

**Improving Letter and Word Recognition**  
**Using a Multisensory Approach**

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Improving Letter and Word Recognition Using a Multisensory Approach

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## Table of Contents

	Page
Abstract.....	ii
Chapter One: Introduction/Problem Statement/Rationale .....	1
Definition of Terms.....	4
Chapter Two: Literature Review .....	6
History.....	6
Learning Styles.....	8
Multiple Intelligence Theory.....	10
Memory.....	11
Chapter Three: Methodology.....	13
Participants and Setting.....	13
Measures.....	13
Procedure.....	14
Letter and Word Recognition Assessments.....	16
Interview Questions.....	16
Observations.....	17
Data Analysis.....	17
Chapter Four: Results.....	19
Letter and Word Recognition Assessments.....	19
Interviews.....	21
Observations.....	22
Chapter Five: Discussion.....	23
Implications of Research.....	24
Limitations.....	25
References.....	27
Appendix.....	29
Interview Questions.....	29
<i>Apple Apple</i> AAA Alphabet Chart.....	30

## Abstract

The effects of multisensory instruction upon the letter and sight word recognition and reading of five and six year old students were investigated during this study. A total of ten kindergarten and first grade students, identified as in need of extra reading support, were assigned to control and experimental groups. Five students were assigned to each group. Students in the control group learned and practiced identifying letters and reading sight words using their visual and auditory modalities. Students in the experimental group used their visual, auditory, kinesthetic and tactile modalities to identify and read letters and sight words. Students were assessed on their recognition of letter names through Marie Clay's Letter Identification task. Sight words were assessed using a teacher made word recognition assessment based on sixteen sight words from Dolch Sight Words List I. Informal oral interview questions were coupled with anecdotal records to triangulate the data gathering by the researcher. Upon completion of four weeks of instruction, each group was assessed for a second time on their recognition of letter names and sight word reading. Results of this study yielded the finding that students instructed through multisensory activities not only improved their number of sight words and letters, but also expressed more pleasurable recounts of the lessons experienced. The discrepancy between the control and experimental group is elaborated on in the discussion portion. Furthermore, in an effort to benefit future classrooms, practical implications are discussed and topics for further research are also stated.

*“Anyone who thinks there is one right way to teach reading,  
has never worked with two children” (Ford, 2005)*

## Chapter One: Introduction

Children need to use many sensory modalities to explore their environment.

Multisensory approaches to reading are based on the idea that many students learn best when material is presented in several different modalities (Preston, 1998). Children should be encouraged to move around, touch, smell, and, when appropriate, taste objects because, it has been found that the more senses involved in investigating an object, the more likely they are to develop ways to remember the objects or recall their experiences (Carbo et al., 1986). Frequently, kinesthetic (movement) and tactile (touch) stimulation is used along with visual and auditory modalities. These methods might feature tracing, hearing, writing, and seeing letters and words using a variety of materials. The main sensory channels are: visual, auditory, and kinesthetic/tactile. The visual learner relies on visual clues and in inward visualization; the auditory learner learns from hearing; the kinesthetic/tactile learner needs to manipulate, touch and write to learn (L.S. Dept. of Ed., 1987). According to Carbo, (1993) modality preference is developmental. The primary years are more dominantly kinesthetic/tactile. Students are more visual at third grade, and auditory systems are more developed by sixth grade (Carbo, 1993). This study focuses on the recall and recognition gains Kindergarten and first grade students make from utilizing strategies that involve touch and movement along with their visual and auditory senses.

This project is designed to discover the ways in which struggling readers respond to the implementation of multisensory activities and strategies having to do with recalling letters and words. The term multisensory is used generically to refer to any learning activity that includes the use of two or more sensory modalities simultaneously to take in or express information. In this project, the term does not mean multimedia as in playing

videotapes or audiocassettes. The term multisensory in this project pertains to techniques for novice or poor readers that involve visual, auditory, tactile-kinesthetic, and/or articulatory-motor components in the carefully sequenced teaching of language structure. For example, students learn and practice alphabet letters by feeling, naming, and matching three-dimensional forms or tracing on rough surfaces; teachers might model matching gestures with a word or sound in order to help stimulate a memory for a letter or word. Students will also learn the identity of phonemes by feeling and seeing the position of the mouth, lips, and tongue.

All humans have learning strengths and weaknesses. This study will particularly impact those learners whom benefit from the incorporation of learning through multiple modalities. The strategies implemented as a result of this study will support and benefit all readers. Furthermore, the instructional practice of the researcher, as well as those whom read this study will be strengthened due to the findings of best practices of multisensory teaching strategies; a result of this study. As future teaching improves as a result of these new findings, future students will benefit as well, as their reading is supported through a multisensory approach.

Research verifies that beginning readers and poor readers tend to be strongly tactile/kinesthetic and have much lower preferences for learning visually and auditorially. At the age of six or seven, most children appear to be, in descending order of development: kinesthetic, tactile, visual, auditory; they learn most easily through their sense of touch and whole-body movement (Carbo, Dunn, et al., 1986). Many educators limit their instruction to the visual and auditory modalities, often leaving out the kinesthetic and tactile modalities. These are sufficient to facilitate learning and retention

for the majority of the students, however, even if only a small majority benefit from the added kinesthetic and tactile modalities, it would prove beneficial. "Most early studies restricted their examination of modalities to the auditory or visual, neither of which tends to be the strength of young children, who are more likely to learn tactually (through manipulatives and a hands-on approach) or kinesthetically (through a whole body, activity oriented experience)" (Dunn, 1988. p. 119 ). Carbo's (1987) work suggests that too many students are victimized by the unspoken assumption that there is one right way to teach reading to all children:

It comes as not surprise that many poor readers are predominantly global, tactile, and kinesthetic learners- for that is precisely the reading style that seems to be accommodated least in U.S. classrooms. Unfortunately, many of today's poor readers are dropouts of reading programs that demand strongly analytic/auditory reading styles (Carbo, 1987 p. 72)

As we know, limited letter and word recognition are probable causes of low comprehension (Valdez, 1994). This study supports the VAKT approach (or visual, auditory, kinesthetic, tactile) to reading where students learn to decode words by simultaneously looking at the word to be learned, saying and hearing the word, touching it, and tracing it and thereby ultimately strengthening meaning making and comprehension. According to Miccinati (1979) "More often than not, a child who is not learning to read by conventional methods does not have a strongly identified mode of learning. A multimodal approach, she therefore stated, allows the child to develop strength in a particular area or combined area."(p. 121)

On a daily basis, the researcher of this study works with a population of Kindergarten to third grade students whom struggle with letter, sound, and sight word recognition. Effective ideas for improving their recognition and automaticity skills are

constantly sought out by the researcher in order to improve the learning of these students. The idea to study this research topic was conceived as the researcher observed a struggling first grade reader use a previously learned hand gesture in order to recall the sound of a vowel. Many of the students the researcher works with are more kinesthetic and “active” such as this first grader that benefited from the kinesthetic/tactile vowel hand gesture. As multisensory research was explored, and numerous kinesthetic and tactile strategies for teaching reading were obtained by the researcher, obvious benefits for the struggling population of students were observed. The researcher wishes to share her personal findings on the topic of multisensory reading strategies to other educators, as well as strengthen her repertoire of teaching strategies to implement for a variety of learners as she begins her professional teaching career. The activities used for this study will offer Kindergarten and first grade students various ways to retain and recall letters, letter sounds and sight words in order to improve their reading abilities.

### **Definitions of Terms**

**Multisensory:** Relating to or involving several bodily senses. For the purposes of this study, the term multisensory will be referring to a) kinesthetic, b) tactile, c) auditory, d) visual

**Kinesthetic:** The sense that detects bodily position, weight, or movement of the muscles, tendons, and joints. Kinesthetic learners learn best through movement of their large or gross motor muscles. They take in information best when they are moving. Movement includes learning while doing, being involved in projects, discovery, role-playing, simulations, real life activities, and learning while standing up or using the large arm muscles to write as on a flip chart or chalkboard.

**Tactile:** Tactile learners learn best through their sense of touch, such as using their hands and fingers. They learn best by writing, drawing, taking notes, using hands-on manipulatives, and involving their emotions and feelings while learning.

**Auditory modality:** Learning by hearing

**Visual modality:** Learning by seeing



**High Frequency Words/ Sight Words:** High frequency words (sight words) are words that students encounter frequently in reading and writing.

**Word Recognition:** the visual perception that occurs when the spelling pattern, the speech, and the meaning are connected automatically

**Recall:** This is the ability to get back out of storage what is needed when it is needed

**Retention:** This refers to the storage of information in the memory for recall at another time.

**Multisensory Approach:** This uses all of the learner's senses, or modalities, in the learning process. The child sees, touches, hears, and says in order to learn.

## Chapter Two: Literature Review

### **History**

The methods that have come to be most strongly associated with multisensory instruction today, are those developed by educators such as Montessori (1912), John Dewey (1966) Fernald and Keller (1921), Strauss and Lehtinen (1947), and Orton & Gillingham, who were challenged by children with dyslexia, learning disabilities, and attention disorders. John Dewey's teaching method is based on the philosophy that the school, therefore the educator, should not provide "schooling" but must "educate" the student. In *My Pedagogic Creed*, John Dewey (1966) gives a clear definition of the purpose of the school:

I believe that the school is primarily a social institution. Education being a social process, the school is simply that form of community life in which all those agencies are concentrated that will be most effective in bringing the child to share in the inherited resources of the race, and to use his own powers for social ends. (p. 48)

Dewey's definition promotes that the educator must stimulate children to find and develop their own resources, not to flood them with mere information and skills. The teacher should be primarily a motivator; his/her techniques and tools should be designed to encourage children to be active participants in their own education.

### **Previous Research on Multisensory Approaches to Reading Instruction**

Multisensory instructional techniques for teaching reading and spelling have existed since the 1920's. The kinesthetic/tactile approach is not new, nor is it influenced exclusively by Dewey. Like Dewey, Montessori also believed that the key to learning is the student, and that the teacher should act as a stimulator; "The child has a mind to absorb knowledge. He has the power to teach himself" (p. 172) Therefore, Montessori

developed a kinesthetic method for teaching writing and reading. A prescribed sequence of activities was applied: a) the tracing of geometric figures, b) the filling in of double-outlined tracing by the child and c) the use of sandpaper letters. In *Education for a New World*, Montessori (1946) gave a vivid description of the children's achievement after they had used a kinesthetic approach with her materials:

By the realization of the formation of the word from its sounds, the child had analyzed and reproduced it externally by means of the moveable alphabet. He knew the form of the letter because he had touched it again and again. So writing came suddenly, an explosion like that into speech. (p.6)

Grace Fernald proposed a VAKT instructional procedure which emphasized syllables and word parts. Fernald, who developed a multisensory approach in which the distinguishing feature is tracing, observed that children sometimes could not learn through normal reading methods using visual and auditory channels. She believed that the addition of kinesthetic and tactile methods would assist their learning (Preston, 1998). A study done by R.A. Pulliam (1945) followed the findings of Fernald and found that the percentage of retention was much greater under a word tracing method than under a non-tracing method. This method involved tracing indented words in heavy cardboard with finger contact while saying the word. The results of his study indicated that remedial teaching may be considerably facilitated through the use of indented word cards.

While the Fernald method stresses whole-word learning, the Gillingham method features sound blending. Orton-Gillingham is the structured, sequential multisensory teaching of written language based upon the constant use of association of all of the following - how a letter or word looks, how it sounds, and how the speech organs or the hand in writing feels when producing it. Children also learn the common rules of the

English language such as the final e rule and when to use -ck and -tch. Older students learn a variety of syllable patterns and common prefixes and suffixes, then Latin and Greek word parts. It is recommended that an Orton-Gillingham-based multisensory method is used to teach a dyslexic person to read, write, and spell. Many reading programs and methods were developed as a result of the Orton-Gillingham method. Some of the most well known adaptations include, the Wilson Reading System, the Slingerland Multisensory Approach and the Spalding Method.

Although the VAKT methods have been used by teachers for years, there is very little data to support their application or to explain why they might be successful. Only a few studies have explored the use of multisensory instructional procedures. These have generally produced supportive results (Thorpe, p. 279). Several explanations have been presented suggesting why multisensory procedures might be successful. Some writers have contended that VAKT procedures provide maximum sensory input to the brain, others say that kinesthetic and tactile sensory input compensates for weak visual or auditory input, or that the auditory, kinesthetic and tactile channels provide support for the visual channel and that the active involvement of all senses results in recognition of the distinctive features of the learning task.

### **Learning Styles**

According to research done by Marie Carbo, everyone has a learning style. People's styles determine how they begin to concentrate every time they have new or difficult knowledge or skills to master. Children learn best when they use their learning style characteristic advantageously (Carbo et al., 1986). The following are examples in

very general terms of the different types of learning styles that can be found in any general education classroom.

### **Visual Learner**

- Often responds with “Just show me!” after hearing an explanation or when presented with new or confusing concepts.
- Often asks for things to be repeated. Overuses, “Huh?”
- Will often look at what other children are doing rather than ask the teacher to repeat the instructions.
- May appear distracted when overwhelmed by too much information.
- May have word-finding problems, so uses a lot of hand gestures. Also may make verbal errors, such as “He got expended from school.”
- Often completes many difficult tasks (change a tire, knit a sweater, weave a basket) but cannot explain in words how it’s done.
- Unless directions or assignments are in writing, may have difficulty remembering them.
- Easily recognizes visual images and can distinguish sounds.
- Is aware of spatial relationships such as spacing, margins, directionalities, and sequencing differences.
- Needs to create a mental picture of what is being said, Examples, Pictures, maps, charts, diagrams, modeling, or demonstrations help create the mental images.

### **Tactile Learner**

- Needs to feel, touch, and manipulate objects.
- Twisting, turning, rotating, pouring, and measuring enhance learning.
- Is a tinker or designer
- Benefits from hands-on experiences, such as math manipulatives (counters, coins matrix, geoboards) building materials, and laboratory experiments.

### **Auditory Learner**

- Gains understanding from what is heard.
- Usually very verbal but has illegible handwriting.
- Enjoys using language.
- Can discriminate between similar sounds.
- May appear distracted as language is being processed. Learning style may be confused with ADHD.
- May omit or transpose words or letters.
- Spells out loud better than on paper. May test better orally.
- Better retains what he hears in class, as opposed to what he reads.
- Comprehends better when read to or reads aloud.
- Not a detail person. May miss sign changes in math problems or incorrectly read numbers, letters, or words.
- Work appears sloppy or messy. Dislikes worksheets.
- Uses bookmarks, in markers, or fingers to mark place.
- Can be the class hummer or whistler.
- May complain of eyes problems, but eye tests do not indicate a problem.

- Benefits from a tape recorder to play back information.
- Benefits from books on tape
- Usually benefits from a phonics approach to reading when combined with whole language.

### **Kinesthetic Learner**

- Uses bodily control and movement to express himself.
- Has exceptional fine and gross motor coordination.
- Eye-hand coordination is also well developed.
- Is energetic and physical. Has difficulty sitting for long periods of time.
- Expresses self successfully through dance, sports, gymnastics, martial arts.

Boyles, N. (1997)

### **Multiple Intelligence Theory**

More than two decades ago, in his book, *Frames of Mind*, Howard Gardner, Ph.D., presented the theory that humans possess, in varying degrees, seven intelligences.

Recently, Gardner revealed an eighth intelligence. Although Gardner's work was targeted at psychologists, not educators, his theory of personal intelligences supports a multisensory, multidisciplinary approach to education. By proposing that our concept of intelligence needs to expand beyond a number determined by an intelligence test, it has changed the way educators perceive students and their potential. By studying Gardner's work, educators are finding academic applications. The eight human intelligences proposed by Gardner are linguistic, logical, musical, spatial, bodily kinesthetic, intrapersonal, interpersonal, and naturalist. Gardner's theory of multiple intelligences confirms that each of us receives, processes, uses, and stores information in different ways. Gardner attempts to point out in his theory that humans have stronger inclinations toward some channels of learning than toward others. Through these channels, we would probably learn and function most effectively. Bodily Kinesthetic learners, as defined by Gardner are "movers". Through touching and maneuvering, such learners use their bodies to process information in a highly effective way. Highly developed gross-motor muscles

allow kinesthetic learners to excel in physical activities such as dancing, sports, acting, and crafts. Equally developed fine-motor muscles assist this learner in skillfully and precisely handling objects. Learners who need to move have high energy levels. They express themselves and solve problems through the control and movement of their bodies.

## **Memory**

The idea that learning experienced through all senses is helpful in reinforcing memory has a very long history in pedagogy. Educational psychologists of the late 19th century promoted the theory that all senses, including the kinesthetic sense, are involved in learning. The second volume of James's (1890) *The Principles of Psychology*, discussed Binet's (1911) theory that all perceptions, in particular those of sight and touch, involve movements of the eyes and limbs and that because such movement is essential in seeing an object, it must be equally essential in forming a visual image of the object. This theory was illustrated through descriptions of typical individuals who used tracing to bolster visual memory. Consistent with this theory were observations that the loss of acquired reading ability as a result of impaired visual memory in adults with brain injury could be bypassed through the use of a kinesthetic modality; tracing letters. When you learn, information is picked up by your five senses and then sent to your brain for processing. Those perceptions eventually become memories that will affect future learning. As the child gains more experience, confidence, and pleasure in accomplishing this action, she will begin to develop expertise. The action will become more automatic. And through repeated experiences, the child develops a memory of the task that will affect future learning. (Lyons, 2003) *Fundamental Principles About Learning and Remembering* (Lyons, 2003):

1. Learning and memory processes exist in a circular relationship.
2. Individuals recall the same event differently.
3. Memories change as individuals change.
4. Emotion is the heart of learning and memory.

Muscle memory is much more efficient for long term memory than visual or auditory. Riding a bike, driving a car, or typing, are all good examples of kinesthetic and tactile activities. If these activities were not experienced for a period of time, it is unlikely they would be forgotten (Kurywczak, 1997)

### *Procedural Memory*

Procedural or skill learning is the first memory function to develop in the brain's early stage of growth (Lyons, 2003). Procedural memories start as explicit memories and change to implicit or automatic memories. Explicit memories are directly accessible to our conscious awareness. For example, when a teacher takes a child's finger and shows her how to match and point to individual words one after another across a line of text, the action is explicit. Implicit memory is responsible for the establishment of a skill or set of skills. These skills become automatic once they are learned. Imagine now adding several modes to the teaching of a skill—through feeling, hearing, smelling, seeing something, all at once. A child will be able to complete a task or recall a name of something without thinking about how she did it in the past. The procedural memory, at first explicit, has become implicit and automatic.



## Chapter Three: Methodology

The major purpose of this study is to discover whether struggling readers will improve in their ability to recognize and read letters and sight words as a result of learning through their visual, auditory, kinesthetic and tactile modalities as opposed to their visual and auditory modalities alone.

### Objectives:

To understand the effectiveness and appeal of multisensory reading strategies and activities on five and six year old remedial reading students.

To improve students' letter and sight word recognition by implementing strategies which stimulate the kinesthetic, tactile, visual and auditory modalities through the observation of the control group as compared to the experimental group.

### **Participants and Setting**

The research was conducted in a primary school in a suburb of a midsize city of western New York. A total of fourteen students, ages five and six, comprised the participants of this study. There were four girls and six boys from Kindergarten and first grade; each in need of extra reading support. This sample of remedial reading students was assembled out of convenience to the researcher based on scheduling and time allotment for this study.

### **Measures**

Results for this study were warranted from the following three assessment measures: 1) Sight Word Identification, 2) Student Interviews, and 3) Observation records. The sight words used in the study were from the Dolch Sight Word List One. Letter knowledge was assessed using an adaptation of Marie Clay's Letter Identification

Task (Clay, 2002). Each of the ten students was assessed in March and again, four weeks later, in April. Students were tested in the corner of a quiet Kindergarten classroom while sitting at a kidney shaped table alone with the researcher. Instructional lessons and practice for both groups took place in the same classroom at the same table within their group of five.

### **Procedure**

Two samples of remedial reading students were identified as experimental and control groups. Each sample consisted of five students, ages five and six. Each of the ten students were assessed in March on their knowledge of sixteen Dolch Sight Words from List 1 (the, to, and, he, you, it, of, in, his, that, she, for, on, they, but, had), and on lowercase and uppercase letters of the alphabet using Marie Clay's Letter Identification task. The sixteen sight words were tested with flashcards. Both the experimental and control groups then worked for four weeks (16 school days) on learning and practicing these letters and sight words. The control group was taught letter names and the ten sight words through the visual and auditory modalities. The experimental sample was taught letter names and sight words through the visual, auditory, kinesthetic, and tactile modalities. After four weeks of instruction, students were again assessed in April, just as they were in March. During each session with both groups, students practiced all twenty-six upper and lower case letters. One sight word was taught and practiced by students each lesson so that a total of sixteen sight words were taught by the end of the study. Sight word and letter recognition lessons took place for fifteen minutes per day, four days a week for four weeks. Lessons, including explicit instructions for the students of each group proceeded as follows:

### Control Group:

#### Letter Names

Step 1: Teacher set up alphabet chart with pictures.

Step 2: Students and teacher together sang alphabet song with sounds as teacher points to each letter and picture as they were sang. Entire song was sang once per lesson.

*Let's sing the Apple Apple AAA song together, ready? Follow my pointer.*

#### Sight Words

Step 1: Teacher showed word on flashcard and modeled word aloud.

*Do you know this word? Read it after me!*

Step 2: Students, in unison, repeated the word, saying it fast.

*Good!*

Step 3: Students said the sounds of each word following a left to right sequence.

*Now say the word slowly and stretch the sounds out, ready?*

Step 4: Students again, in unison, repeated the word, saying it fast while reading from flashcard.

*Read this word, after me.*

Step 5: Teacher wrote word in short sentence, then modeled reading sentence aloud.

*Here's that word in a sentence? Ready? \_\_\_\_\_ Now you try it!*

Step 6: Students repeated teacher and read short sentence containing sight word.

### Experimental Group:

#### Letter Names

Step 1: Teacher passed out individual alphabet charts with pictures to each student.

Teacher and students sang alphabet song together while each student tapped their charts according to the letter and picture being sang.

*Let's sing our "Apple Apple AAA" song together. Put your reading finger on your charts and sing along with me. Tap each picture and letter as we sing the name of each picture and sound. Ready?*

Step 2: Students trace each letter on their alphabet chart with their index finger.

*Put your index finger on the lower case "a" and trace it! Now do the uppercase "A" and the rest. Let's do it together.*

#### Sight Words

Step 1: Teacher showed word on flashcard and modeled word aloud.

*Do you know this word? Read it after me!*

Step 2: Students, in unison, repeated the word, saying it fast.

*Good!*

Step 3: Students traced words on sandpaper with index finger saying the sounds while doing so.

*Now let's trace it on this surface with your index finger as we say it together out loud.*

*How does it feel?*

Step 4: Students underlined the word, saying it fast.

*Slide your finger under the word like you are underlining it while you say the word.*

Step 5: Students traced the word in salt trays with index finger saying the sounds while doing so.

*Now trace it in your salt tray and say the word.*

Step 6: Students underlined word in salt tray while saying it fast.

*Now slide your finger under the word like you're underlining it again as you say the word.*

Step 7: Teacher wrote word in short sentence and read aloud to students.

*Here's that word in a sentence. Now you try it after I read it.*

Step 8: Students each made word using magnetic letters and said it as they pushed letters together.

*Make your word with magnetic letters so it matches mine. Say it as you push the letters together.*

Step 9: Students play Sight Word/Letter Twister

*Now we'll play Twister for the last few minutes. Please line up on the side of the game pieces. When I tell you what hand/foot to move, place it on the word or letter that I call out! There is more than one of each letter/word so you do not have to be on the same one as a friend! If you lift your hands/feet up off the word/letter you sit down! Ready?*

### **Letter and Word Recognition Assessments**

An assessment of the students' letter and word identification were given as separate assessments. The researcher presented a word and waited three seconds. If the student did not respond by reading the word during those three seconds, it was recorded as an incorrect response. The first assessments were given to all participants the day prior to the four weeks of instruction. These assessment results served as the baseline data and were later compared to the end of the study assessments, given the day after instruction ended. Each student was given a numerical score representing the number of correct words or letters they identified.

### **Interviews Questions**

The researcher interviewed both the control and experimental group of students informally and at random times throughout the study. Interview questions were posed to the students while they worked in their respective groups. The questions were designed to obtain information regarding student's feelings about how they learned high frequency

words as well as about their feelings toward specific lesson activities. Questions also addressed students' perceptions of their learning (See Appendix).

### **Observations**

Informal observations were made and recorded by the research. These observations focused on students' engagement in lesson activities pertaining to learning letters and words, with an emphasis on how the use of multisensory reading strategies affected their retention of letters and words.

### **Data Analysis**

Both qualitative and quantitative assessment was used to collect and analyze data. Three forms of assessments were used to triangulate the results of this study. Systematic observations and informal student interviews will be considered along with letter and sight word assessments from March and April when results are analyzed. Letter and sight word assessments were taken the day before group instruction began and the day after and were then compared. A paired sample t-test was used to determine if the difference between the means of pre test and post test measures were statistically significant. Observations were recorded in the form of anecdotal records in a research journal by the researcher each day after lessons. The researcher asked students informal interview questions having to do with their likes and dislikes of lesson activities throughout the four weeks of data collection. Answers were recorded in the researcher's journal.

After the second round of letter and word assessments, all students' test results were compiled and put into chart form so that the assessments from before and after the instruction could be compared. The gains each student made based on their recognition of

words and letters before and after group instruction was charted and considered along with responses to interview questions and researcher's observations.

## Chapter Four: Results

### **Results**

In this setting, with this particular population studied, results showed that with the supplementation of kinesthetic and tactile teaching strategies, students not only had better recognition of sight words and letter names, but students responded in a more positive manner to multisensory reading strategies and the lessons used to teach with them. Results from a paired sample t-test showed that students' learning of letters was statistically significant for both groups of students. The improvement in sight word recognition was statistically significant for the experimental group, but not for the control group; strengthening the notion that kinesthetic and tactile reading activities, supports students' recognition abilities.

### **Letter and Word Recognition Assessments**

Although gains were made in both the experimental and control groups learning of upper and lower case letters, and Dolch list sight words, the most significant amount of learning occurred in the experimental group, where the participants used kinesthetic and tactile modalities in addition to visual and auditory. More specifically, the most significant gains were demonstrated in the sight word learning of the experimental group. Table 1 displays the growth in students' learning of sight words over the course of the four week study.

Table 1 Sight Word Assessments

<b>SIGHT WORD RECOGNITION ASSESSMENT EXPERIMENTAL GROUP</b>		
<b>Student</b>	<b>Number of Words Correctly Identified MARCH x/16</b>	<b>Number of Words Correctly Identified APRIL x/16</b>
A	14	16
B	5	9

C	8	10
D	10	10
E	4	7
p = .029		
<b>SIGHT WORD RECOGNITION ASSESSMENT CONTROL GROUP</b>		
Student	Number of Words Correctly Identified MARCH x/16	Number of Words Correctly Identified APRIL x/16
F	2	2
G	7	8
H	7	9
I	4	6
J	9	9
P = .089		

As shown in Table 1, the difference between the means for using VAKT strategies (experimental group) to improve sight word recognition was statistically significant ( $p < .05$ ,  $p = .029$ ). The difference between the means for using only VA strategies (control group) was not statistically significant at the .05 level ( $p < .05$ ). Each group however, had at least one student who did not improve in his/her sight word recognition.

Table 2 compares the results of the experimental and control groups' Letter Recognition Assessments.

Table 2 Letter Recognition Assessments

<b>LETTER RECOGNITION EXPERIMENTAL GROUP</b>		
Student	Number of Letters Correctly Identified MARCH x/54	Number of Letters Correctly Identified APRIL x/54
A	44	54
B	31	49
C	26	38
D	42	51
E	19	39
p = .003		
<b>LETTER RECOGNITION CONTROL GROUP</b>		
Student	Number of Letters Correctly Identified	Number of Letters Correctly Identified



	MARCH x/54	APRIL x/54
F	28	41
G	26	38
H	37	46
I	39	50
J	43	54
p = .000		

Both groups increased their repertoire of known alphabetic letters and were both significant at the .01 level ( $p < .01$ ). The increase in recognized alphabet letters was slightly greater among those subjects in the experimental group. These results are consistent with the results of the Sight Word Recognition Assessment and support the contention that students were more successful in the experimental group where they were participating in more sensory learning.

### **Interviews**

Results from informal interview questions posed to the experimental group showed students' inclination to multisensory reading activities. Subject B and D from the experimental group showed their interest in using materials when practicing sight words, "It's fun because we get to use the special markers and the erasers." Students were also motivated by the implementation of salt trays and the idea of making words with their fingers in this medium. Subject C stated, "I like the salt trays because you can see the letters you write!" implying that the subject is creating his own visual of the word as he feels it and says it simultaneously. Other students stated that they liked to use the salt trays, magnetic letters, and wipe-off strips because "it was fun". As one subject C stated, "it keeps your brain strong... I like the salt because you can put your fingers in it". While tapping her alphabet letters on the alphabet song chart, subject A exclaimed, "I'm getting better and better!"

Control group student responses to interview questions tended to be indifferent; evidence, perhaps, of the unexciting flashcard and listening activities these students engaged in so as to learn their letters and sight words. The researcher found it difficult to obtain answers from them about their learning because the students did not have much to reflect on in their lessons that involved simply flashcards, alphabet song recording, and teacher's sentence strips. Two students nodded in agreement as they were asked if they liked reading words from flashcards; however they were not given any options for comparing this activity.

### **Observations**

Students' overall enthusiasm was very high among the experimental group. They came to the group excited to begin each lesson and were engaged throughout the duration of each lesson. Even though the lessons were the same format for four weeks, students did not appear to be getting tired of the activities; rather they approached the table ready to begin.

While students in the control group were also ready to learn, they lacked the same excitement partly because they did not have the materials to anticipate playing with.

The researcher also noted that during tracing time in the experimental group, students worked with their materials (magnetic letters, salt trays, alphabet song cards, and Twister game pieces) independently for long stretches of time without looking to the teacher. Students seemed absorbed in their tasks and enjoyed what they were doing. The only negative observations made about the experimental groups learning of sight words and letters was in playing sight word and letter Twister where students became off-task and distracted by the silliness and fun of the game in three different instances.

## Chapter Five: Discussion

The analysis of all three forms of results examined the effectiveness and appeal of multisensory reading strategies and activities on five and six year old remedial reading students. In the experimental group, where the kinesthetic and tactile modalities were incorporated, four out of five students increased their number of recognized sight words, and five out of five increased their number of correctly identified upper and lowercase alphabet letters. The paired sample t-test revealed that the difference between students' pretest and posttest assessments were significant in all cases except for the control group's sight word learning where students were simply learning words by reading them off of flash cards and repeating them after their teacher.

The physical movement and tactile opportunities of the experimental group's method caused such a strong attraction for the young children. For example, the tracing of words and letters while they spoke letter sounds and words kept students' hands busy, allowing for a greater focus on what they were doing during a lesson. The playing of sight word/letter Twister engaged the five students' entire body and allowed them to stir from their seats and move around. Finally, the frequent writing on the wipe-off strips allowed the students to write with tools that excite and motivate them. Finally, it appeared, from researcher's observations, that the appeal of multisensory reading strategies was evident among all experimental subjects. Students in this group came to the table ready and enthusiastic about beginning, where they control group students seemed indifferent about the tasks. While extra materials might, at times, prove to be distracting to some students, they usually served as a tool used to help students retain more information.

In conclusion, the results of this study support the contention that multisensory instruction succeeds because it uses multiple sensory receptors thereby increasing students' attention to their task. Multisensory reading strategies and activities have also shown to be more interesting to young learners as they are able to use their touch, feel, say and hear words, letters, and sounds as they learn to read.

### **Implications of Research**

As stated in chapter one, most primary age students are tactile/kinesthetic (Carbo, 1993). For this reason, in the early primary grades, students should be given the opportunity to incorporate multisensory strategies into their learning of letters and words as to improve their reading abilities. The inclusion of multiple sensory modalities during reading makes words more memorable, more deeply mylineated into memory. Students see, pronounce and hear the words in the process, creating a representation of words with their own movements. Thus, *how* information is presented is an important factor in the learning process. An ancient Chinese proverb states, "I hear and I forget. I see and I remember. I do and I understand." These words have meaning for this study. In planning lessons, Teachers will not include all senses in their teaching every minute of every day, but they might however, do so as much as possible and when these types of strategies might best be applied. The important thing is that teachers might keep these ideas in mind. Presenting a variety of sensory experiences benefits all students and increases their likelihood of learning and retaining the information. Educators must act as facilitators, providing opportunities for the individual to essentially enable students to make more purposeful use of his or her senses.

## Limitations

Although the researcher attempted to eliminate potential confounds within the study, limitations inevitably exist in her results. The researcher recognizes this study is not representative of all five and six year olds, nor is it representative of all elementary classrooms, as it was conducted in a fairly diverse school in the Northeastern region of the United States. The researcher realizes that since observations were done during the same time each day, they were observing students at only one point in their school day. The researcher would have liked to have observed the teaching of the subjects in their classes for an entire day so that the teaching of letters and words outside of the study could have been observed and noted. This way, the researcher would know of the confounds that might be effecting the learning of sight words. The researcher's thinking was that each of the subjects was being influenced by daily teaching evenly, so that these results are not skewed but impact this study consistently across all subjects.

Since the researcher is a graduate student, she has formulated her own assumptions regarding letter and word recognition strategies. These assumptions are based on textbook learning, opinions of professors, and her own observations. She is aware that these beliefs may have affected their ability to observe objectively. The researcher believes that further investigation of multisensory reading strategies is necessary. Future research might explore the following topics:

- making matches between the child's learning style and activities.
- determining how these strategies improve on-task behaviors since there was evidence of this finding in this study.

- discovering the ways in which multisensory learning affects students with disabilities.

Lastly, since this study only researched the short-term effects of multisensory reading instruction, long term effects of this type of learning might also yield useful results.

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## Appendices

### Interview Questions

1. Do you like reading sight words from flash cards/tracing words and letters in salt and on the/making words with magnetic letters/writing them on the wipe-off strips/playing sight word/letter Twister?
2. Do you think that doing these activities helps you learn the words?  
Why/why not?
3. Which do you like best – reading flash cards, tracing in salt, making words with magnetic letters, writing on wipe-off strips, or playing sight word/letter Twister?



A A A



B B B



C C C



D D D



E E E



F F F



G G G



H H H



I I I



J J J



K K K



L L L



M M M



a a a



b b b



c c c



d d d



e e e



f f f



g g g



h h h



i i i



j j j



k k k



l l l



m m m

N N N

O O O

P P P

Q Q Q

R R R

S S S

T T T

U U U

V V V

W W W

X X X

Y Y Y

Z Z Z

n n n

o o o

p p p

q q q

r r r

s s s

t t t

u u u

v v v

w w w

x x x

y y y

z z z