Visual Phonics and Phonological Awareness Interventions: Stability of Gains in Language and Literacy

Mara Hampton
Visual Phonics and Phonological Awareness Interventions: Stability of Gains in Language and Literacy

BY

Mara Hampton

SENIOR HONORS THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

BACHELOR OF SCIENCE

IN THE DEPARTMENT OF COMMUNICATION DISORDERS AND SCIENCES,
EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2010

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING THE THESIS REQUIREMENT OF THE DEPARTMENTAL HONORS PROGRAM.

THESIS DIRECTOR

HONORS COORDINATOR

DEPARTMENT HEAD
Visual Phonics and Phonological Awareness Interventions: Stability of Gains in Language and Literacy

Mara Hampton

Eastern Illinois University
The current study was a follow-up to a pretest-posttest control group experiment that found speech and/or language impaired preschoolers significantly improved their receptive and expressive language skills after ten weeks of phonological awareness interventions. Following ten weeks of phonological awareness intervention, speech and/or language impaired preschoolers also made gains in early literacy skills, with greater gains in a phonological awareness group supplemented by See the Sound/Visual Phonics (visual phonics).

The present study was conducted as a follow-up six months later. The purpose was to determine the stability of gains from the two phonological awareness interventions on the development of auditory comprehension, overall language abilities, and early literacy skills. Specifically, the study examined the effect of phonological awareness intervention supplemented with visual phonics hand cues, in contrast with only phonological awareness intervention. Ten children identified as speech and/or language delayed were assigned to one of three groups that received (a) phonological awareness instruction, (b) phonological awareness instruction supplemented with visual phonics hand cues, or (c) no intervention. Two children were designated as a control group and eight were placed in each of two experimental groups.

Results demonstrated that preschoolers with speech and/or language impairment maintained gains in early literacy skills from phonological awareness intervention supplemented by visual phonics and phonological awareness alone. However, the control group also made similar gains in early literacy skills; therefore the gains could not be attributed solely to the phonological awareness treatments. The results showed that
preschoolers with speech and/or language impairment did not maintain gains in auditory comprehension from the phonological awareness interventions. Conversely, gains found in overall language development were maintained by the phonological awareness group alone, but were not maintain when the phonological awareness intervention was supplemented by visual phonics.
PHONOLOGICAL AWARENESS INTERVENTION

Acknowledgements

I would like to thank everyone who assisted in making this project a success. I would like to extend my sincere gratitude to my thesis chair Dr. Tina Veale, whose expertise, patience, and commitment added to my undergraduate experience. Despite her own tremendous responsibilities, she always offered her time and professional expertise to the development and writing of this undergraduate thesis, as well as her words of encouragement. I have learned more than I ever thought I would from this experience.

Also, thank you to Dr. Anthony, the Departmental Honor’s Coordinator, for her desire to encourage students to pursue research to enrich their education, and her assistance with testing. I would also like to thank teachers, staff, and parents at Mattoon Head Start and Newman Grade School for their participation and cooperation.

Thanks to all the Honors senior girls who struggled through this project with me. You were all constant companions throughout this process, and helped me to stay calm. A special thanks goes to my family for their love and encouragement. I want to thank my parents for their support and motivation throughout my undergraduate experience.
# Table of Contents

## Abstract

## Acknowledgements

## Table of Contents

## List of Tables

## List of Figures

## Chapter I-Introduction

## Chapter II-Review of Literature
- Phonological Awareness and Its Importance
- Impact of Phonological Awareness on Literacy Development
- Impact of Phonological Awareness on Language
- Visual Phonics and Its Importance
- Impact of Visual Phonics on Literacy Development
- Impact of Visual Phonics on Speech and Language
- Purpose of This study

## Chapter III-Methodology
- Subject Selection
- Procedures
- Data Analysis

## Chapter IV-Results
- Analysis of Language Abilities
- Analysis of Auditory Comprehension Abilities
- Analysis of Emergent Literacy Skills

## Chapter V-Discussion
- Summary of Results
- Stability of Gains from Phonological Awareness Intervention
- Stability of Gains from Phonological Awareness with Visual Phonics
- Phonological Awareness vs. Phonological Awareness Supplemented by Visual Phonics Intervention
- Relationship to Previous Research
- Clinical Implications
- Strengths of the Study
- Limitations of the Study and Need for Future Research
- Conclusions

## References
<table>
<thead>
<tr>
<th>Appendix A- Informed Consent</th>
<th>58</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix B- IRB Approval</td>
<td>61</td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pretest, Posttest 1, and Posttest 2 CELF-P:2 Core Language Standard Scores</td>
<td>37</td>
</tr>
<tr>
<td>2.</td>
<td>Pretest, Posttest 1, and Posttest 2 TACL-3 Quotient Scores</td>
<td>39</td>
</tr>
<tr>
<td>3.</td>
<td>Pretest, Posttest 1, and Posttest 2 PALS Average Percentage of Correctness Scores</td>
<td>41</td>
</tr>
</tbody>
</table>
List of Figures

Figure

1. Pretest, Posttest 1, and Posttest 2 CELF-P:2 Core Language Standard Scores 37
2. Pretest, Posttest 1, and Posttest 2 TACL-3 Quotient Scores 39
3. Pretest, Posttest 1, and Posttest 2 PALS Average Percentage of Correctness Scores 41
Chapter I

Introduction

Phonological awareness refers to an individual’s ability to identify sound or phonological structures of spoken words. Phonological awareness skills include distinguishing units of speech auditorily, such as words, syllables, individual phonemes, onsets, and rimes. A person's ability to blend and segment phonemes is critical for the development of decoding skills, reading fluency, and spelling. Phonological awareness is an important and reliable predictor of later reading ability (Schuele & Boudreau, 2008).

Rhyming, isolating sounds, segmenting, deleting, substituting, and blending sounds tasks are used to assess children’s knowledge of phonological awareness skills. Children who have well-developed phonological awareness when they come to school have a head start making sense of how sounds and letters operate in print. This ability is important for using sound-letter knowledge effectively in reading and writing. In fact, a student’s level of phonological awareness at the end of kindergarten is one of the strongest predictors of future reading success in grade one and beyond (Schuele & Boudreau, 2008). Many children begin kindergarten with well-developed phonological awareness. Some children seem to develop these skills fairly easily within a stimulating classroom environment, while others need more instruction that consciously and deliberately focuses on phonological awareness. More than 20 percent of students struggle with some aspects of phonological awareness, while 8–10% exhibit significant delays. Early intervention is crucial and can make a real difference to students with limited levels of phonological awareness (Hatcher, Hulme, & Ellis, 1994).
A speech-language pathologist may play a significant role in children's acquisition of phonological awareness skills. Speech-language pathologists possess sufficient knowledge and skills to provide effective phonemic awareness (i.e. manipulation of individual sounds) instruction. Phonemic awareness instruction is an important component of early literacy instruction, particularly for children who experience difficulty learning to read. Spencer, Schuele, Guillot, and Lee (2008) designed a study to assess specific phonemic awareness skills of various educators. This was important because they recognized that in order to teach a child to link sounds and print, educators must have explicit awareness of the sound structure of words. The measure included three tasks: phoneme segmentation, phoneme identification, and phoneme isolation. The educators tested included speech-language pathologists, kindergarten teachers, first-grade teachers, special education teachers, and reading teachers. Results found that speech-language pathologists demonstrated significantly higher phonemic awareness skills when compared to other educators.

There is abundant evidence that phonological awareness is important for literacy acquisition in languages where there is a systematic relationship between phonology and orthography (Hatcher et al., 1994; Hulme, Crane, & Snowling 2004; Muter, Hulme, Snowling, & Stevenson, 2004; Nation & Hulme, 1997; Wagner, Torgesen, & Rashotte, 1994). Implementation of phonological awareness training with young children has proven to be an effective strategy in developing literacy skills (Gillon, 2000). Muter et al. (2004) stated that learning to read aloud or decode words depends on letter knowledge and phoneme awareness. Hatcher et al. (1994) found that literacy development is
dependent on children's ability to link phonological awareness skills to letter knowledge and reading.

Limited research exists showing the impact of phonological awareness training upon the language and speech development of children. Dyke (2008) found significant improvements in participants' auditory comprehension following ten weeks of phonological awareness training. Orth's (2006) study showed that ten weeks of phonological awareness training produced significant gains in participants' expressive vocabulary. Hansen (2002) and Megli (2004) revealed significant gains in both receptive and expressive language skills of preschoolers following ten weeks of phonological awareness training.

Phonological awareness intervention and another technique, See-the-Sound/Visual Phonics (visual phonics) have been identified as effective in promoting the acquisition of literacy skills. Visual phonics, developed in 1982 by the International Communication Learning Institute, is a multi-sensory technique that uses hand-shapes and written symbols to develop awareness of all speech sounds in the English language. The visual phonics technique gives students a concrete way to understand speech sounds by providing visual and kinesthetic information (Montgomery, 2008). Visual phonics helps students understand a sound and how it is made, which is critical in literacy, language, and speech. The Visual phonics method is used to improve reading through the development of phonological awareness skills and speech through the development of articulation movements (Narr, 2008; Trezek & Malmgren, 2005; Trezek & Wang, 2006; Trezek, Wang, Woods, Gampp, & Paul, 2007).
PHONOLOGICAL AWARENESS INTERVENTION

Phonological awareness training and visual phonics have been shown to have positive effects on literacy, speech, and language. Limited research is available on the effects of phonological awareness intervention when integrated with visual phonics hand cues on children’s language and literacy skill development. No research has been conducted to see if the gains from phonological awareness and visual phonics training have a lasting effect on children.
Chapter II

Review of Literature

Phonological Awareness and Its Importance

According to Schuele and Boudreau (2008), phonological awareness is a processing skill that enables a child to analyze the sound structure of language. Phonological awareness skills range from simple to complex. Simple levels of phonological awareness involve the ability to attend to and make judgments about general sound structures. Tasks that require basic phonological awareness knowledge include segmenting words into syllables, identifying and generating rhymes, and matching words with the same beginning sound. A more complex level of phonological awareness is phonemic awareness, which is the ability to isolate and manipulate individual sounds or phonemes. Overall, phonological awareness requires a child to analyze, formulate judgments, and manipulate sounds in spoken words.

An understanding of phonological awareness is necessary to build a foundation for skillful word decoding in reading and spelling. The critical importance of phonological awareness is observed in the realization that an alphabetic script only holds value to a child who comprehends that words are composed of sounds (Schuele & Boudreau, 2008). Brady, Poggie, and Rapala (as cited in Mann & Foy, 2007) "suggested that differences between good and poor readers may lie in the accuracy of formulating phonological representations" (p. 52). Mann and Foy (2007) conducted a study with 102 preschool children and examined their phonological awareness in relation to whether children were delayed, typical, or advanced in articulation of consonants. They found that failure to master production of early developing consonants and a greater prevalence
of certain types of production errors were associated with deficient phonological awareness. It was also found that children who displayed no errors in consonants had advanced phonological awareness relative to other children in the sample.

van Kleeck, Gillam, and McFadden (1998) provided phonological awareness intervention to 16 preschool children with speech and/or language disorders for nine months. Results indicated that preschool children with speech and/or language impairment made significant gains in rhyming and phoneme awareness. The use of a control group showed that improvements were not due to maturation or regular curriculum instruction. The study confirmed that phonological awareness requires explicit training. The subjects ranged from four to five years of age. Both four and five year olds with speech and language impairment significantly improved rhyming ability and phoneme awareness following intervention. Clinical implications of the study suggested that phonological awareness intervention can be effective by four to five years of age.

**Impact of Phonological Awareness on Literacy Development**

During the past two decades, research has shown the effectiveness of phonological awareness intervention for young students who are at risk for reading difficulties. The National Reading Panel (National Institute of Child Health and Human Development, 2000) explicitly defined phonological awareness as a critical building block for successful reading achievement. Learning to read requires a child to understand the alphabetic principle, or that letters map into phonemes. For example, a child must comprehend that the word "cat" consists of the phonemes /k/ /æ/ /t/. A child's early letter
knowledge and phonemic skills, which are the foundation for mastery of the alphabetic principle, form the basis for the development of decoding (Hulme, et al., 2004).

Bird, Bishop, and Freeman (1995) investigated the link between expressive phonological impairment, phonological awareness, and literacy skills. Their study included 31 boys between the ages of five and seven years with expressive phonological impairment and a control group of normally developing boys. The results showed that the boys with expressive phonological impairment scored significantly below normally developing peers on measures of phonological awareness and literacy. Areas of difficulty included segmenting and matching onsets and rimes.

A longitudinal study of 90 children, conducted at the ages of four years-nine months, five years-nine months, and six years-nine months, demonstrated that learning to read aloud or decode depends on letter knowledge and phoneme awareness (Muter, et al., 2004). Results from the study suggested that comprehension depends on higher level language skills, such as understanding word meanings and grammatical structure. The children who demonstrated reading difficulties displayed problems learning to decode words and in reading comprehension.

As young children develop phonological awareness, they internalize the sound-based properties of words that allow sound-letter associations to be made. They build internal phonological representations by realizing that sounds in words can be manipulated to create new words. Children then internalize rules and patterns associated with sound-based properties. This allows them to successfully decode new words. Students have the ability to associate decoded words with those stored in their expansive
word banks. Comprehension in reading occurs when students can easily decode words and apply word meanings to the context of what they are reading (Narr, 2006).

According to Wagner, et al., (1994) children who exhibit proficient phonological awareness in kindergarten learn to read with greater ease than other children. They also concluded that while there are many variables that contribute to a child's ability to read, phonological awareness is the skill that is most closely related to future reading success. Nation and Hulme (1997) reported that the ability to segment phonemes is a strong predictor of reading and spelling abilities in young children. They showed that sound categorization and phonemic segmentation scores were significantly correlated with each other, with the subjects' age, and with reading and spelling ability.

Hatcher, et al. (1994) hypothesized that literacy development is dependent on children's ability to link phonological awareness skills to letter knowledge and reading. The subjects of their study were seven year old children who were reading delayed. The children were assigned to one of three experimental teaching conditions or a control condition. The three experimental groups consisted of reading instruction only, phonological awareness training only, and reading instruction combined with phonological awareness lessons. Phonological awareness lessons consisted of identification and production of rhyming words, the identification of words as units within sentences, the identification and manipulation of syllables, the identification and discrimination of sounds within words, sound synthesis (into words), word segmentation (into sounds), the omission of sounds from words, sound substitution within words, and the transposition of sounds within words. Reading instruction included re-reading a book, reading the book introduced at the end of the previous session, letter identification,
writing a story, and introducing a new book and attempting to read it. Reading
instruction combined with phonological awareness training included activities that linked
the two experimental groups. The linked activities included practicing letter-sound
associations, relating spelling to sounds with plastic letters, and writing words while
paying attention to letter-sound relationships. Children in the experimental groups
received two individual, thirty minute lessons each week in school, for twenty weeks.
The control group received no additional training.

The group given integrated reading and phonological awareness training
improved more in reading skills than did the other groups who were given equal amounts
of teaching concentrated solely on reading or on phonological awareness training alone.
The authors concluded that reading combined with the phonology program was effective
because it combined reading practice at easy instructional levels with letter-sound
training and phonological awareness training. Hatcher et al. (1994) also found that
interventions involving structured, phonically-based instruction, combined with explicit
phoneme awareness and grapheme-phoneme linkage training, were effective in helping
children who were experiencing difficulties in the early stages of learning to read. They
stated that teachers should target phonemic and phonological awareness skills during
reading instruction for poor readers.

Impact of Phonological Awareness on Language

The acquisition of phonological awareness skills requires cognitive and linguistic
abilities. It is well established that children with speech and language disorders are at
significant risk for delays in phonological awareness skills (Bird et al., 1995; Raitano,
Pennington, Tunick, Boada, & Shriberg, 2004; Rvachew, Ohberg, Grawburg, & Heyding,
For example, a study conducted in 2003 by Rvachew, et al. found that children with expressive phonological delays demonstrated significantly poorer phonemic perception and phonological awareness skills as compared to their normally developing peers.

Rvachew and Grawberg (2006) examined the relationships among variables that may contribute to poor phonological awareness in preschool-aged children with speech sound disorders using a linear structured equation model. The relationships between phonological awareness skills, speech perception, articulation, receptive vocabulary, and emergent literacy skills were assessed. Results illustrated that emergent literacy knowledge was almost entirely explained by phonological awareness; and that phonological awareness was predicted by speech perception and receptive vocabulary. Therefore, phonological awareness skills are delayed in children with speech sound disorders because they have poor speech perception abilities and/or relatively poor receptive vocabulary skills.

Hansen (2002) examined the changes in overall language abilities of preschool children who were developing language at a typical rate and children with mild language disorders. Hansen implemented a ten week phonological awareness training program involving nine subjects. The program used a sound-by-sound approach, in which the sounds that were chosen to target in therapy were based on those found to be most in error, according to the *Goldman-Fristoe Test of Articulation, 2nd Edition* (GFTA-2) (Goldman & Fristoe, 2000). Each sound was targeted in the phonological awareness training program for two weeks. Results from pre- and posttesting using the GFTA-2 and *Preschool Language Scale-Third Edition* (PLS-3) (Zimmerman, Steiner, & Pond, 1992)
documented significant changes in overall language and speech scores for both the
children who were developing language at a typical rate and those with language
impairment.

Even though Hansen (2002) found increases in the overall language abilities of all
nine subjects following phonological awareness training, she could not be certain of the
factors that produced these findings because no control group was implemented. Megli
(2004) replicated Hansen's study and incorporated a control group to verify whether
potential changes in her subjects were due to phonological awareness training. The
subjects of the study were nineteen three- and four-year old children. The subjects were
divided into groups representing children with typical speech, delayed speech, typical
language, and delayed language development. The phonological awareness training
activities focused on target phonemes that were most frequently in error within each
group of children. The activities included rhyming games, syllable counting, sound
segmentation, isolation of words in sentences, and blending of sounds in words. Based
on results attained from the PLS-3, phonological awareness training was found to
significantly increase the language and speech skills of the ten children in the
experimental groups. The control group showed no significant gains. Megli's (2004)
results corroborated Hansen's (2002) conclusions.

Gillon (2000) conducted a study using a phonological training program that was
administered to children who displayed spoken language impairment and early reading
delays. Their spoken language impairments included expressive phonological difficulties
and delayed semantic and syntactic development. Results of the study revealed that
children who received phonological awareness intervention achieved levels of
performance similar to typically developing students in the areas of phonological awareness, reading comprehension, and speech production. Orth (2006) compared the changes in auditory comprehension and expressive language skills in preschool children following ten weeks of phonological awareness training. She found that phonological awareness training produced a significant difference in expressive language scores on the *Preschool Language Scale – 4th Edition* (PLS-4) (Zimmerman, Steiner, & Pond, 2002).

In 2008, Dyke revealed significant gains in the auditory comprehension skills of three-and five-year old children following ten weeks of phonological awareness intervention in small groups. She also found that five-year old children made significantly greater gains in auditory comprehension following phonological awareness intervention than three-year old children. Participants consisted of twelve children with typically developing language. The control groups consisted of two three-year-old children and two five-year-old children, and the experimental groups included four three-year-old children and four five-year-old children. The phonological awareness intervention focused on activities designed to target specific phonological awareness tasks. The phonological awareness tasks included rhyming, phoneme discrimination, and syllable segmenting. The experimental groups met for approximately twenty minutes, two days per week. The control group did not receive phonological awareness training and participated only in the pre- and posttest phases of the study. Significant gains in the auditory comprehension skills of the three-and five-year old children were measured using the *Test of Auditory Comprehension of Language-3rd Edition* (TACL-3) (Carrow-Woolfolk, 1999). The scores obtained on the TACL-3 were also used to determine that
five-year old children made significantly greater gains in auditory comprehension following phonological awareness intervention than three-year old children.

**Visual Phonics and Its Importance**

Visual phonics is a multisensory strategy that represents all of the sounds of English with a hand-shape cue and a corresponding written symbol (Montgomery, 2008). Implementing the strategy of visual phonics allows for sounds to be symbolized concretely in a visible way. The hand-shape cues are tied kinesthetically to the production of the sounds of English. They were designed to resemble the look and feel of the sounds they represent. For example, the hand-shape for the /f/ sound is made by placing four fingers on the thumb with the palm facing your mouth, then quickly flicking the fingers upward off the thumb, representing movement of lips and teeth during production of /f/ (Waddy-Smith & Wilson, 2003). Written visual phonics symbols resemble the position or the movement of the hand during formation of a hand-shape. Because the visual phonics symbols logically represent the production of sounds, the alphabet is made less arbitrary. The purpose of teaching visual phonics is to make the sounds of English visually accessible through hand coding or writing the symbols, and tactilely accessible through coding of the symbols (Woolsey, Satterfield, and Roberson, 2006). Visual phonics is not a communication system; rather, it is a tool for conveying the phonemic information contained within isolated words.

After implementing visual phonics, Krupke (Montgomery, 2008) reported immediate improvements in students who had previously shown only limited therapeutic gains. Students began to produce more sounds with less examples or models. Krupke stated that when students used the hand-shape cues as they produced their target sounds,
sound accuracy was noticeably improved over when they did not use hand-shape cues. Sound accuracy was also found to be noticeably higher when students utilized the visual phonics hand-shapes than when they did not.

Visual phonics was designed as a tool to help with phoneme and word production for recognition in reading, spelling, and speech. Visual phonics focuses on phonemes which are the building blocks of a language. Thus, this system is designed to assist the students in manipulating phonemes, and developing phonemic awareness and phonics skills (Trezek et al., 2007). Visual phonics can be woven into any literacy activity in which sound awareness or sound/letter connections are being taught. For younger children, visual phonics makes rhyming words visual and kinesthetic, not just auditory. Being able to see and feel phonological concepts may serve to establish, enhance, or reinforce the literacy foundation provided by phonological awareness.

**Impact of Visual Phonics on Literacy Development**

One of the most complex skills a student must master is reading. Research has shown that phonemic awareness increases reading and spelling skills in preschool and kindergarten children (Yopp, 1992). Visual phonics provides visual access to phonological information that has been shown to be important in the reading process. Visual phonics gives deaf students the opportunity to play with representations of sounds and internalize them in a visual way. Deaf children, like hearing children, must learn the rules of English and use context cues to be able to discern which sounds match specific words (Woolsey et al., 2006). Visual phonics can provide a usable framework for teaching the rules for decoding print.
According to Waddy-Smith and Wilson (2003), students make connections between what they see on the lips (i.e. speech reading), what they say (speech production), and what they see in print (reading). Once these connections have been made, children can begin to incorporate visual phonics into learning to read. These authors described how to integrate visual phonics into a traditional phonological awareness program. When introducing rhyming words, the instructor presents words using visual phonics hand cues. By focusing on the hand cues, children are able to see similarity in how words look, and hear similarity in how the words sound. Children can see how many phonemes are in a given word by counting the number of visual phonics hand cues. Visual phonics hand cues allow children to differentiate if words begin or end with the same or different sounds. Finally, using visual phonics to present sounds in words provides visual feedback and enhances the ability to segment the sounds in words.

Visual phonics provides opportunities for children to learn about rhyming, unique spellings, multiple word meanings, dictionary skills, and other abilities that support reading. The American Speech-Language-Hearing Association (ASHA, 2001) notes that poor readers have deficits in phonological awareness, phonological memory, phonological retrieval, and phonological production. Waddy-Smith and Wilson (2003) found that deaf students who have problems with the reading process have a similar profile. Children who are deaf have difficulty with sequential memory for letters in words, sequential memory for words in sentences, decoding or encoding words, production of appropriate mouth movements, awareness of sound/symbol relationships, and speech production.
Trezek and Wang (2006) conducted a study to show the impact of a phonics-based reading curriculum (*Reading Mastery I Curriculum*) supplemented by visual phonics upon beginning reading skills. Thirteen students and three elementary school teachers from a hearing impaired program were recruited for the study. Students were placed into one of three groups based on age. Group one consisted of kindergarteners with an average age of five years, six months; group two was first graders with an average age of six years, one month; and group three was first graders with an average age of seven years, three months. All student participants had varying degrees of hearing loss, ranging from severe to profound, with two first graders using cochlear implants.

*The Direct Instruction Reading Mastery I*, a systematic program utilized to teach beginning reading skills, served as the curricular base for this intervention study. The phonics-based reading curriculum consisted of three sections, all focusing on the development of comprehension and decoding. The sections included skills in which students learned sound pronunciation, sequencing, oral blending, rhyming, symbol identification, picture comprehension, sequencing of events, vocabulary, vocabulary comprehension, picture comprehension, written comprehension activities, story reading, and reading fluency. Visual phonics was implemented throughout the phonics-based reading curriculum.

After receiving instruction from the *Reading Mastery I Curriculum* supplemented by visual phonics, the mean score of each group of students was significantly higher at posttest when compared to pretest measures. Results of a paired-sample t-test revealed that the findings obtained on the Word Reading subtest were statistically significant. The study indicated that given one year of instruction from a phonics-based reading
curriculum supplemented by visual phonics, kindergarten and first grade children who were deaf or hard-of-hearing displayed significantly improved letter naming, rhyme recognition and production, initial/final phoneme identification, sound blending, and reading comprehension.

Trezek et al. (2007) explored the results of utilizing visual phonics to supplement a phonics based reading curriculum, called *Literacy Across Columbus Elementary Schools* (LACES), for students who were deaf or hard-of-hearing. The study's participants included four teachers and 20 students in kindergarten and first grade. The student participants had varying degrees of hearing loss ranging from mild to profound (30-112 dB), with ten students using cochlear implants. The literacy program consisted of 90 minutes of daily instruction, which included explicit instruction in phonemic awareness and phonics, read aloud sessions, vocabulary training, reading and enrichment, and reteaching. In this study, visual phonics was implemented during the phonemic awareness and phonics training, vocabulary training, and word learning training. *The Dominic Reading and Writing Assessment Portfolio* was administered prior to implementation of the literacy program combined with visual phonics. The mean scores of each group were significantly higher at posttest than at pretest. Results indicated that one year of instruction using a phonics-based reading curriculum supplemented by visual phonics produced improvements in beginning reading skills, as measured by standardized assessments for kindergarten and first-grade students who were deaf or hard-of-hearing.

Narr (2006) presented an ethnographic look at the use of visual phonics in the classroom of a teacher intern. Narr reported that the teacher intern felt that progress in reading occurred at a faster pace, students became more independent spellers, the
quantity of vocabulary words increased, and word memory was enhanced. Narr (2008) examined the phonological awareness and decoding skills in ten students who were deaf or hard of hearing. The study followed the students from kindergarten through third grade. Literacy instruction was provided by two teachers certified in visual phonics. Both teachers incorporated visual phonics during the phonemic awareness and phonic aspects of the reading process. The students were taught to comprehend the relationship between hand cues, sounds they represented, and the corresponding letter in the alphabet.

Results indicated that students were able to use phonological information to make rhyme judgments and decode (Narr, 2008). They were able to complete the tasks of phonological awareness and decoding with greater than chance performance, which supported Narr’s hypothesis that reading instruction using visual phonics with deaf or hard-of-hearing students was correlated with increased ability to carry out phonological awareness and decoding tasks. Results showed no relationship between performance on reading ability and length of time in literacy instruction with visual phonics.

In 2010, Gergits conducted a study to determine the effectiveness of two phonological awareness interventions on the development of emerging literacy skills. The study examined the effect of phonological awareness intervention in conjunction with visual phonics hand cues, in contrast to phonological awareness intervention alone. The subjects of the study consisted of twenty-five preschool children ranging in age from 3 years-6 months to 5 years-6 months who were identified as speech and/or language delayed. All twenty-seven children were assigned to one of three groups that received (a) phonological awareness instruction, (b) phonological awareness instruction paired with visual phonics hand cues, or (c) no intervention. The control group, which received no
intervention, consisted of seven children; twenty children were placed in the two experimental groups. Both experimental groups participated in a ten week phonological awareness intervention program administered by two graduate students in Communication Disorders and Sciences. The phonological awareness interventions consisted of twenty-minute sessions, twice per week for ten weeks, for a total of twenty sessions, in small groups of three to four children.

The eight children in experimental group one received phonological awareness intervention consisting of activities such as rhyming, syllable counting, and sound segmentation and discrimination tasks. The second experimental group of ten children participated in a similar phonological awareness intervention program; however, visual phonics hand-shapes were integrated into the intervention. Descriptive data obtained from the *Phonological Awareness and Literacy Screening-Pre-Kindergarten* (PALS Pre-K) (Invernizzi, Sullivan, Meier, Swank, 2004) were examined to determine whether phonological awareness intervention or phonological awareness intervention supplemented with visual phonics hand cues impacted the emergent literacy skills development of preschool children with speech and/or language impairment. Results showed that group two, on average, scored the highest on the PALS Pre-K at posttest. Group one and the control group also showed improved scores at posttest. These results suggested that visual phonics played a role in facilitating increased performance in literacy skills measures by the PALS Pre-K; although, the total gains could not be attributed to the treatment alone.
Impact of Visual Phonics on Speech and Language

Trezek and Malmgren (2005) employed a pre- and posttest experimental design to evaluate the efficacy of implementing a phonics treatment package with deaf or hard-of-hearing middle-school aged children. Eleven students were randomly selected for the treatment group and twelve students were in the control group. Students in the control group continued to receive the standard reading curriculum, without visual phonics, while the treatment group received instructions from a phonics-based program. The visual phonics activities included pronunciation, sound introduction, and word reading. Visual phonics and the computer program Baldi, which revealed how the mouth shape, lip movement, and tongue placement work in conjunction to produce specific speech sounds and words, were incorporated into the treatment group's reading curriculum.

Students in the treatment group who received instruction from the phonics treatment package made statistically higher gains in identifying sounds in isolation, identifying sounds within words, and generalizing these skills to pseudowords, as compared to students in the control group who did not receive this instruction. Students in the treatment group also showed higher generalization skills of phonics knowledge compared to students in the other group. Teachers in the study observed an increase in the children's interest in speech production and ability to articulate sounds correctly. Responses on the posttest from students with significantly profound hearing loss included mouth movements and visual cues, whereas during the pretest, no motor movements were observed. The authors concluded that the presence of mouth movements in the children's responses indicated the children with more severe hearing loss were learning to connect letters to articulatory movements.
In 2009, Dyke conducted a study to determine the effectiveness of two phonological awareness interventions on the development of auditory comprehension, expressive language, semantics, and syntax. The study examined the effect of phonological awareness intervention in conjunction with visual phonics hand cues, in contrast to phonological awareness intervention alone. The subjects of the study consisted of twenty-seven preschool children ranging in age from 3 years-6 months to 5 years-6 months who were identified as speech and/or language delayed. All twenty-five children were assigned to one of three groups that received (a) phonological awareness instruction, (b) phonological awareness instruction paired with visual phonics hand cues, or (c) no intervention. The control group, which received no intervention, consisted of seven children; twenty children were assigned to two experimental groups. Both experimental groups participated in a ten week phonological awareness intervention program administered by two graduate students in Communication Disorders and Sciences. The phonological awareness interventions consisted of twenty-minute sessions, twice per week for ten weeks, for a total of 20 sessions, in small groups of three to four children.

The first experimental group of eight children received phonological awareness intervention consisting of activities such as rhyming, syllable counting, and sound segmentation and discrimination tasks. The second experimental group of ten children participated in a similar phonological awareness intervention program; however, visual phonics hand-shapes were integrated into the intervention. Results demonstrated that preschoolers with speech and/or language impairment significantly benefited from phonological awareness intervention coupled with visual phonics and phonological
awareness intervention alone. No significant differences were found between experimental groups one and two. Auditory comprehension, expressive language, language content and language structure improved significantly following ten weeks of either phonological awareness intervention integrated with visual phonics or phonological awareness intervention alone. These results suggested that visual phonics did not significantly impact language development over the course of a ten week phonological awareness program.

Purpose of This Study

Previous studies have demonstrated the relationship between phonological awareness, reading, and language skills. Poor reading and/or language skills are prevalent in children who have communication disorders. Likewise, children with communication impairment also display deficits in phonological awareness skills. Research has shown that a child's phonological awareness and phonics skills influence their decoding abilities and later reading achievement. Studies have supported the idea that phonological awareness training increases the acquisition of reading skills (Hatcher et al., 1994; Nation & Hulme, 1997; Wagner et al., 1994).

Visual phonics, a symbol system that represents the sounds of letters in a tactile, kinesthetic, and visual manner, may be an effective tool in teaching phonological awareness to children whose phonological skills are immature. Bringing together the visual phonics system and phonological awareness training may be effective in building children's phonological representations. The visual phonics symbols allow the child to visualize a sound and connect it to a letter, rather than only hearing the sound. Previous studies have found the use of visual phonics combined with language-based curricula to
be effective for deaf or hard-of-hearing populations (Narr, 2008; Trezek & Malmgren, 2005; Trezek & Wang, 2006; Trezek et al., 2007).

Few studies have researched the effectiveness of phonological awareness intervention on the development of language. Dyke (2008) found that following a ten week phonological awareness training program, auditory comprehension skills of typically developing preschool children significantly improved. Another study by Dyke (2009) found that auditory comprehension, expressive language, language content and language structure improved significantly following ten weeks of either phonological awareness intervention supplemented with visual phonics or phonological awareness intervention alone. Gergits (2010) study found greater improvements in early literacy skills following ten weeks of phonological awareness intervention with or without visual phonics hand cues compared to a control group, which received no intervention.

There are few longitudinal efforts or studies that examine long-term impacts of phonological awareness or phonological awareness supplemented by visual phonics. This study will be conducted to determine the permanence of overall gains in language and literacy skills of preschool children with language impairment following a six month lapse of time without phonological awareness training or visual phonics implementation.

The following research questions will be addressed:

1. After a six month lapse, to what extent do speech-language impaired preschoolers maintain gains from treatment with phonological awareness intervention in language and literacy skills?
2. After a six month lapse, to what extent do speech-language impaired preschoolers maintain gains from treatment with phonological awareness intervention supplemented by visual phonics in language and literacy skills?

3. After a six month lapse, is there a difference noted between the phonological awareness intervention vs. the phonological awareness intervention supplemented by visual phonics upon language and literacy abilities?
Chapter III

Methodology

Subject Selection

Subjects were recruited from those who participated in joint studies by Dyke (2009) and Gergits (2010). Of the original twenty-five preschool children who ranged in age from 3 years-6 months to 5 years-6 months, ten were available for follow-up testing. Children were recruited from two at-risk preschools in central Illinois, including three children who were enrolled in a preschool program, and seven children who were enrolled in a prekindergarten program at an elementary school. Participant selection for the previous study was based on the following criteria: (a) displayed language impairment as determined by the results of the Test of Auditory Comprehension of Language-3rd Edition (TACL-3; Carrow-Woolfolk, 1999) and the Clinical Evaluation of Language Fundamentals – Preschool 2nd Edition (CELF-P:2; Wiig, Secord, & Semel, 2004); (b) displayed speech impairment as determined by the results on the The Goldman-Fristoe Test of Articulation – 2nd Edition (GFTA-2; Goldman & Fristoe, 2000); (c) normal visual acuity based upon teacher report; (d) English as the primary language; and (e) no known cognitive deficits based upon teacher report. The children in the study were previously placed in one of the following groups based on location: experimental group #1 (phonological awareness intervention); experimental group #2 (phonological awareness intervention supplemented by visual phonics); and control group (no intervention).
PHONOLOGICAL AWARENESS INTERVENTION

Procedures

The previous study by Gergits (2010) utilized a pretest-posttest control group design to compare the effectiveness of phonological awareness intervention and phonological awareness intervention supplemented by visual phonics in supporting the development of the following emergent literacy skills in the three groups: alphabet knowledge, beginning sound awareness, print awareness, word awareness, rhyme awareness, syllable blending, syllable segmenting, and nursery rhyme awareness. In the same project, a separate study by Dyke (2009) examined the effectiveness of phonological awareness intervention and phonological awareness training in conjunction with visual phonics on the auditory comprehension and expressive language abilities of preschool children with language impairment. The study also determined whether gains in overall language development of language-impaired preschool children who received phonological awareness training were significantly different from those who received phonological awareness training supplemented by visual phonics.

The current study utilized a time series design as a follow-up to Dyke (2009) and Gergits (2010). The intent of the study was to repeat testing six months following completion of the original studies using the same standardized and criterion referenced tests. The assessments were administered by a licensed speech-language pathologist or a supervised undergraduate student Communication Disorders and Sciences. Three standardized tests were administered to the subjects, including the Test of Auditory Comprehension of Language (TACL-3), the Clinical Evaluation of Language Fundamentals (CELF-P:2), and the Phonological Awareness and Literacy Screening – Pre-Kindergarten (PALS-Pre-K) (Invernizzi, Sullivan, Meier, Swank, 2004) or the
Phonological Awareness and Literacy Screening-Kindergarten (PALS-K) (Invernizzi, Juel, Swank, & Meier, 2007). The TACL-3 is a standardized assessment of receptive language development and was administered to assess the subjects' receptive language abilities. The CELF-P:2 assessed overall language abilities among the subjects and consists of both auditory comprehension and expressive subtests. The PALS-PreK or the PALS-K assessment of emergent literacy skills was administered to determine the subjects' alphabet knowledge, sound awareness, print awareness, and rhyme awareness.

**Data Analysis**

The performance of each group was evaluated using descriptive statistics. Inferential statistics were not applied given the low number of subjects. Inspection of data was also conducted to determine the relative performance of each group over time. This allowed the researcher to determine whether subjects maintained gains in language and literacy after treatment was terminated.
Chapter IV

Results

Subjects remained in the groups to which they had previously been assigned in the Dyke (2009) and Gergits (2010) studies. Groups included a phonological awareness intervention (PA) group, N=2; phonological awareness intervention supplemented by visual phonics hand cues (PA + VP), N=6; and control group, N=2.

Analysis of Language Abilities

The sum of standard scores from three subtests of the CELF-P:2, Sentence Structure, Word Structure, and Expressive Vocabulary, made up the Core Language score for each subject. Core Language scores of the CELF-P:2 (Wiig et al., 2004) were used to determine the overall language development of each group.

To address the research question regarding whether phonological awareness intervention or phonological awareness intervention supplemented by visual phonics maintained gains in overall language development of preschool children with delayed speech and/or language, visual inspection of tabled data and descriptive statistics were employed. Table 1 and Figure 1 display the CELF-P:2 core language score data.
Table 1.

Pretest, Posttest 1, and Posttest 2 CELF-P:2 Core Language Standard Scores

<table>
<thead>
<tr>
<th>Subject</th>
<th>Group 1 Phonological Awareness</th>
<th>Group 2 Visual Phonics</th>
<th>Group 3 Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post 1</td>
<td>Post 2</td>
</tr>
<tr>
<td>S1</td>
<td>81</td>
<td>88</td>
<td>94</td>
</tr>
<tr>
<td>S7</td>
<td>55</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>S12</td>
<td>98</td>
<td>133</td>
<td>108</td>
</tr>
<tr>
<td>S16</td>
<td>63</td>
<td>90</td>
<td>69</td>
</tr>
</tbody>
</table>

As Figure 1 demonstrates, Group 1 (N=2) showed an average standard score gain of 7.5 points from pretest to posttest 1, immediately following phonological awareness intervention. Six months later, at posttest 2, this same group maintained the gains realized after intervention and showed a further average gain of 3.0 points (net overall...
gain from pretest to posttest 2 of 10.5 points). Group 2 (N=6) showed an average standard score gain of 28.1 points following phonological awareness intervention supplemented by visual phonics hand cues. These gains were not maintained six months after intervention, with an average 14.3 point drop in scores (net overall average gain from pretest to posttest 2 of 13.8 points). The control group (N=2) which received no intervention during the study showed an average standard score gain of 4.0 points from pretest to posttest 1, and an average gain of 12.0 points from posttest 1 to 2 (net overall average gain from pretest to posttest 2 of 16.0 points).

**Analysis of Auditory Comprehension Abilities**

The *Test of Auditory Comprehension of Language, 3rd Edition (TACL-3)* (Carrow-Woolfolk, 1999) was used to evaluate auditory comprehension abilities of the three groups. The sum of standard scores from three subtests of the *TACL-3, Vocabulary, Grammatical Morphemes, and Elaborated Phrases and Sentences*, made up the Quotient score. Quotient scores of the *TACL-3* were used to determine the average receptive vocabulary, grammar, and syntax skills of each group during the course of the study.

To address the research question regarding whether the subjects who received phonological awareness intervention or phonological awareness intervention supplemented by visual phonics maintained gains in auditory comprehension, visual inspection of tabled data and group means were utilized. Table 2 and Figure 2 display the *TACL-3* quotient score data.
Table 2.

As Figure 2 demonstrates, Group 1 (N=2) showed an average quotient score gain of 3.5 points from pretest to posttest 1, immediately following phonological awareness intervention. Six months later, at posttest 2, this group failed to maintain the gains.
realized after intervention and showed an average drop of 1.0 point in their quotient scores (net overall gain from pretest to posttest 2 of 2.5 points). Group 2 (N=6) showed an average quotient score gain of 9.5 points following phonological awareness intervention supplemented by visual phonics hand cues. These gains were not maintained six months after intervention, with an average 6.7 point drop in scores (net overall average gain from pretest to posttest 2 of 2.8 points). The control group (N=2) which received no intervention during the study showed an average standard score gain of 2.0 points from pretest to posttest 1, but then lost ground with an average drop of 4.5 points from posttest 1 to 2 (net overall average loss from pretest to posttest 2 of 2.5 points).

Analysis of Emergent Literacy Skills

The Phonological Awareness Literacy Screening-Kindergarten (PALS-K) (Invernizzi, et al., 2007) and Phonological Awareness Literacy Screening-Pre-Kindergarten (PALS-Pre-K) (Invernizzi, et al, 2004) were used to evaluate emergent literacy abilities of the three groups. The average percentage of correctness from the PALS-K and PALS-Pre-K was calculated to compare the growth in emergent literacy skills, including such skills as name writing, lowercase alphabet recognition, letter sound recognition, beginning sound recognition, and rhyme awareness.

To address research questions regarding whether phonological awareness intervention or phonological awareness intervention supplemented by visual phonics maintained gains in emergent literacy skills of preschool children with delayed speech and/or language, data from the PALS assessments were evaluated. Visual inspection of
tabled data and group mean scores were examined. Table 3 and Figure 3 display the PALS percentage of correctness score data.

<table>
<thead>
<tr>
<th>Group 1: Phonological Awareness</th>
<th>Group 2: Visual Phonics</th>
<th>Group 3: Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>Pre</td>
<td>Post 1</td>
</tr>
<tr>
<td>S1</td>
<td>9.6</td>
<td>35.2</td>
</tr>
<tr>
<td>S7</td>
<td>4.8</td>
<td>12.8</td>
</tr>
<tr>
<td>S12</td>
<td>16.8</td>
<td>76.8</td>
</tr>
<tr>
<td>S16</td>
<td>31.2</td>
<td>44</td>
</tr>
</tbody>
</table>

*Table 3.*

Pretest, Posttest 1, and Posttest 2 PALS Average Percentage of Correctness Scores

![Graph showing data for Group 1: PA, Group 2: PA+VP, and Group 3: Control.](image)

*Figure 3.*
Upon inspection of Figure 3, it is apparent that Group 1 (N=2) showed an average percentage of correctness score gain of 17.1 points from pretest to posttest 1, immediately following phonological awareness intervention. Six months later, at posttest 2, this group continued to gain in early literacy skills, showing a further gain of 7.1 percentage points (net overall gain from pretest to posttest 2 of 24.4). Group 2 (N=6) showed an average percentage of correctness score gain of 25.2 points following phonological awareness intervention supplemented by visual phonics hand cues. These gains were magnified six months after intervention, with an additional average gain of 27.5 percentage points (net overall average gain from pretest to posttest 2 of 52.7 percentage points). The control group (N=2) who received no intervention during the study showed an average percentage of correctness score gain of 8.4 points from pretest to posttest 1, and an additional gain of 32.6 percentage points from posttest 1 to 2 (net overall average percentage gain from pretest to posttest 2 of 41 percentage points).
CHAPTER V  
Discussion

Summary of Results

The purpose of this study was to determine the stability of gains in overall language, auditory comprehension, and early literacy skills from two phonological awareness interventions. Specifically, the study examined the maintained effect of phonological awareness intervention integrated with visual phonics hand cues, in contrast to only phonological awareness intervention. Previous research has proposed that phonological awareness intervention supports receptive and expressive language development in children with speech and/or language impairment (Hansen, 2002; Megli, 2004). Dyke’s (2008) study also demonstrated that phonological awareness intervention supports auditory comprehension development in typically developing children. Other studies have shown the effectiveness of visual phonics in deaf or hard-of-hearing populations (Narr, 2008; Trezek & Malmgren, 2005; Trezek & Wang, 2006; Trezek et al., 2007).

Results of this study revealed that gains made in overall language development, language comprehension abilities, and literacy development were not universally stable six months after phonological awareness intervention for children with speech and/or language impairment. Specific findings will be discussed in the following section.

Stability of Gains from Phonological Awareness Intervention

Gains in overall language development were stable and showed a slight increase after a six month lapse where no intervention was implemented, but the control group also showed growth, suggesting that the change might not have been due to the
phonological awareness treatment. Auditory comprehension gains were not stable, with a slight decrease after a six month lapse where no intervention was implemented. Similar performance by the control group and the other experimental group (PA+VP) were also noted, suggesting that children with speech and/or language impairment may need ongoing intervention to maintain gains. Early literacy skill gains were maintained and significant growth was realized for children who received phonological awareness treatment, as well as those who received phonological awareness with visual phonics (PA + VP) and the control group. This suggests that while phonological awareness intervention had immediate impact on early literacy skill acquisition, over time other factors may influence ongoing development of literacy.

**Stability of Gains from Phonological Awareness Intervention with Visual Phonics**

Despite impressive growth immediately following phonological awareness treatment supplemented by visual phonics, overall language gains were not found to be stable six months later, while the control group continued to increase in language abilities. This suggests that children with speech and/or language impairment require ongoing intervention to support early gains realized from phonological awareness supplemented by visual phonics. Also, auditory comprehension gains realized immediately after ten weeks of phonological awareness intervention supplemented by visual phonics were not maintained after a six month lapse of time where no intervention was implemented. The control group also lost ground in auditory comprehension skills. This again supports the notion that ongoing treatment, rather than only ten weeks, may be necessary for children with speech and/or language impairment. Gains in early literacy skills were maintained and magnified following six months of no intervention. While
initial gains were relatively modest, gains six months later were robust. The control
group also showed significant gains, however, negating the conclusion that phonological
awareness intervention supplemented by visual phonics was responsible for these results.
It is interesting that the PA + VP group made greater gains than the PA only group,
suggesting that the early literacy gains may take time to be revealed, and that visual
phonics may facilitate significantly greater gains than phonological awareness
intervention alone.

Phonological Awareness vs Phonological Awareness Supplemented by Visual
Phonics Intervention

In the area of overall language, early gains by children with speech and/or
language impairment appeared greater following phonological awareness intervention
supplemented by visual phonics as compared to phonological awareness alone (Dyke,
2009). Six months later, the gains of all three groups appeared similar. As reported
previously, Group 1 (PA) had a net gain from pretest to posttest 2 of 10.5 points, Group
2’s net gain was 13.8 points, and the control group’s net gain was 16 points. This
suggests that visual phonics may facilitate rapid skill acquisition in speech and/or
language impaired children, but ongoing treatment is needed to maintain these
improvements.

In the area of auditory comprehension, early gains by children with speech and/or
language impairment appeared significantly greater following phonological awareness
intervention supplemented by visual phonics rather than phonological awareness alone
(Dyke, 2009). None of the three groups showed stable gains six months after
interventions were stopped. Group 1’s net gain from pretest to posttest 2 was 2.5 points,
Group 2’s net gain was 2.8 points, and the control group’s net gain was 2.5 points. Again, it appears that children with speech and/or language impairment require ongoing intervention.

In the area of early literacy skills, early gains by children with speech and/or language impairment appeared greater following phonological awareness intervention supplemented by visual phonics as opposed to phonological awareness alone (Gergits, 2010). All three groups maintained and improved their scores dramatically after six months of no intervention. The PA+VP group showed the most growth. Group 1’s net gain from pretest to posttest 2 was 24.4 points, Group 2’s net gain was 52.7 points, and the control group’s net gain was 41 points. It may be that visual phonics assists children with speech and/or language impairment to establish sound-symbol relationships that lead to increased growth in literacy skills over time. It is important to note that the control group also increased their skills, indicating that factors other than phonological awareness or visual phonics contributed to increases in the subject’s literacy scores.

Relationship to Previous Research

Results from this study lend support to Hansen’s (2002) and Megli’s (2004) previous findings that phonological awareness intervention alone positively impacted overall language skills of children with speech and/or language impairment. Data from these studies indicated that direct, ten week phonological awareness intervention significantly improved receptive and expressive language skills of preschool children with speech and/or language impairment. Hansen (2002) examined auditory comprehension and expressive language from pretest to posttest. Megli (2004) replicated
Hansen’s (2002) study and included a control group to show that the gains realized in language were attributable to the phonological awareness intervention.

In this study, speech and/or language impaired preschoolers who received phonological awareness intervention only maintained gains in overall language abilities for six months following intervention. These findings from the current study question results of Dyke’s (2008) study, which showed that ten weeks of phonological awareness intervention was adequate time to establish significant improvement in auditory comprehension of typically developing preschool children. It should be noted that Dyke’s subjects had typical language abilities, where as the subjects from the current study were speech and/or language impaired, which may have impacted the maintenance of language gains.

In this study, subjects who received phonological awareness with or without visual phonics maintained and increased their early literacy gains for six months following interventions. These results also support Gillon’s (2000), study which found that implementation of phonological awareness training with young children was an effective strategy in developing literacy skills. Gillon’s data indicated that children who received phonological awareness training made significantly more gains in phonological awareness and reading abilities than children who received no intervention or another type of language intervention. Also, Gillon (2000) found that the children with spoken language impairment who received phonological awareness training had similar final results in the areas of phonological awareness and reading comprehension to typically developing children at the end of the study.
A possible explanation for the visual phonics group not maintaining language gains could be reliance on kinesthetic learning (Trezek & Malmgren, 2005; Trezek & Wang, 2006; Trezek et al., 2007). The kinesthetic feature of the visual phonics hand-shape cues makes sounds of words visual and kinesthetic, rather than just auditory. The participants in the PA + VP group showed significant gains in language development immediately following intervention, but were not able to maintain those gains when no intervention was implemented. Therefore, being able to see and feel phonological concepts may not allow the child to internalize the concepts of the sounds; therefore, when the hand signals were removed, the children did not maintain the gains made.

Clinical Implications

A number of notable conclusions may be drawn from this study. First, speech-language pathologists should consider the duration and intensity of intervention. Duration is defined as the total length of intervention (e.g., ten weeks) and intensity as the frequency of intervention (e.g., twice a week for 20 minutes). The National Reading Panel (NICHD, 2000) found that 5 to 18 hours of intervention provided substantial benefit, with longer programs not necessarily leading to greater benefit. Typical phonological awareness intervention programs have been spread over 7 to 12 weeks, with three to five sessions per week, 15 to 30 minutes in length (Ball & Blachman, 1988). Most studies to date that have focused on phonological awareness intervention have included children with widely varying abilities, and some studies removed the children who were at risk for reading and academic failure. It is difficult to know if children with speech and/or language impairment will respond to similar duration or intensity of intervention. The intervention that was provided for this study was relatively short,
occurring in two, 20-minute sessions per week over a ten week period. This short intervention produced significant positive changes in receptive and expressive language development and showed gains in early literacy development of preschoolers with speech and/or language impairment; however, the gains in language were not maintained once the intervention was terminated. This study suggested that two, 20 minute sessions per week over ten weeks of intervention may not be an adequate amount of time for solidifying language changes. Ten weeks of intervention may, however, be an adequate amount of time for small changes that produce lasting effects in early literacy skill development.

**Strengths of the Study**

The present study was a follow up to a pretest-posttest control group study. It analyzed the stability of gains in language and early literacy skills for preschool children with speech and/or language impairment after a six month period with no further intervention. Adding a second posttest allowed for measurement of changes in receptive language, overall language abilities, and early literacy skills over time. A control group was incorporated to determine if changes in development of language and early literacy skills for the experimental groups 1 and 2 could be attributed to one of the experimental phonological awareness interventions, or if the changes could have been due to other factors.

**Limitations of the Study and Need for Future Research**

Children in the study were from two different schools and five different classrooms. The researchers did not control for variability in children’s preschool and kindergarten curricula. Also, only a small amount of participants from the previous study
(Dyke, 2009; Gergits, 2010) were available for testing. This resulted in fewer subjects for the phonological awareness only (N=2) and control groups (N=2), as compared to the larger number of subjects available for the phonological awareness group supplemented by visual phonics (N=6). The discrepancy in number of subjects per group may have skewed the results.

Ongoing research is needed to address a series of questions raised by this study. The intervention time period implemented by the study was ten weeks. Significant results were achieved in receptive and expressive language and positive gains were attained in early literacy skills immediately following ten weeks of intervention. However, after six months without ongoing intervention, the significance of the early gains in language were diminished except for the phonological awareness group. Longer duration and/or greater frequency of intervention should be investigated.

Participants in the study were diagnosed as speech and/or language impaired. Future research should examine subjects who demonstrate only language impairment. Subjects with speech disorders only should be eliminated for increased homogeneity of the groups. In light of the particular linguistic difficulties experienced by this population, the amount of support needed to effect change could be different for speech vs language impaired children.

Phonological awareness intervention was implemented through small group, pull-out sessions. No intervention was implemented during classroom time or in the home environment. Future research should examine the effects of extending intervention into the classroom and/or home environments.
**Conclusions**

During the past several decades, research has provided a great deal of insight into variables that contribute to success in learning to read and write. Phonological awareness is a critical skill that contributes to the acquisition of literacy, and is now included in preschool and kindergarten curricula. Some children are not able to master skills in phonological awareness through exposure from classroom curricula, and need direct intervention that targets these skills. Children with communication disorders (i.e. speech and/or language impairment) are more likely to develop reading difficulties than children meeting normal language milestones and more likely to need more intervention to develop phonological awareness skills (Boudreau & Hedberg, 1999).

This study provided information regarding the stability of gains in language development and early literacy skills from two directly implemented small-group phonological awareness interventions. One experimental condition, phonological awareness supplemented by visual phonics, showed promise in maintaining early literacy gains, but not in maintaining language gains of preschool children with speech and/or language impairment. The other experimental condition, phonological awareness alone, showed promise in maintaining overall language development and early literacy skills of preschool children with speech and/or language impairment. As research continues to explore the effectiveness of phonological awareness intervention and the specific methods that yield the greatest gains for children, speech-language pathologists can become more efficient and effective in applying phonological awareness techniques.
References


PHONOLOGICAL AWARENESS INTERVENTION


Narr, R. F. (2006). *Applying see the sound/visual phonics to literacy and vocabulary instruction with DHH students.* Presentation at the meeting of the Association of College Educators of the Deaf and Hard of Hearing; Denver, CO.


Appendix A

CONSENT TO PARTICIPATE IN RESEARCH

Maintenance of Gains from Phonological Awareness Interventions in Language Impaired Preschoolers.

You are invited to participate in a research study conducted by Mara Hampton and Dr. Tina K. Veale, from the Communication Disorders and Sciences department at Eastern Illinois University. Your participation in this study is entirely voluntary. Please ask questions about anything you do not understand, before deciding whether or not to participate.

• PURPOSE OF THE STUDY

The purpose of this research is to determine if the gains made in overall language development and pre-literacy skills of preschool children with delayed language abilities achieved from the phonological awareness intervention in conjunction with visual phonics instruction are maintained over a six month period. Phonological awareness is the ability to break speech into units of sound that can be manipulated to form new words and sentences. It is a foundational ability that is required for children to learn to speak and read. While phonological awareness intervention is popular in both early childhood curricula and in speech-language therapy programs, there has been little research to document the maintenance of gains from phonological awareness intervention on language development of preschool children. Visual phonics is a multisensory strategy that represents all of the sounds of English with a hand-shape cue and a corresponding written symbol. For over 20 years, visual phonics has been a tool in literacy instruction with deaf/hard-of-hearing students. Teachers, speech-language pathologists, paraprofessionals, and parents have also reportedly used visual phonics and seen improvements in their children. This study seeks to evaluate if the previous gains made from the phonological awareness intervention supplemented by visual phonics were maintained after a six month period.

• PROCEDURES

If you volunteer your child to participate in this study, s/he will be asked to do the following:

Preschool children will be administered four standardized tests by an undergraduate student and a licensed speech-language pathologist to determine their production of speech sounds, their pre-literacy abilities, and language abilities. The Goldman-Fristoe Test of Articulation – 2nd Edition (GFTA-2) will be the standardized test uses to assess each child’s speech abilities. Children will be shown a picture and required to verbalize a one-word response for the administrator. The Clinical Evaluation of Language Fundamentals – Preschool 2nd Edition (CELF-P:2) will be the primary standardized test chosen to assess overall language abilities among all children. The test will consist of both auditory comprehension and expressive subtests. Each child will be asked to point to pictures or to verbalize answers to test questions. The Test of Auditory Comprehension of Language – 3rd Edition (TACL-3), a standardized test of receptive language development, will be administered to assess each child’s ability to understand what is spoken to him or her. Each child will be asked to point to pictures. Children who score below average on the CELF-P:2 and TACL-3 will be selected to participate in the study. The Phonological Awareness and Literacy Screening – Pre-Kindergarten (PALS-Pre-K) will be the final standardized test chosen to assess
each child’s alphabet knowledge, speech sound awareness, print awareness, and rhyme awareness. Testing will require approximately 90 minutes per child.

- **POTENTIAL RISKS AND DISCOMFORTS**

  Overall risks are considered minimal. Participant may become mildly frustrated during testing or intervention. This should be minimal and of short duration. This study will not pose any safety or health concerns.

- **POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY**

  Information regarding whether phonological awareness intervention in conjunction with visual phonics has a lasting effect on language development, speech, and literacy skills of preschool children with language delays. This is beneficial to the researcher as a student in the Communication Disorders and Sciences department. The information obtained from this study may be beneficial to other professionals such as early education providers, elementary education teachers, speech-language pathologists and special education teachers.

- **CONFIDENTIALITY**

  Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of storing test data in a filing cabinet in a locked office at the EIU Speech-Language-Hearing Clinic. When presenting results of the study, pseudonyms will be used to protect the identity of the participants.

- **PARTICIPATION AND WITHDRAWAL**

  Participation in this research study is voluntary and not a requirement or a condition for being the recipient of benefits of services from Eastern Illinois University or any other organization sponsoring the research project. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind or loss of benefits or services to which you are otherwise entitled.

  You may also refuse to answer any questions you do not want to answer. There is no penalty if you withdraw from the study and you will not lose any benefits to which you are otherwise entitled.

- **IDENTIFICATION OF INVESTIGATORS**

  If you have any questions or concerns about this research, please contact Mara Hampton at 217-549-9880 or Tina K. Veale at 217-581-2712, EIU Speech-Language-Hearing Clinic, 600 N. Lincoln Avenue, Charleston, IL, 61920.

- **RIGHTS OF RESEARCH SUBJECTS**
If you have any questions or concerns about the treatment of human participants in this study, you may call or write:

Institutional Review Board
Eastern Illinois University
600 Lincoln Ave.
Charleston, IL 61920
Telephone: (217) 581-8576
E-mail: eiuirb@www.eiu.edu

You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with EIU. The IRB has reviewed and approved this study.

I hereby consent to the participation of ________________________________________, a minor/subject in the investigation herein described. I understand that I am free to withdraw my consent and discontinue my child's participation at any time.

Signature of Minor/Handicapped Subject's Parent or Guardian   Date

I, the undersigned, have defined and fully explained the investigation to the above subject.

Signature of Investigator   Date
Thank you for submitting a proposed modification to the research protocol titled "Maintenance of Gains from Phonological Awareness Interventions in Language Impaired Preschoolers", IRB number 09-113, for review by the Eastern Illinois University Institutional Review Board (IRB). The IRB has reviewed and approved the addition of Mattoon Head Start as a study site. The approval is effective 12/9/2009. You may continue with your research through 10/22/2010.

The approval of this protocol and its modifications is valid only for the research activities, timeline, and subjects described in the above named protocol. IRB policy requires that any changes to this protocol be reported to, and approved by, the IRB before being implemented. You are also required to inform the IRB immediately of any problems encountered that could adversely affect the health or welfare of the subjects in this study. Please contact me, or the Compliance Coordinator at 581-8576, in the event of an emergency. All correspondence should be sent to:

Institutional Review Board
c/o Office of Research and Sponsored Programs
Telephone: 581-8576

Thank you for submitting the research protocol titled, "Maintenance of Gains from Phonological Awareness Interventions in Language Impaired Preschoolers" for review by the Eastern Illinois University Institutional Review Board (IRB). The IRB has approved this research protocol following an Expedited Review procedure. IRB review has determined that the protocol involves no more than minimal risk to subjects and satisfies all of the criteria for approval of research.

This protocol has been given the IRB number 09-113. You may proceed with this study from 10/23/2009 to 10/22/2010. You must submit Form E, Continuation Request, to the IRB by 9/22/2010 if you wish to continue the project beyond the approval expiration date.

This approval is valid only for the research activities, timeline, and subjects described in the above named protocol. IRB policy requires that any changes to this protocol be
reported to, and approved by, the IRB before being implemented. You are also required to inform the IRB immediately of any problems encountered that could adversely affect the health or welfare of the subjects in this study. Please contact me, or the Compliance Coordinator at 581-8576, in the event of an emergency. All correspondence should be sent to:

Institutional Review Board  
c/o Office of Research and Sponsored Programs  
Telephone: 581-8576  
Fax: 217-581-7181  
Email: eiuirb@www.eiu.edu