate goal for reading, decoding and fluency are the foundation of reading skills. This program is successfully providing instruction to struggling students that will improve these necessary skills.

## REFERENCES

- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Cox, A. R. (1992). *Foundations for literacy: structures and techniques for multisensory teaching of basic written language skills*. Cambridge, MA: Educators Publishing Services.
- Daniel S., Walsh A, Goldston D., Arnold E., Reboussin B., F. Wood (2006). Suicidality, school dropout, and reading problems among adolescents. *Journal of Learning Disabilities*. 39 no6 507-14.
- Enfield, M. L. (1998). The quest for literacy: *Annals of Dyslexia*, 38, 8-21
- Foorman, B. R., Francis, D. J., Beeler, T., Winikates, D., and Fletcher, J. M. (1997). Early interventions for children with reading problems: Study designs and preliminary findings. *Learning Disabilities*, 8, 63-71.
- Gillingham, A., & Stillman, B. W. (1997). *The Gillingham Manual. Remedial training for children with specific disability in reading, spelling, and penmanship*. (8<sup>th</sup> ed.). Cambridge, Publishing Service.
- Gersten, R., Fuchs, L.S., Compton, D., Coyne, M., Greenwood, C., and Innocenti, M.S. (2005). Quality indicators of group and quasi-experimental research in special education. *Exceptional Children*, 71, 149-164.
- Guyer, B. P., Banks, S. R., and Guyer, K. E. (1993). Spelling improvement for college students who are dyslexic. *Annals of Dyslexia*, 43, 186-193.

- Guyer, B. P., and Sabatino, D. (1989). The effectiveness of a multisensory alphabetic phonics approach with college students who are learning disabled. *Journal of Learning Disabilities* 22, 430-434.
- Henry, M. K. (1998). Structured, sequential, multisensory teaching: the Orton legacy. *Annals of Dyslexia*, 48, 3-26.
- 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, 229-242.
- Katsiyannis, A., Maag J. W. (2001). Educational methodologies: legal and practical considerations. *Preventing School Failure*, 46, 31-36.
- Davis, N., Lindo, E.J., Compton, D. L., Children at Risk for Reading Failure: Constructing an Early Screening Measure. *Teaching Exceptional Children*. 39 no5 32-7 May/June 2007.
- Oakland, T., Black, J. L., Stanford, G., Nessbaum, N. L., and 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, 140-147.
- Shaywitz, S. E., (1996). Dyslexia. *Scientific America* 275, no5, 98-104.
- Slingerland, B. H. & Aho, M. (1994-1996). *Slingerland Reading Program*.  
Cambridge. MA: Educators Publishing Services.
- Spalding, R.B. & Spalding, W. T. (1990). *The Writing Road to Reading (4<sup>th</sup> ed.)* New York: Quill.

- Speece, D. L., Mills, C., Ritchey, K. D., Hillman, E., (2003). Initial Evidence That Letter Fluency tasks are valid indicators of early reading skills. *The Journal of Special Education, 36 no4*, 223-233.
- Ritchey, Kristen D., Goeke, Jennifer L. (Fall 2006). Orton-Gillingham and Orton-Gillingham-based reading instruction: A review of the literature. *The Journal of Special Education v. 40 no. 3* p. 171-83.
- Rose, T. E., Zirkel, P. (Fall 2007). Orton-Gillingham methodology for students with reading disabilities- 30 years of case law. *The Journal of Special Education, 41 no3* 171-185.
- Scarborough, H. S. (1998). Predicting the future achievement of second graders with reading disabilities: Contributions of phonemic awareness, verbal memory, rapid naming, and IQ. *Annals of Dyslexia, 68*, 115-136.
- Schatschneider, C., Francis, D. J., Foorman, B. R., Fletcher, J. M., & Mehta, P. (1999). The dimensionality of phonological awareness: An application of item response theory. *Journal of Educational Psychology, 91*, 439-449.
- Wilson, B.A. (1996). *Wilson Reading System*. Millbury, Ma: Wilson Language Training Corporation

