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THE EFFECTS OF VISUAL REPRESENTATIONS ON TEACHER TRAINING OF PHONOLOGICAL AWARENESS PRINCIPLES

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Communication Sciences and Disorders

by

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B.S., University of Southern Mississippi, 2001
M.S., University of Southern Mississippi, 2003
December 2009

DEDICATION

This is dedicated to my daughter Kennedy,

who thrills me with the miracle of language every day.

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There are many people who have inspired me and to whom I am grateful for their inspiration throughout my academic career. My goal would not have been accomplished without the love and support of family, friends, coworkers, and teachers. Most of all I want to thank God for giving me the abilities and opportunities to pursue my doctoral degree. My faith has given me the strength, wisdom, and ability to accomplish this dissertation, and that would not have been possible without love, support, and prayers.

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ABSTRACT

Teachers are now being held to high accountability standards in reading instruction, yet studies show that teachers lack adequate knowledge in reading and phonological awareness principles (Moats, 1994, 2009; Spencer, Schuele, Guillot, & Lee, 2008). The purpose of this study was to determine the effects of visual representations of letter/sound production (i.e., Phonic Faces, Norris, 2001) on improving teacher knowledge of phonological awareness principles, and to determine if there is a concomitant improvement in phonological awareness and reading acquisition for children in those classrooms. Seventeen kindergarten teachers from a Mississippi school were pretested on phonological awareness principles, then divided into three groups: Phonic Faces Training (PFT), with visual strategies; Traditional Training (TT), with no visual strategies; and a No Training (NT) control group. The PFT and TT groups participated in one half-day training in phonological awareness principles. All groups were posttested immediately after training, and again 3 months later at the end of the school year. Gains in phonological awareness knowledge from pretest to posttest and delayed posttest were analyzed. School records of data from the January and April administrations of subtests from the *Dynamic Indicators of Basic Early Literacy Skills* (Good & Kaminski, 2002) were compared for relative student gains. The results of this study revealed that all three groups made gains from pretest to posttest, and there were no significant differences between groups who were trained and the NT control group. In student performance, there was a significant difference in gain in Nonsense Word Fluency favoring the PFT group over the TT group and NT. The NT group did not differ from either of the inservice groups on gains in Nonsense Word Fluency. The NT teachers' students gained the most in Letter Naming Fluency.

CHAPTER 1

REVIEW OF LITERATURE

In the field of reading, extensive research has been conducted on the effectiveness of reading instruction and the prevention of reading difficulties (Felton, 1993; Foorman et al., 2006; Foorman & Torgesen, 2001; McCutchen & Berninger, 1999; Torgesen, 2002). The National Institutes of Child Health and Human Development (2000) reported five competencies that were essential to effective reading instruction: phonological awareness, phonics, fluency, vocabulary, and comprehension. Phonological awareness is considered a prerequisite to phonics that develops prior to entry into school for children who have literacy experiences, and thus has become a focus in kindergarten programs (Ehri et al., 2001).

Phonics instruction is typically introduced in first grade to enable children to learn to independently decode print and engage in text reading that will serve to develop a sight word vocabulary and construction of meaning. To acquire this skill, children must have knowledge of the phoneme-grapheme relationships and understand the hierarchical relationship between words and their component phonemes. However, children may fail to acquire these abilities for a variety of reasons, including insufficient instruction (Felton, 1993; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Foorman et al., 2006; Torgesen, 2002), inadequate development of phonological awareness (Felton, 1993; Torgesen et al., 1999; Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004), or dependence upon a visual learning style that makes establishing letter-sound and print-meaning relationships difficult (Hoffman & Norris, 2006).

Word recognition, phonics, and phonemic awareness are based on understanding and manipulating the structure of words according to linguistic principles. Moats (1994, 2009) argued that for reading teachers to be effective, they must have training in the linguistic

principles and structure of English. Specifically, they need to have extensive knowledge of the phonetic, orthographic, and morphological system that forms the English language. Consequently, researchers have begun to examine reading teachers' linguistic knowledge, or lack thereof, related to reading instruction principles (Cunningham, Perry, Stanovich, & Stanovich, 2004; McCutchen, Abbott, et al., 2002; McCutchen & Berninger, 2000; McCutchen, Harry, et al., 2002; Moats, 1994, 2009; Spencer, Schuele, Guillot, & Lee, 2008).

While there is agreement in the literature that reading teachers need specific training in phonemic awareness and phonics, how this instruction may best be provided has not been explored. This study will explore this question by comparing teachers who receive instruction using visual representations of phonemes with those who do not. The purpose of this study is twofold: to explore the efficacy of the use of visual representations on improving phonological awareness knowledge in kindergarten teachers, and to explore whether or not there is a concurrent improvement in phonological awareness and reading acquisition for students who are served by teachers with this training (Bos et al., 1999).

Importance of Phonological Awareness

Phonological awareness has been shown to be important to reading and reading instruction. Studies have shown that it is the single best predictor of learning to read in the early stages, with higher correlations than IQ, vocabulary, or listening comprehension (Stanovich & Siegel, 1994). Reading an alphabetic system requires an understanding that words are comprised of phonemes; phonemes can be segmented, isolated, and manipulated within words; and phonemes are represented using graphemes in both direct and indirect relationships (Ehri et al., 2001). Children with poor phonological awareness lack the foundational ability to link phonemes to graphemes and to understand the hierarchical relationship between letters and

words. Further evidence suggests a strong and reciprocal relationship between phonological awareness and reading. Once readers have some grapheme-phoneme knowledge, reading instruction heightens their awareness and contributes to greater ability to manipulate words. Thus, phonological awareness is both a prerequisite for and a consequence of learning to read (Yopp, 1992).

Ehri et al. (2001) conducted a meta-analysis of the extant research on phonological awareness instruction. The analysis revealed that direct phonological awareness instruction is more effective than any of the other instructional methods examined in teaching children to read and spell. Furthermore, all students, regardless of socioeconomic status, benefitted from phonological awareness instruction. The authors found that phonological awareness programs that focused on only one or two skills at a time were more effective than programs that focused on three or more phonological awareness skills. Therefore, it is important to be aware of the progression of difficulty of phonological awareness skills. Another point from this review is that teachers need to realize that students will differ in phonological awareness ability, and that they need to help students apply phonological awareness skills in reading and writing activities. Finally the review showed that phonological awareness instruction was most effective when incorporated with letter instruction.

According to Foorman, Breier, and Fletcher (2003), nationwide 38% of fourth graders perform below basic on national reading assessments. With appropriate instruction and interventions, this review reports that nationally only 2 to 6% of first and second graders remain impaired readers. The difference between the actual cases and the potential cases following intervention suggests that the cause must be lack of appropriate instruction. According to the authors, effective classroom instruction can move the number of students below basic from 38%

to between 5% and 10%. However, according to the authors, teachers themselves lack the linguistic knowledge necessary to effectively teach reading.

Mathes et al. (2005) studied the effects of instructional methods on improving reading ability in struggling readers. Like Foorman et al. (2003), they reported that between 5 and 7% of students in early grades do not meet reading benchmarks, even with effective instruction. They compared instruction for 92 students comprised of phonological awareness and reading intervention using direct instruction with 92 students receiving parallel instruction utilizing a cognitive theory approach (i.e., scaffolding, modeling, guided reading practice, coaching, and fading techniques), and a control condition of 114 students participating in enhanced classroom learning environments (i.e., assessment and progress monitoring data provided to teachers, professional development for teachers on interpreting assessment data, access of researchers as consultants in classroom). Six teachers providing either the direct instruction or parallel instruction interventions received 42 hours of intensive training in reading instruction prior to the interventions. The authors found that for both interventions, students demonstrated significantly greater gains in phonological awareness skills than students in enhanced classrooms. Moreover, they found that with proper interventions, the number of inadequate readers was reduced to only 3%. They concluded that with proper intervention and teacher training, it is possible to greatly reduce the number of readers that perform below grade level benchmarks.

Teacher Knowledge of Reading Principles

Moats (1994) explored reading teachers' knowledge of phonemic, orthographic, and morphologic principles. Moats assessed 89 teachers' knowledge of basic reading principles, including phoneme knowledge, phoneme-grapheme correspondence, language principles, and morpheme knowledge. She found that teachers had limited knowledge of linguistic terminology

(such as phonetics, phonology, and phonics), limited phonic knowledge (such as identifying consonant blends), and limited phoneme and morpheme awareness (such as segmenting sounds). Only 25% of teachers surveyed could identify that "ox" had three sounds, not two. The inherent problem is that teachers associate words to letters and not phonemes, and therefore have difficulty separating the letter-sound relationships that are necessary for phoneme segmentation. Moats concludes that all reading teachers should be required to have training and coursework in linguistic knowledge as part of their core curriculum.

Following Moats's (1994) groundbreaking study on teachers' reading knowledge, further studies have been conducted in this area. Using *Moats's Informal Survey of Linguistic Knowledge*, McCutchen, Harry, et al. (2002) compared 24 kindergarten teachers' linguistic knowledge to general academic knowledge, such as knowledge in science and social studies. The authors found that while teachers had adequate general academic knowledge (M=73.9% correct), they lacked adequate linguistic knowledge (M=30.7% correct).

Along with teacher knowledge, McCutchen, Harry, et al. (2002) also measured correlations between student knowledge and teacher knowledge and practice. At the beginning of the year, the authors assessed kindergarten word reading ability with a 20-word reading test. They found that without specific training, teachers' phonological knowledge correlated significantly with word reading ability in kindergarten students at the end of the school year (r=.49, p<.05). Teachers' explicit phonological instruction to students also correlated significantly with kindergarten students' word reading ability at the end of the year (r=.47, p<.05). This implies that the greater a teacher's knowledge is in phonological awareness, the better a student's reading ability.

McCutchen, Abbott, et al. (2002) measured increases in teacher knowledge following a 2-week summer institute (35 hours of instruction) on linguistic knowledge and principles. They recruited 44 kindergarten teachers, 24 of whom participated in the summer institute, and 20 who served as a control group. Pretest performance on the *Informal Survey of Linguistic Knowledge* (Moats, 1994) showed no group differences in linguistic knowledge (experimental M= 46.1%, control M= 44.4%, non-significant ANOVAs). Following the summer institute, the experimental group increased their linguistic knowledge (M= 53.6%), whereas the control group did not (M= 46.6%). These findings suggest that teachers can increase their knowledge of reading-related linguistic concepts in a relatively short period of time.

McCutchen, Abbott, et al. (2002) also compared gains in the reading scores of the kindergarten students from the teacher experimental and control groups. The authors measured the kindergarteners' phonological awareness, listening comprehension, fluency, and word reading. They also measured the amount of time the experimental group teachers spent on phonological awareness instruction as compared to the control group. The authors found that the experimental group spent significantly more time than the control group on phonological awareness instruction (effect size = .82, M = 4.5 more minutes per day), and that the teacher's use of phonological awareness instruction was significantly correlated with student phonological awareness gains [$t(19) = 4.13$, $p<.001$]. Further, students in the experimental group made approximately 50% more gains in letter recognition than students in the control group. Finally, teachers' minutes used of explicit phonological awareness instruction was significantly correlated to students' word reading ability at the end of the year [$t(20) = 2.50$, $p<.023$]. This evidence suggests that as teacher phonological awareness knowledge increases, a corresponding increase in student gains in reading occurs.

Cunningham, Perry, Stanovich, and Stanovich (2004) assessed the phonological awareness and phonics knowledge of 722 kindergarten through third grade teachers using a test adapted from Moats (1994). They found that almost 20% of teachers were not able to correctly identify the phonemes in any of the 11 words presented to them, almost 30% of teachers identified half of the phonemes in the 11 words, and less than 1% correctly identified all the phonemes in the 11 words presented. Even in the simple word "sun," only 63% of teachers were able to correctly identify that the word had three phonemes. When presented with the word "exit," only 2.6% of teachers correctly identified five phonemes. This indicates that teachers remain focused on their orthographic knowledge, and have difficulty shifting to phoneme knowledge, implying that they have weaknesses in phoneme-grapheme mapping. Because "x" is one letter, teachers often interpret it as one sound instead of two.

Cunningham et al. (2004) found similar results for phonics knowledge. Again less than 1% of the 722 teachers correctly answered all seven questions assessing explicit phonics knowledge. This included questions regarding the content and structure of English at both the level of sounds and words, such as onset-rime, definitions of syllables and consonants, and phonics concepts such as diphthongs. In implicit phonics knowledge, teachers were asked to identify words that followed irregular spelling patterns. Only 11% correctly identified all of the 11 irregular words presented. After completing the survey, teachers reported to the authors that not only had they not received any training in these concepts as part of their curriculum, but also their instructional materials did not emphasize these concepts. This research shows that teachers have notable deficits in the areas of phonological awareness and phonics knowledge.

Spencer, Schuele, Guillot, and Lee (2008) compared the knowledge of phonological awareness of speech-language pathologists (SLPs), reading teachers, and special education

teachers. These populations provided a means to examine the effects of teacher training, since speech-language pathologists (SLPs) have extensive coursework in linguistic concepts, while reading teachers and special education teachers are trained in concepts specific to reading instruction and reading disabilities. The authors solicited 541 SLPs, kindergarten and first grade teachers, reading teachers, and special education teachers. Using an author developed tool adapted from Moats (2000), they measured the educators' knowledge of phonological awareness, including phoneme segmentation, phoneme identification, and phoneme isolation.

The results revealed the mean for speech-language pathologists was higher than the other educators', with an effect size of 1.5 SDs between groups (Spencer et al., 2008). The authors also found that there was no significant difference between the group of special education and reading teachers (M = 30.04) and the group of kindergarten and first grade regular education teachers (M = 30.40). These findings indicate that even specialty teachers (special education and reading teachers) do not demonstrate more linguistic content knowledge than regular education teachers. It further suggests that SLPs can be considered valuable resources in schools in providing professional development and training to teachers regarding linguistic knowledge. However, it is important to note that while SLPs did demonstrate more linguistic competence than other educators, their mean was 37.34 out of maximum 47 points, or 79% accurate, which is not considered expertise. This study demonstrates that it would behoove all educators involved in reading instruction to participate in some type of professional development to enhance linguistic knowledge.

Training Teachers in Phonological Awareness

Given the weaknesses teachers demonstrate in phonological awareness knowledge, it is evident that training in this skill may be beneficial. Bos, Mather, Narr, and Babur (1999) taught

31 teachers a summer course in how to teach phonological awareness, word recognition, spelling skills, and fluency, followed by year-long classroom collaboration with teachers. In the course, teachers learned strategies to increase phonological awareness, as well as strategies that emphasized the spelling connection and speech to print. The authors measured teachers' attitudes toward linguistic knowledge, actual linguistic knowledge using a 24-item assessment adapted from Lerner (1997), Moats (1994), and Rath (1994), and measured gains in student knowledge for letter-sound association and spelling.

The results showed that overall teachers valued the course information, and they showed a more positive attitude towards explicit, structured language instruction at the end of the course (Bos et al., 1999). Teacher knowledge also significantly increased by the end of the course, moving from a mean of 14.91 at pre-course, to a mean of 19.18 at post-course, and remained greater at the end of the year (M=18.27). Furthermore, kindergarteners in the trained teachers' classrooms showed significant gains (p=.01) in sound identification, letter-sound association, and dictation compared to the comparison group. This indicates that not only did training increase teacher knowledge, but teachers utilized the knowledge in their classrooms and maintained the knowledge throughout the year. By increasing teacher knowledge, gains were made in student knowledge as well.

McCutchen and Berninger (2000) trained 59 first and second grade teachers in literacy-related knowledge during a 2-week summer institute. Topics covered in the institute included phonological awareness; orthographic awareness; orthographic-phonological connections (word-specific knowledge, alphabetic principle, etc.); morphological awareness; functional reading system (teaching word recognition, comprehension, etc.); functional writing system (teaching handwriting, spelling, etc.); motivation; dialectal, bilingual, and English as a second language

issues; and conceptual foundations for learning disabilities. The authors then observed the participants over the course of the school year to measure implementation of principles taught in the summer institute.

The results (McCutchen & Berninger, 2000) indicated significant gains ($p<.001$) in teacher knowledge as measured by the *Informal Survey of Linguistic Knowledge* (Moats, 2004). Classroom observations conducted throughout the year revealed that teachers implemented the phonic and phonological awareness principles in classroom lessons. These findings indicate that teacher linguistic knowledge can be improved through explicit trainings, and the knowledge is implemented in the classroom.

The studies showing change in teacher knowledge and positive outcomes in classrooms were based on intensive training models. These findings are consistent with research that has focused on the most effective methods of training teachers through professional development. The purpose of training teachers is to implement change in the educational system that will ultimately change the way teachers think and teach. Hall and Hord (2001) identified the best and worst models of change. In the worst models of change, change was viewed as a short-term event, as was characterized by brief inservices and little follow up throughout the school year. Their findings showed that while interventions and inservices are important, multiple exposures to information and follow up with teachers were most effective in implementing change. Furthermore, according to the authors, organizations do not change, individuals do. Therefore it is important for inservices to target individuals to effectively implement changes in knowledge and instructional methodology. They acknowledged, however, that such professional development endeavors require large commitments of funds, time, and effort by school districts, and most school districts do not have the resources necessary to provide such trainings. The

single inservice model therefore continues to be used in school districts and at professional conferences across the country.

While research has shown that the single inservice model is not ideal, other studies have shown that adult learning can be enhanced through the use of visuals. In a review of the extant literature, Alesandrini (1984) concluded that visuals enhance adult meaningful learning, including the learning of concepts and expository information. In particular, pictures that represent concepts by analogy and pictures such as charts or graphic organizers were found to be effective. Pictures that represent by analogy convey a concept by showing something familiar and implying a similarity. This enables the learner to understand and remember the new information by relating it to prior knowledge (Alesandrini, 1984; Royer & Cable, 1975). This was particularly true if an abstract concept (i.e., metallic crystalline structure) was depicted using concrete analogies (i.e., tinker toys, with the sticks representing chemical bonds and the discs representing molecules).

Charts and graphic organizers were classified by Alesandrini (1984) as "logical" because they are highly schematized and do not look like the objects or meanings they represent. Instead, these visuals are related logically to an abstract concept. They serve to structure the main points or concepts and communicate the hierarchical or part-whole relationships among the concepts. Alesandrini concluded from the extant literature that these visuals do facilitate learning by adults, particularly if the learner is actively involved in interpreting and manipulating the information presented through questions or other accompanying activities.

This study sought to determine if the effectiveness of learning an unfamiliar approach (linguistic principles and phonological awareness) to teaching familiar material (the alphabet and

letter-sounds) could be enhanced in the single session training by using visuals designed to depict important linguistic features of letters and sounds.

Visual Strategies in Phonological Awareness

Phonological awareness concerns oral language. Phonemes are the basic categories of speech sounds, and phonemic awareness is the understanding that words are sequences of phonemes. These concepts are very abstract and auditory, rendering them difficult for many individuals to understand and apply. There is evidence that supporting the concept of phonemes with visual representations enhances understanding. The National Reading Panel's review of research revealed that the most effective training in phonological awareness for at-risk children occurred when letters were used to teach these concepts (Ehri et al., 2001).

Gillon (2000, 2005) showed the greatest gains were made with interventions that included phonological awareness activities with grapheme-phoneme correspondences. In the first study, Gillon (2000) examined the efficacy of phonological awareness intervention in children with spoken language impairments. The participants of this study were 61 school-aged children with a delay in expressive phonological development, but with no severe receptive language or cognitive delays. The control group was comprised of 30 school-aged children with normal speech and language skills.

The participants were divided into four groups. Group 1, the experimental intervention, received treatment in phonological awareness activities (Gillon, 2000). These activities included rhyme, phoneme manipulation of sounds in isolation, phoneme identity, phoneme segmentation and blending, linking speech to print, and program adaptations that met the child's individual phonological needs. One of the activities, the linking speech to print activity, makes explicit connections between phonological awareness, print and storybooks. In this activity phonemes

were linked to graphemes using word games and letter blocks. Group 2, the traditional intervention control, received intervention using the Van Riper method, which targeted students' sound productions in isolation, syllables, words, phrases, and sentences. In Group 3, minimal intervention, the speech-language pathologist had minimal interactions with the children and made recommendations for teachers and parents to use at home. Group 4 was comprised of normal, age-matched peers receiving regular education instruction.

The groups were compared for phonological awareness ability (Gillon, 2000). Group 1, the phonological awareness intervention group, showed greater overall improvement in phonological awareness ability than Groups 2 and 3. Not only did this group improve more, but it also caught up with the normal speech comparison group, performing comparably at the end of the experiment. Gillon also measured the program effects on reading development by measuring non-word reading, reading accuracy, comprehension, word identification, and letter identification. Again Group 1 demonstrated more improvement than Groups 2 and 3 on all measures except letter identification tasks. There was no difference between Group 1 and the normal Group 4. The final analysis measured effects on speech production, with Groups 1, 2, and 3 all showing improvement in overall speech production. Gillon's study did show improvement for the targeted intervention, phonological awareness. It also showed improvement in reading skills when compared to interventions that did not involve any integrated reading strategies.

The effects of phonological awareness intervention for children with speech impairments were further explored by Gillon (2005). Phonemic awareness was taught to first and second graders with a history of delays in phonological development but average vocabulary skills. Gillon used phonemic awareness tasks that identified the first sound in a word, grouped words that began with the same sound, segmented words into onset and rime, and taught letter-sound

relationships for the first sound in words. Thus, part of the phonological awareness training incorporated visual representations.

The results of this study found significant differences compared to the control group for word reading, non-word reading, and spelling (Gillon, 2005). These results imply that attempts to improve word recognition through phonemic awareness training work better when there is a visual representation involved.

Attempts have been made to use visual enhancement to teach phonological awareness. Levy and Lysynchuck (1997) showed that typically-developing kindergarten and first grade children learned to recognize more words when the print was enhanced by color coding the letters associated with the onsets and rimes of the words. Castiglioni-Spalten and Ehri (2003) found that children who were taught to relate sound sequences in words to pictures of articulatory gestures performed better than children taught to sequence sounds in words with blocks in their finger-point reading and reading of words. These findings indicate that making phonological information more salient using visual cues enhances learning, and suggests that using pictures associated with the mouth positions of phonemes provided a stronger cue than block sequences.

Torgesen et al. (1999) studied the effects of group and individual instruction in phonics and phonological processing in children with phonological processing disorders. The participants in this study were children with identified weaknesses in phonological processing skills and letter naming. The identified children were grouped into four conditions: No-Treatment Control group (NTC); Regular Classroom Support condition (RCS); Embedded Phonics condition (EP); or Phonological Awareness plus Synthetic Phonics (PASP). The PASP program taught gestures associated with phonemes using facial pictures, and labeled sounds in words with facial pictures,

then colored blocks, then letters. The PASP group performed significantly higher in performance and rate of learning than all other groups in phonemic decoding skills. In addition, the PASP group made greater gains in the ability to read non-words and real words, and to spell dictated words than the control group.

One visual strategy that has been used to improve phonological awareness is Phonic Faces (Norris, 2001). Phonic Faces are an example of visuals that depict an abstract concept using concrete analogies (Alesandrini, 1984). For example, the letter "p" represents the abstract concept of a phoneme characterized as a "stop plosive" (Ladefoged, 2006). In Phonic Faces, an analogy is made between straight line on the letter "p" and the concept of stopping the airflow, and the curve on letter "p" is analogous to the top lip used to produce the plosive /p/ sound, as shown in Figure 1. Thus, Phonic Faces use the picture of a face with the embedded letter to cue phoneme production, using the shape and position of the letter to represent oral production cues associated with that phoneme.

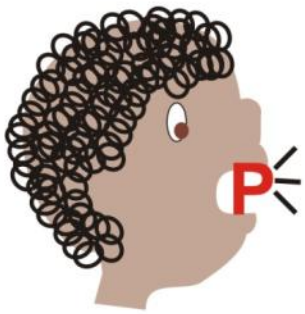


Figure 1. Phonic Face (Norris, 2001) represents the /p/ sound as the letter "p"

Phonic Faces (2001) have been used with a varying population to teach phonological awareness principles. Terrell (2007) used Phonic Faces to teach toddlers (ages 20-24 months) phonological awareness skills. Sixteen toddlers in daycare programs were tested using letter awareness tasks (finding letters, identifying letters, discriminating letters) and phoneme

awareness tasks (sound/letter correspondence, identifying sounds, discriminating sounds, producing sounds). The toddlers were read alphabet books (i.e., each page containing a letter and 3-4 pictured objects that began with the phoneme, as in "b" depicted with "ball," "bed," and "boy") with some letters embedded in Phonic Faces and some not. Results showed that toddlers made significantly greater gains for letters embedded in Phonic Faces ($p<.007$) in both sound awareness and letter awareness, specifically in finding any letters on Phonic Faces cards, finding specific letters on Phonic Faces cards, and producing sounds from Phonic Faces cards. These findings demonstrate that Phonic Faces were effective in increasing phonological awareness skills. McInnis (2008) found similar results for toddlers taught using sight words containing Phonic Faces as the initial sound accompanied by pictures depicting the meaning drawn into the remaining letters. The toddlers not only learned more words in this condition but also showed evidence of abstracting and using the alphabetic principle. That is, the cues provided by the analogy between the letter and the sound production resulted in the toddlers associating the phoneme represented by the letter with new, untaught words.

Brazier-Carter (2008) recruited four Head Start teachers from an urban population to read either Phonic Faces alphabet storybooks or emergent reading books to their class for 15-20 minute sessions daily for 6 weeks. The same storybook was read five times per week. The alphabet storybooks centered on one specific phoneme, which was pictured using the Phonic Face character producing the sound as a natural part of the story (Peter makes the /p/ sound as popcorn is heard and seen popping). Instances of the letter/sound also occur throughout the text so that children can be encouraged to listen for the sound, sound in word position, rhyming words, and other phonological awareness abilities (i.e., "Peter popped popcorn - /p/ /p/ /p/"). Teachers were trained to exploit these opportunities for letter and phoneme awareness

throughout the reading of the book. In the emergent reading book condition, books were chosen from the Wright Group Sunshine series (Wright Group, 1990-1998). These books have high repetition of words and sentences, and control group teachers were taught to reference the letters and sounds in these repeated words throughout the book reading. One week prior to the storybook reading intervention, the Head Start teachers participated in four 30-minute trainings that focused on one topic per session, including: phonemic awareness (initial sound, rhyme, and sound segmenting), print referencing (letter name, letter sound, book conventions), vocabulary (definitions, picture explanations, personal experiences), and narrative (retelling, questions, paraphrasing/explaining).

The results of Brazier-Carter (2008) showed that teachers using the Phonic Faces books made significantly more references to phonemic awareness and print referencing (M=6.9, M=7.2, respectively) than the emergent reading book group (M=2.1, M=2.5, respectively). They also made significantly more references to meaning (vocabulary and story elaboration, M=26.7) than with the emergent reading books (M=19.5). These results show that using Phonic Faces books improves teachers' consistency for referencing and teaching pre-reading skills, such as phonemic awareness and print awareness, but not at the expense of meaning. Furthermore, when the Phonic Faces books were used, the students made significantly greater gains in vocabulary (Phonic Faces M=+6.7, Emergent Reading M=+5.3), print concepts (Phonic Faces M=+2.0, Emergent Reading M=+0.5), and phonemics awareness (Phonic Faces M=+5.2, Emergent Reading M=+3.4).

Summary

The research shows that teachers who have training in linguistic concepts use this knowledge to teach reading principles in their classrooms, and that the students in these

classrooms make greater gains in phonological awareness and reading development. The research further shows that visual representations, including letters, pictures depicting articulatory gestures, and Phonic Faces (Norris, 2001), which incorporate both visual cues, increase the phonological awareness of both children and teachers in their classrooms. In the case of Phonic Faces, the phonological knowledge of the teachers was not directly measured, but rather behaviors produced during storybook reading were used as a measure of increased awareness. Thus, the efficacy of using this visual representation to increase the linguistic knowledge of teachers has not been ascertained.

In previous studies, teacher training was provided using lectures, oral practice, and written examples. The training time was relatively long and extensive (up to 35 hours). In the Brazier-Carter (2008) study, teachers learned the phonological awareness concepts and were able to apply those following just 30 minutes of instruction when their subsequent classroom interactions were cued by the Phonic Faces books. However, the linguistic knowledge of the teachers was not directly measured. This study will explore the effects of the use of Phonic Faces on improving the linguistic knowledge of teachers and the concurrent effects on student learning. The specific questions of this study are:

1. Will Phonic Faces visual representations improve phonological awareness skills in kindergarten teachers?
2. Will there be a concurrent improvement in phonological awareness and reading acquisition for students in those classrooms?

CHAPTER 2

METHODS

This study examined two questions: a) What are the effects of visual representations of letter/sound production, i.e., Phonic Faces (Norris, 2001), on improving teacher knowledge of phonological awareness principles? and b) Is there a concomitant improvement in phonological awareness and reading acquisition for children in those classrooms? One group of teachers was trained in phonological awareness principles using visual representations for letter-sound correspondence, one group was trained without visual representations, and one group received no training. Teacher knowledge of phonological awareness was assessed prior to training, immediately after training, and after 3 months of teaching in the classroom. School records of data from the January and April administrations of subtests from the Dynamic Indicators of Basic Early Literacy Skills (DIBELS, Good & Kaminski, 2002) were compared for relative student gains.

Subjects

Seventeen kindergarten teachers from a primary school in Brookhaven, Mississippi, participated in this study. Permission to participate in the study was obtained from each participant (see Appendix A). Individual meetings with each participant were held to review the purpose of the study, the amount of involvement in the study, and to answer any questions pertaining to the study.

The participants completed a demographic questionnaire to determine years of teaching experience, types of teaching experiences and certification, and prior exposure and instruction in reading content knowledge (see Appendix B). Upon completion of the questionnaire, participants

were matched based on years of teaching experience, area(s) of certification, and reading instruction coursework.

Table 1 presents a profile of teacher characteristics. The participants in this study were all female. Three participants were African-American, and 14 participants were Caucasian. The participants ranged in age from 24 to 61 years old. Years of teaching experience ranged from 0 to 30 years. Years teaching the kindergarten grade level ranged from 0 to 26 years. Ten teachers had their Bachelor's degrees, three had some graduate course work, four had Master's degrees, and none had post-Master's coursework.

Courses in reading theory and/or practice ranged from no semester hours to 9 + semester hours. Types of coursework that teachers had can be seen in Table 2.

Materials

Materials used included a teacher pre/posttest, a computer and projector, Phonic Faces (Norris, 2001), Microsoft Office 2003 PowerPoint presentations, handouts, and DIBELS Phoneme Segmentation Fluency, Nonsense Word Fluency, and Letter Naming Fluency subtests (Good & Kaminski, 2002).

Teacher Pre/Posttest – Moats's Teacher Knowledge Survey (Moats, 2009) and Spencer et al.'s (2008) phoneme awareness test was adapted, including items that were relevant to phonological awareness, syllable knowledge, and phoneme knowledge, resulting in a 49-item multiple-choice instrument. Items were selected from and presented in multiple choice and true/false format (see Appendix C). The adapted test was administered to 10 adults and readministered 4 days later to establish instrument reliability, which was .98.

Computer and Projector – A computer and projector were used to project a Microsoft Office 2003 PowerPoint presentation during each workshop on a white board.

Table 1

Characteristics of Teacher Participants

Teacher	Age	Exp.[a]	Kg.[b]	Degree[c]
A	58	22	21	B.S.[d]
B	30	9	9	B.S.
C	47	18	7	M.Ed.[e]
D	30	8	8	B.S.
E	49	25	5	B.S.
F	49	26	10	M.Ed.
G	61	16	5	B.S.+[f]
H	53	22	15	M.Ed.
I	44	22	15	B.S.+
J	28	6	5	B.S.
K	45	25	15	B.A.+[g]
L	48	9	7	B.S.
M	24	0	0	B.S.
N	51	26	26	B.S.
O	52	30	24	B.A.
P	53	15	4	M.Ed.
Q	37	15	9	B.S.

[a]Years of teaching experience. [b]Years of experience teaching Kindergarten. [c]Highest degree earned. [d]Bachelor of Science. [e]Master of Education. [f]Bachelor degree plus some graduate coursework. [g]Bachelor of Arts.

Phonic Faces PowerPoint – Phonic Faces (Norris, 2001), presented in PowerPoint format, was used to teach principles of phonological awareness, including distinctive features of phonemes, categories of phonemes, cognate pairs, phoneme segmentation, phoneme blending, and phoneme manipulation. Grapheme-phoneme correspondence was demonstrated using Phonic Faces, including six high frequency syllable rules for spelling regular words.

Table 2

Number of Teachers' with Hours in Reading Coursework

	0-3[a]	3-6	6-9	9+[b]
Reading Instruction	8	7	0	2
Reading Acquisition	11	4	1	1
Reading Disabilities	13	4	0	0
Phonetics	14	1	2	0

[a]Number of hours of coursework. [b]9 or more hours of coursework.

Phonological Awareness PowerPoint – A PowerPoint, parallel in content and format but without Phonic Faces (Norris, 2001), was used to teach the same principles of phonological awareness. Letters were used to demonstrate grapheme-phoneme correspondence and syllable rules.

Handouts – Handouts comprised of the PowerPoint slides were given to both the Phonic Faces and Traditional Training groups (26 pages and 24 pages, respectively; see Appendix E and Appendix F). The handouts were the same in content and format, but the PF handouts contained examples using Phonic Faces. Activities for practicing phoneme segmentation, syllable

segmentation, and phoneme-grapheme correspondence were included, and practice items modified to incorporate Phonic Faces.

DIBELS (Good & Kaminski, 2002) Phoneme Segmentation Fluency, Nonsense Word Fluency, and Letter Naming Fluency Subtests – DIBELS is a criterion-referenced assessment tool used to measure kindergarten students' pre-reading and reading skills. It was administered by school personnel in January and again in April. The Phoneme Segmentation Fluency subtest of DIBELS requires orally segmenting spoken words into phonemes, i.e., all the sounds in "sam" are /s/, /æ/, /m/. One point is awarded for each phoneme correctly identified within the period of 1 minute. Scores result in a designation of either: low risk – skill level is adequate and good phonics are predicted; some risk – the skill is performed, but not at a fluent level in phonics; and at risk – the skill level is below age expectations, with prerequisites for phonics not shown.

The Nonsense Word Fluency Subtest (Good & Kaminski, 2002) measures the ability to sound out nonsense words based on phonic rules. For example, the word "lut," is presented and can either be read as each individual sound (/l/, /u/, /t/) or the whole word to receive credit. One point is awarded for each correct letter sound produced in one minute. All nonsense words presented follow a Consonant-Vowel-Consonant, or Vowel-Consonant pattern, or "short" vowel syllables. Scores result in a designation of either: low risk – skill level is adequate and good phonics are predicted; some risk – the skill is performed, but not at a fluent level in phonics; and at risk – the skill level is below age expectations, with prerequisites for phonics not shown.

The Letter Naming Fluency Subtest (Good & Kaminski, 2002) measures the ability to identify the name of a letter. For example, the letter "c" is presented, and should be identified as "cee." One point is awarded for each correct letter name produce in one minute. Scores result in a designation of either: established – skill level is adequate and good phonics are predicted;

emerging – the skill is performed, but not at a fluent level in phonics; and deficient – the skill level is below age expectations, with prerequisites for phonics not shown.

Procedures

Two days prior to training, teachers were administered the adapted Teacher Knowledge Survey. Based primarily on the pretest scores, and then secondarily on years of teaching experience and education, teachers were matched and then members of matched pairs were randomly assigned to either the Phonic Faces Training (PFT) or the Traditional Training (TT) groups. This resulted in seven teachers in each group. In addition, one teacher who scored high on the Teacher Knowledge Survey, one who scored in the middle, and one who scored low were assigned to the no training (NT) control group. A profile of the three groups is presented in Table 3.

Training consisted of a single half-day workshop presented by a licensed, school-based speech-language pathologist with 5 years of experience. The training took place in a small computer room at the elementary school. The room was furnished with tables and seating for each participant, with seats positioned in front of a large, multi-media board. The PFT group was trained in the morning, and the TT group was trained in the afternoon. Training occurred during a regular school day, and teachers left their classrooms to participate in the staff development. A school administrator participated in both trainings. The No Training (NT) group remained in their classroom and received no training. Both the PFT and TT groups were trained in phonological awareness through a Microsoft Office 2003 PowerPoint presentation with accompanying handouts (see Appendix E and Appendix F).

The presentation began by defining and differentiating key concepts to be used throughout the workshop, including: phoneme – the smallest unit of sound that can combine with

other sounds and form words; phonetics – the study of individual speech sounds; phonology – the study and use of phonemes in words; phonics – the letter/sound correspondence; phonological awareness/phonological processing/phonemic awareness – the ability to "think" about the speech sound system (the primary term used was phonological awareness; Bauman-Waengler, 2000).

Table 3

Profile of Phonic Faces Training Group (PFT), Traditional Training Group (TT), and No Training Group (NT)

	Age[a]	Exp.[b]	Pretest	Reading Instruction[c]
PFT	46.29	17.71	23	1.47
TT	41.86	15.71	23	1.47
NT	47.33	20.0	22	1.42

Note: Pretest score is mean score out of a total of 49 points.
[a]Mean age of teachers. [b]Mean years of teaching experience. [c]Mean hours of prior reading instruction.

Next the different types of phonological awareness tasks were presented, including rhyming (discrimination of rhyming words and production of rhyming words); segmentation of sentences, syllables, and phonemes; isolation of phonemes; deletion of phonemes; substitution of phonemes; and blending of phonemes (Robertson & Salter, 2007). The progressive developmental benchmarks for phonological awareness tasks were described. Because the presentation was to kindergarten teachers, the focus was on the first developmental phonological

awareness tasks, including rhyming, alliteration, phoneme matching, syllables, onset-rime, initial phoneme isolation, phoneme blending, and phoneme segmentation.

Finally, basic principles for teaching phonological awareness were presented. These principles include brief time periods of instruction (10-15 minutes), few activities per lesson (2-3), movement through developmental progression from easiest to most difficult, the model-lead-observe method (I do one, we do one, you do one), immediate corrective feedback, multisensory engagement (touch, move, say), and teaching with letters (Moats, 2005; Norris & Hoffman, 2002).

To aid in teaching individual phonemes, participants learned not only the correct production of phonemes (enunciating consonants such as /b/ without the "schwa" sound), but also distinctive features of the phonemes (Moats, 2005). A phoneme's distinctive feature is the place, manner, and voice characteristics of each phoneme that distinguishes it from other phonemes. Consonants (see Figure 2) and vowels (see Figure 3) were presented in separate distinctive feature charts to teach each phoneme. These charts depict the relationships between abstract features and represent logical visuals as described by Alesandrini (1984).

The participants followed the charts and produced the phonemes while the presenter discussed it. Along with learning the phonemes, the phoneme-grapheme correspondences were also explored. For example, for the phoneme /ē/, the graphemes, or written letters, that correspond are "ee," "e-e," "e," "ea," "ey," "y," "ie," and "ei" (see Figure 3).

The TT group received the training with auditory examples and alphabetical letters when graphemes were introduced. The PFT group received training in the same content, but with visual representations used to aid in teaching the phonological awareness principles (see Figure 4).

Consonant Phonemes by Place and Manner of Articulation

	Lips	Teeth/ Lips	Tongue/ Teeth	Ridge/ Teeth	Roof Mouth	Back of Throat	Glottis
Stops Unvoiced Voiced	/p/ /b/			/t/ /d/		/k/ /g/	
Nasals	/m/			/n/		/ng/	
Fricatives Unvoiced Voiced		/f/ /v/	/th/ /th/	/s/ /z/	/sh/ /zh/		
Affricates Unvoiced Voiced					/ch/ /j/		
Glides Unvoiced Voiced					/y/	/wh/ /w/	/h/
Liquids				/l/ /r/			

Figure 2. Distinctive feature chart of place, manner, and voicing of English consonants from Moats, L. C. (2005). *Language essentials for teachers of reading and spelling: Module 2: The speech sounds of English: Phonetics, phonology, and phoneme awareness.* Longmont, CO: Sopris West Educational Services[1].

Along with learning the phonemes, the phoneme-grapheme correspondences were also explored with the PFT group using the visual representations (see Figure 5). For example, for the phoneme /ē/, the graphemes, or written letters, that correspond are “ee,” “e-e,” “e,” “ea,” “ey,” “y,” “ie,” and “ei”.

[1]From *LETRS Module 2: The Speech Sounds of English: Phonetics, Phonology, and Phoneme Awareness (First Edition)*, by Louisa Moats, 2005, Longmont, CO: Sopris West Educational Services. Copyright 2005. Reprinted with permission.

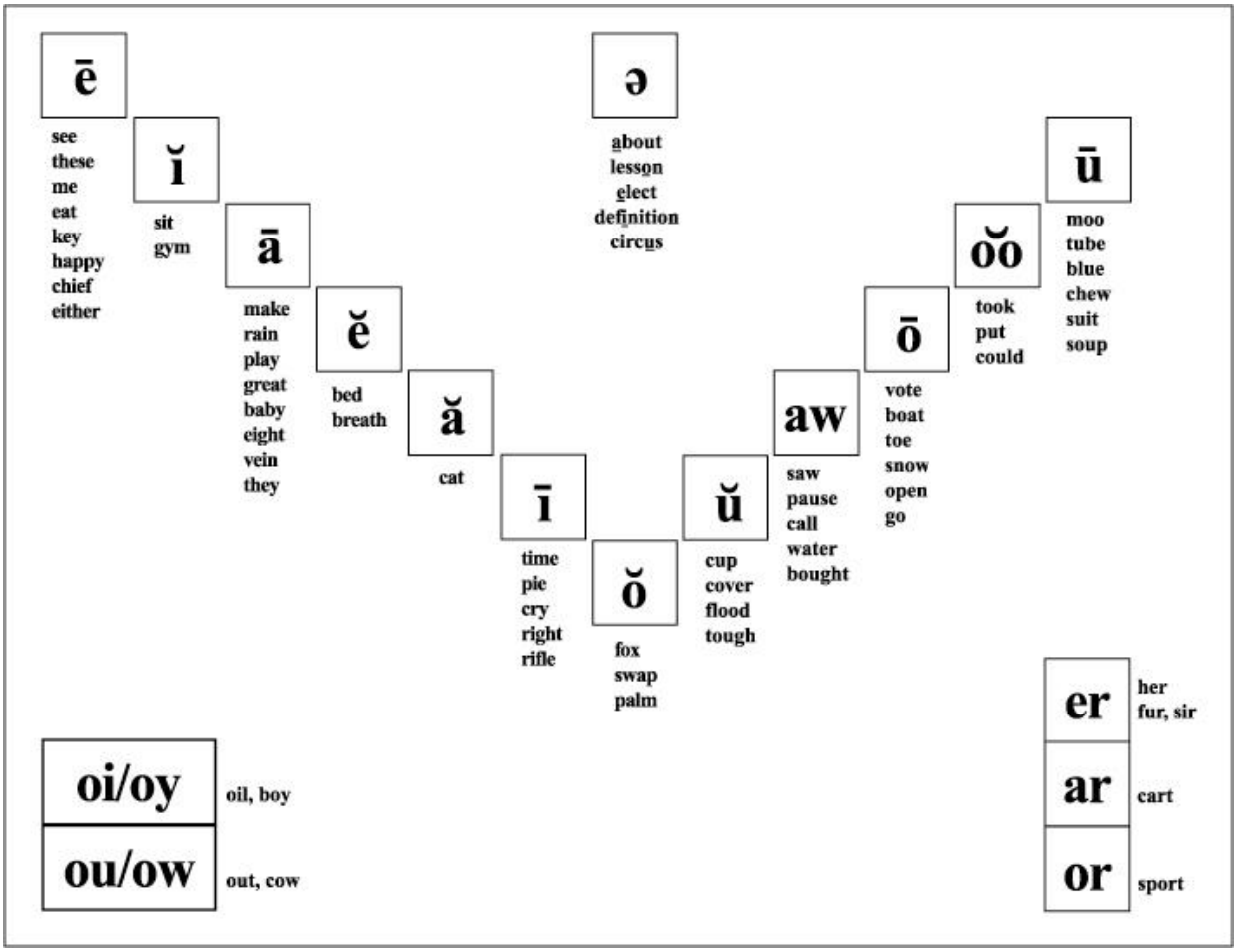


Figure 3. Distinctive feature chart of English vowels from Moats, L. C. (2005). *Language essentials for teachers of reading and spelling: Module 2: The speech sounds of English: Phonetics, phonology, and phoneme awareness.* Longmont, CO: Sopris West Educational Services[2].

The visual representations used were Phonic Faces cards (Norris, 2001). The Phonic Faces cards were presented by a feature of each sound, and the backgrounds color-coded based on the feature. The "stop and explode" sounds, /p, b, k, g/ were presented together and color coded with hues of blue backgrounds. The "tongue tip lifting" sounds, /t, d, l, s, z/, were

[2]From *LETRS Module 2: The Speech Sounds of English: Phonetics, Phonology, and Phoneme Awareness (First Edition)*, by Louisa Moats, 2005, Longmont, CO: Sopris West Educational Services. Copyright 2005. Reprinted with permission.

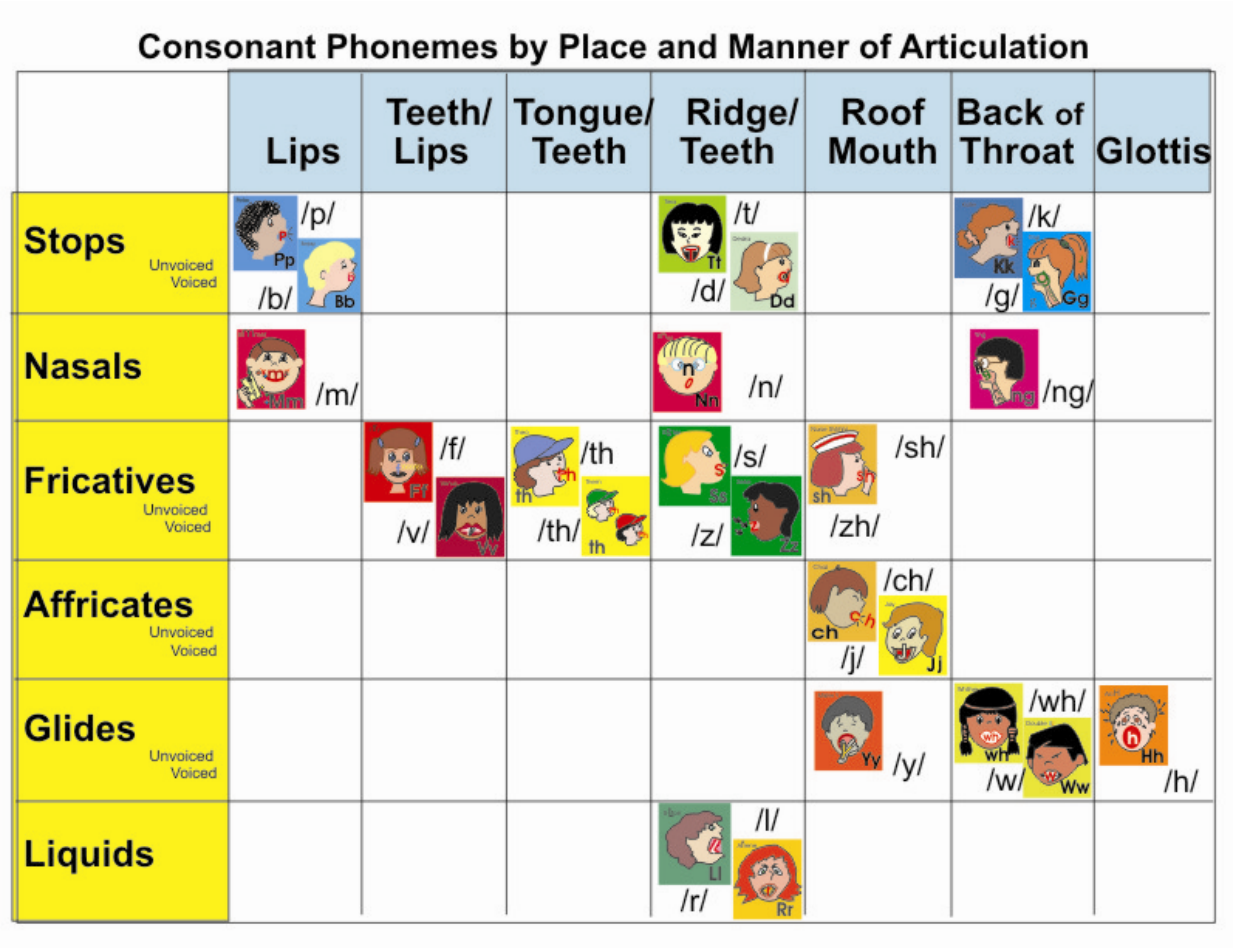


Figure 4. Distinctive feature chart of place, manner, and voicing of English consonants for Phonic Faces Training Group.

presented together and color coded with hues of green backgrounds. The “noisy, vibrating” sounds /f, v, m, n, ng/ were presented together and color coded with red backgrounds. The “noises people make” sounds /ch, sh, h, y, r/ were presented together and color coded with orange backgrounds. The “movers and shakers” sounds /wh, w, j, ks, kw/ and “others” /th/ (voiced and voiceless) were presented together and color coded with yellow backgrounds. The short vowel sounds, /a, e, i, o, u, y/, were depicted as babies, color coded with dark purple backgrounds, and presented together.

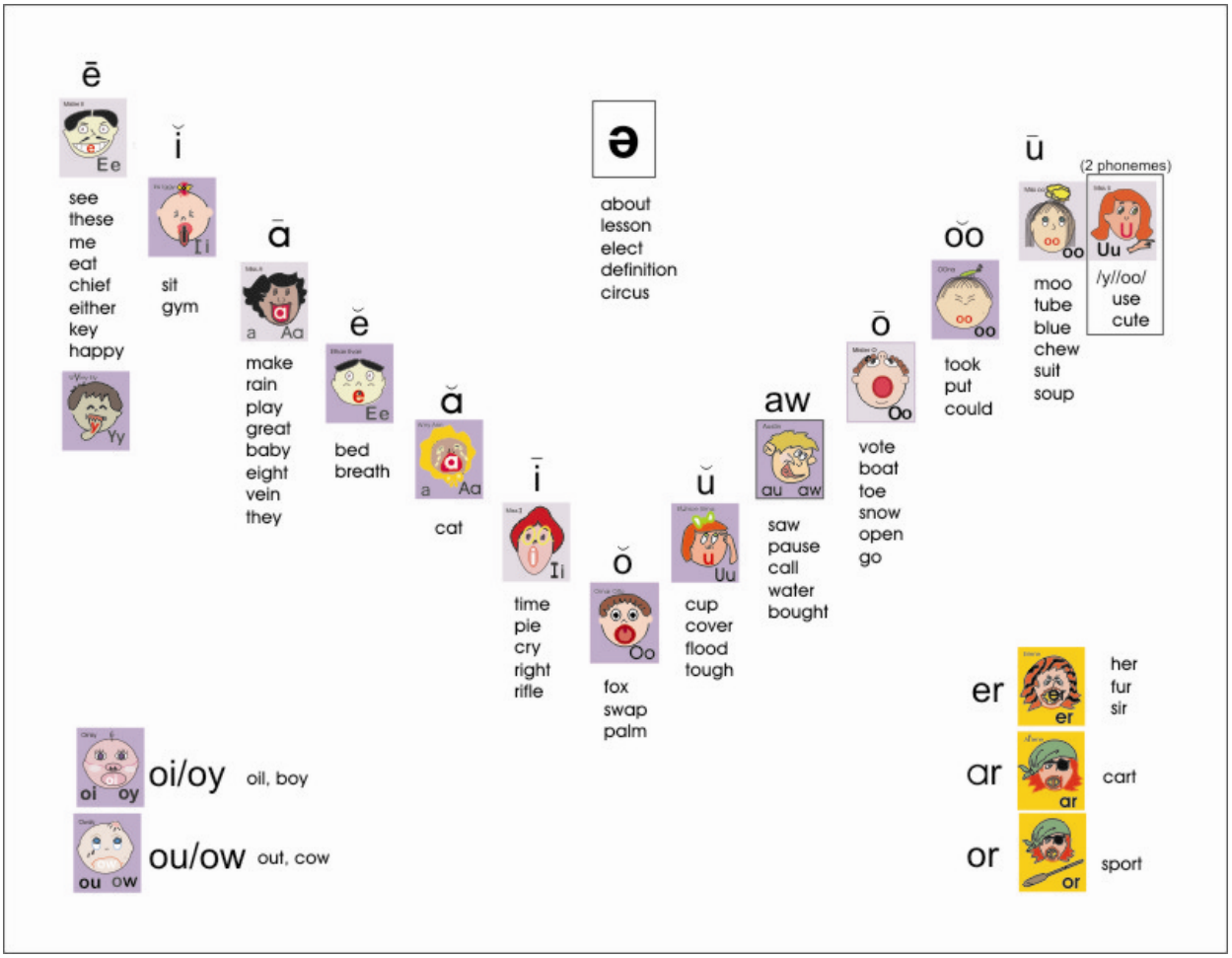


Figure 5. Distinctive feature chart of English vowels for Phonic Faces Training Group.

The long vowel sounds, /a, e, i, o, ju/ were depicted as adults, color coded with light purple backgrounds, and presented together. The diphthong vowel sounds, /oo, ow, oi, oo/, were color coded with dark purple backgrounds, except for "oo" pronounced as /u/ which was light purple, and presented together. The r-controlled vowels, /er, ar/, were presented together and color coded with orange-hued backgrounds.

Following the introduction of the phonemes, each of the developmental phonological awareness tasks was demonstrated using Phonic Faces within an animated PowerPoint. Demonstrations of rhyme, phoneme segmentation and so forth were shown as the appropriate

faces flew in or dissolved out to show the change in phonemic structure (rather than conventional spelling).

Measures

Two days after the training, the participants were readministered the phonological awareness test, which was used as a post-workshop measure of knowledge gained. Participants completed the phonological awareness test once more three months later at the end of the school year in May to measure knowledge retention.

Scoring

The experimenter administered all of the pre- and post-tests and scored them. Each correct response was awarded one point, for a potential score of 49.

Reliability

To establish inter-rater reliability, nine tests from each administration were randomly selected and scored by another licensed speech-language pathologist. Inter-rater reliability was .99.

CHAPTER 3

RESULTS

The purpose of this study was to determine the effects of the use of visual representations of letter/sound production (i.e., Phonic Faces [Norris, 2001]) on improving teacher knowledge of phonological awareness principles, and any concomitant improvement in phonological awareness and reading acquisition for children in the teachers' classrooms. Teachers were divided into three groups: the Phonic Faces Training group (PFT), which contained visual representations; the Traditional Training group (TT), which contained no visual representations; and the No Training (NT) control group, which received no training, and was only given the phonological awareness tests. The teacher demographics were used to determine any correlations between teacher characteristics and phonological awareness test results. Students' DIBELS (Good & Kaminski, 2002) scores from pre-training to post-training (i.e., midyear to end of the year) were used to measure change in student learning. The results of the tests, correlations of the teachers' characteristics, and the students' DIBELS scores were analyzed.

A two-way (time x condition) mixed model ANOVA was used to compare each of the phonological awareness measures for changes immediately following training and long-term changes at the end of the school year. Characteristics of the teachers including age, experience, and amount of reading training were correlated with both their pretest scores and their gains after intervention using Spearman's rho. Changes in DIBELS (Good & Kaminski, 2002) scores from pretest to posttest also were compared between groups to determine if differences in teacher training had an effect on student outcomes.

Teacher Phonological Awareness Knowledge

All teachers participated in a phonological awareness pretest, a post-training phonological awareness posttest, and a delayed posttest 3 months later. Each correct answer was awarded one point, for a total of 49 points possible. The mean scores for the PFT and TT training groups and the NT control group at pretest, posttest, and delayed posttest can be seen in Figure 6, along with group standard error of estimates. At pretest, the group averages for the PFT (M = 23.0, SD 7.6), TT (M = 23.0, SD 6.9) and NT (M = 22.0, SD 5.0) appear to be approximately equal. A test of homogeneity of variance (Levene Statistic = .581, df = 2, 14, $p < .572$) revealed that the three subject groups displayed similar variances at pretest. A Oneway ANOVA ($F < 1.0$, df = 2, 14, $p < .975$) indicated that the three group means were not significantly different at pretest.

All three groups improved their scores immediately after training: PFT M = 25.6, SD 8.4; TT M= 28.86, SD 6.0; and NT M = 27.0, df = 6.3. At the delayed posttest measurement, the NT group continued to increase its score (M = 28.7, SD 4.0), while the two intervention groups declined: PFT (M = 23.0, df = 6.1) and TT (M = 28.0, SD 4.8) (see Figure 6). The complete set of data was analyzed using a three Treatment Groups (PFT, TT, NT) by three Treatment Times (Pretest, Posttest, Delayed Posttest) mixed ANOVA. Use of this analysis assumes equality of error variances across the three participant groups at each measurement time and sphericity of the repeated measures data across time (Field, 2005). The first assumption was checked using Levene's Test of Equality of Error Variances, which resulted in nonsignificant differences among error variances of the participant group scores at all three times: Pretest ($F < 1.0$, df = 2,14, $p < .572$), Posttest ($F < 1.0$, df = 2,14, $p < .482$), and Delayed Posttest (F =1.66, df = 2,14, $p < .225$). Sphericity includes an assumption of equal variances across the three measurement

times, as well as equal covariances among pairs of measurement times. The assumption of sphericity was assessed using Mauchly's Test of Sphericity and found to be nonsignificant (W = .813, df = 2, p < .261). Having met these two assumptions, the F values of the main ANOVA are reported without correction below.

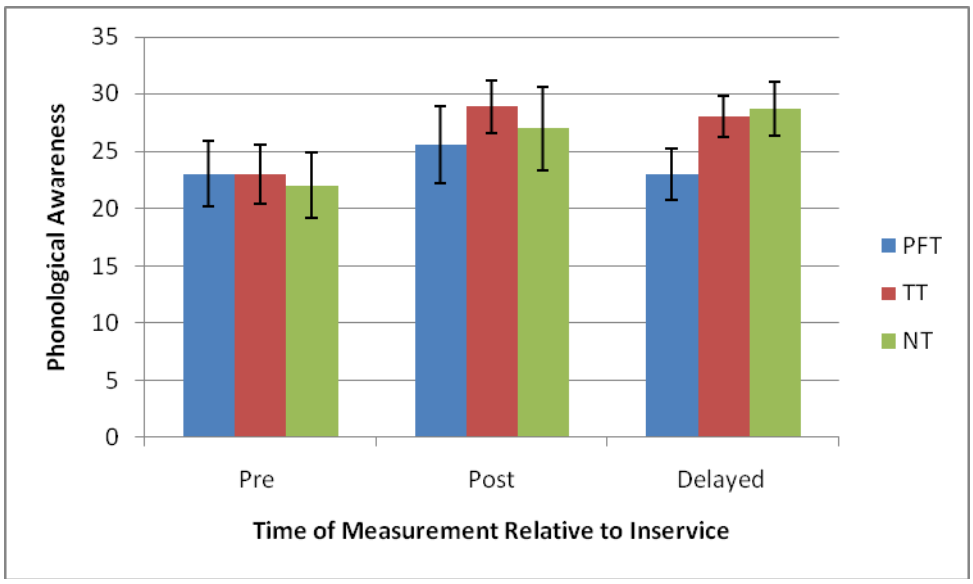


Figure 6. Average Phonological Awareness Test Scores of Phonic Faces Training Group (PFT), Traditional Training Group (TT), and No Training Group (NT) at Pretest, Posttest, and Delayed Posttest.

The main effect for Treatment Time was significant (F = 8.189, df = 2,28, p < .002). The effect size for Treatment Time was calculated using Partial Eta Squared (η^2 = .369). This result indicates that 37% of the variance in scores was accounted for by the application of intervention for the two training groups and other events occurring during the passage of time after the intervention affecting all three groups of teachers. The main effect for Treatment Group (F < 1, df = 2, 14, p < .684) and the Treatment Group by Treatment Time interaction (F = 1.986, df 2, 24, p < .159) failed to reach significance, indicating that all three groups of teachers exhibited similar patterns across treatment times. Thus it appears that neither of the two inservice types changed the teachers' phonemic awareness compared to the control group.

Treatment groups were combined to compare the average scores across Treatment Times using the Bonferroni procedure. The whole group average rose from 22.8 (*SD* = 6.5) at pretest to 27.18 (*SD* = 6.9) at posttest and then fell to 26.1 (*df* = 4.0) at the delayed posttest. The Bonferoni tests showed that the teachers' scores increased significantly from pretest to posttest ($p < .013$). The average scores remained at that level in the delayed posttest as indicated by a significant difference between pretest and delayed posttest ($p <.034$) with no difference between posttest to delayed posttest ($p < 1.00$).

In summary, the data indicated that all teachers increased their knowledge of phonological awareness regardless of type of training or receipt of training. The lack of a difference between the experimental groups and the control groups suggests that neither inservice was effective, and all of the teachers increased their knowledge of phonological awareness as they engaged in teaching phonological awareness to children. Perhaps this apparent learning of phonological awareness principles occurs every year. An alternative possibility is that both inservices were equally effective, but unintentionally, the teachers in the control group received the information from the teachers in the experimental groups from cross contamination resulting in experimental treatment diffusion (Campbell & Cook, 1979).

Teacher Demographic Correlations

The teacher demographic profiles identifying teacher age, years of teaching experience, highest degree earned, coursework in phonetics, reading acquisition, reading instruction, and linguistics, DIBELS (Good & Kaminski, 2002) training, and reading endorsements were analyzed for any correlation with phonological awareness test scores. Table 4 shows correlations of teacher characteristics and gains in pretest to posttest phonological awareness test scores.

Table 4

Correlations of Teacher Characteristics with Pretest Scores and Pretest to Posttest Gains

	Pretest	Gain
Age	-.11	-.05
Experience	-.20	**.40**[a]
Degree	**.12**	**.34**
Phonetics	-.30	-.20
Reading Acquisition	-.18	-.11
Reading Instruction	-.32	**.09**
Linguistics	-.21	-.21
DIBELS	-.17	**.38**
Reading Endorsement	-.22	**.32**

[a]Positive correlations are in bold.

Correlations of characteristics of the teachers were calculated with both their pretest scores and their gains after intervention using Spearman's rho. In part owing to the small number of teachers, none of these correlations was significant. However, grouping the variables by those with positive and negative correlations revealed a pattern. At pretest, scores on the test were negatively correlated with measures of experience and inservice training. This suggests that the training material in the present study was different from the participants' prior knowledge. Those with a stronger knowledge of facts that disagreed with the current training were less likely to score high on the pretest. However, the gain scores suggest that the teachers who gained the most were those with greater experience, more advanced degrees, DIBELS training, and a reading endorsement.

Students' Performance

DIBELS scores, including Phoneme Segmentation Fluency, Nonsense Word Fluency, and Letter Naming Fluency, were used to measure the gains made by students in the classrooms of the teachers in the three teacher groups. Figure 7 shows the group averages and standard error of estimates of the three groups of children for the three tests at pretest. It appears here that the children in the control group classrooms scored higher on all three of these measures at pretest. Calculation of the Levene statistic prior to the use of ANOVA to assess these differences revealed that the assumption of homogeneity of variance was met for Nonsense Word Fluency (Levene statistic = 1.24, $df = 2, 226$, $p < .291$) and Letter Naming Fluency (Levene statistic = 1.152, $df = 2, 226$, $p < .318$) but not Phoneme Segmentation Fluency (Levene statistic = 5.489, $df = 2, 226$, $p < .005$). As a result, Phoneme Segmentation Fluency was evaluated using the Welch F. Results indicated that the groups differed in both Nonsense Word Fluency ($F = 4.823$, $df = 2, 226$, $p < .009$) and Letter Naming Fluency ($F = 3.125$, $df = 2, 226$, $p < .046$) but not in Phoneme Segmentation Fluency (Welch $F = 2.591$, $df = 2, 110$, $p < .080$).

Comparisons of pairs of groups were made using the Bonferroni post hoc procedure. These analyses revealed that none of the pairwise comparisons reached significance for Letter Naming Fluency. For Nonsense Word Fluency the control group mean was significantly higher than both inservice groups. As a result of these analyses any group differences were corrected statistically.

Increases in students' DIBELS (Good & Kaminski, 2002) scores from pretest to posttest were compared between groups to determine if differences in teacher training had an effect on student outcomes. The average gain scores of the children in classrooms taught by teachers who received the PFT instruction, TT instruction, and No Training control condition can be seen in

Figure 8. The children in the classrooms taught by the PFT teachers showed greater gains than the other groups in Phoneme Segmentation Fluency and Nonsense Word Fluency. The NT control condition showed greater gains in Letter Naming Fluency.

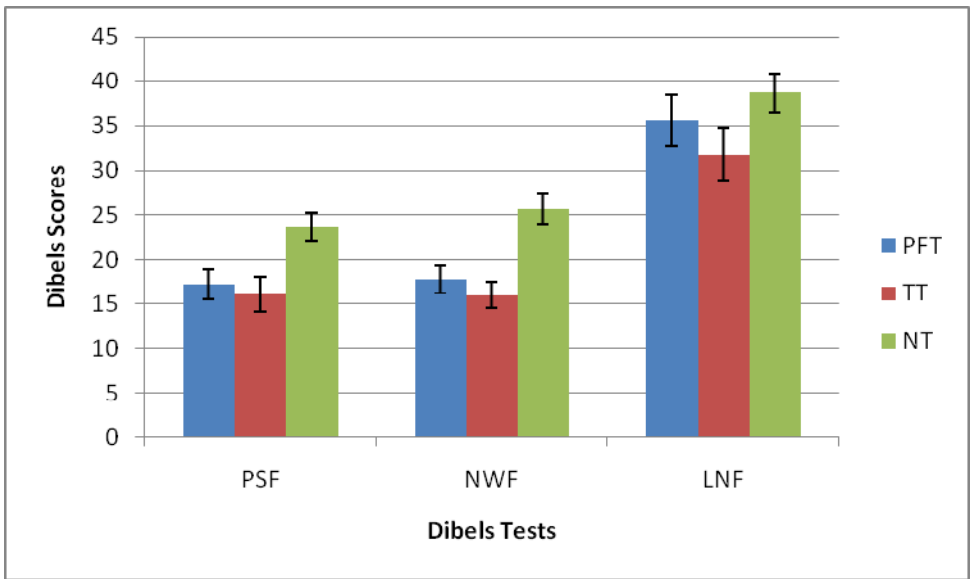


Figure 7. Pretest Average Phoneme Segmentation Fluency, Nonsense Word Fluency, and Letter Naming Fluency Scores of Children in Classrooms Taught by Teachers in the Phonic Faces Training (PFT), Traditional Training (TT), and No Training (NT) Groups.

Calculation of Levine statistics revealed that the assumption of equality of group variances was met for Letter Naming Fluency (Levene statistic = 0.06, $df = 2, 226$, $p < .937$) but it was violated for Phoneme Segmentation Fluency (Levene statistic = 3.81, $df = 2, 226$, $p < .023$) and Nonsense Word Fluency (Levene statistic = 4.55, $df = 2, 226$, $p < .012$). As a result, the Welch F was utilized in group comparisons for both Phoneme Segmentation Fluency and Nonsense Word Fluency to determine if the mean gain score differences were significant.

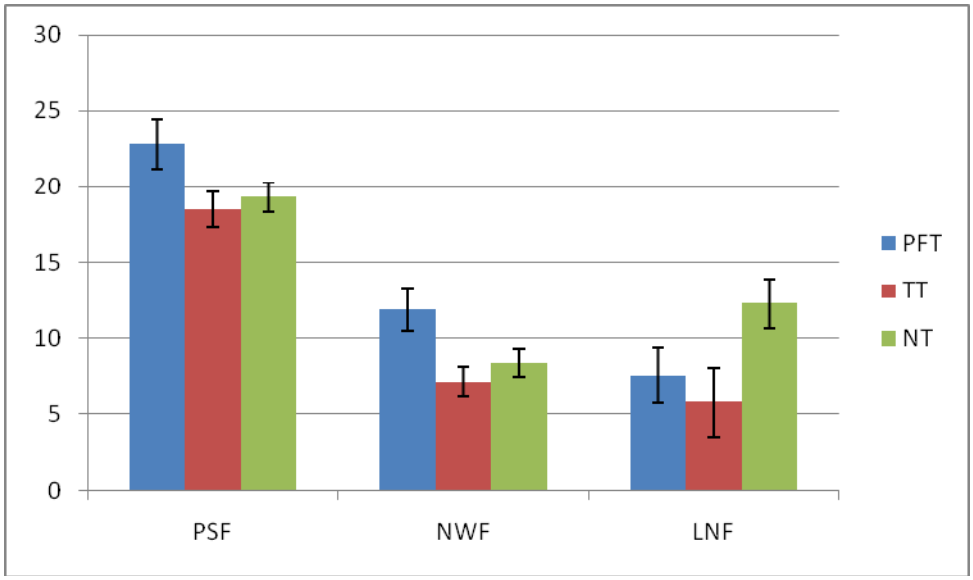


Figure 8. Average Gains in Phonemic Segmentation Fluency (PSF), Nonword Fluency (NWF), and Letter Naming Fluency (LNF) Scores of Children in Classrooms Taught by Teachers in the Phonic Faces Training (PFT), Traditional Training (TT), and No Training (NT) Groups.

Gains in Phoneme Segmentation Fluency were statistically similar across the groups (Welch $F = 2.04$, $df = 2, 125$, $p < .134$). Gains across groups were reliably different for both Nonsense Word Fluency (Welch $F = 4.79$, $df = 2, 105$, $p < .01$) and Letter Naming Fluency ($F = 7.50$, $df = 2, 226$, $p < .001$). Posthoc comparison using Dunnett T3 revealed a significant difference in gain in Nonsense Word Fluency favoring the Phonic Faces group over the Traditional Training group. The Control Group did not differ from either of the inservice groups on gain in Nonsense Word Fluency. Posthoc comparison using the Bonferroni statistic revealed a significant difference favoring the control group over both inservice groups with no difference between inservice groups in Letter Naming Fluency.

Correlations between teacher characteristics and pupil gains in Phoneme Segmentation Fluency, Nonsense Segmentation Fluency, and Letter Naming Fluency can be seen in Table 5. The lone significant correlation was a moderate and negative relationship between Degree and

gain in phonological awareness. This negative correlation may be attributed to teachers with higher degrees having more knowledge related to phonological awareness, therefore they had less knowledge to gain during training. Whereas, the teachers who did not have higher degrees had more knowledge to be gained and room for phonological awareness gains from phonological awareness training than teachers with higher degrees.

Summary

The results of this study reveal mixed results. While all three groups made gains from pretest to posttest, there were no significant differences between groups who were trained and the no training control group. At pretest, scores on the test were negatively correlated with measures of experience and inservice training. However, a teacher's level of education, years of experience, DIBELS (Good & Kaminski, 2002) training, and reading endorsement positively correlated with phonological awareness pretest and posttest gains. In regards to changes in students' performance, there was a significant difference in gain in Nonsense Word Fluency favoring the PFT group over the TT group and NT. The NT group did not differ from either of the inservice groups on gains in Nonsense Word Fluency. The NT teachers' students gained the most in Letter Naming Fluency. Finally, there was a moderate negative correlation between a teacher's level of education and gains in phonological awareness. From these results, it appears that the training did affect the teachers' methods of instruction, as evidenced by the greater gains in Nonsense Word Fluency for the trained groups, and the greater gains in Letter Naming Fluency by the NT control group.

Table 5

Correlations of Teacher Characteristics and Student Gains

	PSF[a] Gain	NWF[b] Gain	LNF[c] Gain
Posttest Score	.07[d]	-.01[e]	-.21
Age	-.17	-.10	.26
Experience	.07	.10	.20
Degree	-.50*[f]	-.18	.05
Phonetics	-.11	-.10	.19
Reading Acquisition	-.11	-.12	-.06
Reading Instruction	-.29	-.15	.13
Linguistics	.04	.11	.08
DIBELS	-.15	.02	-.16
Reading Endorsement	.06	.03	-.03

[a]Phoneme Segmentation Fluency. [b]Nonsense Word Fluency. [c]Letter Naming Fluency.
[d]Positive correlation. [e]Negative Correlation. [f]Reached significance.

CHAPTER 4

DISCUSSION

The purpose of this study was two-fold: a) to determine the effects of visual representations of letter/sound production (i.e., Phonic Faces, Norris, 2001) on improving teacher knowledge of phonological awareness principles; and b) to determine if there is a concomitant improvement in phonological awareness and reading acquisition for children in those classrooms.

Effects of Training on Teacher Knowledge

The first purpose was to analyze the effects of phonological awareness training on improving teacher knowledge in phonological awareness principles. The use of the visual analogy cues provided by Phonic Faces to teach concepts of phonemes and phonemic awareness had been shown to be effective for a range of child populations (Brazier-Carter, 2008; McInnis, 2008; Terrell, 2007). The question was whether adults would similarly find these cues insightful and increase in their own phonemic awareness.

The results of this study do not provide an unambiguous answer to this question. At best, they suggest that one exposure is not sufficient to result in a change. Previous studies showed teachers' knowledge of phonological awareness significantly improved following training in phonological awareness and linguistic principles (Bos et al., 1999; McCutchen, Abott, et al., 2002; McCutchen & Berninger, 2000). However, the professional development training lasted for a period of two to two and a half weeks (Bos et al., 1999; McCutchen, Abott, et al., 2002; McCutchen & Berninger, 2000). The training also occurred during the summer when the teachers were able to learn and reflect on the information without the demands of classroom teaching taking precedence over training. In comparison, the current study's training consisted of

one half-day inservice during the school year. This follows the typical training model of many school institutions (Hall & Hord, 2001). Therefore, the lack of gains in teacher knowledge in the current study could be attributed to the abbreviated amount of training given. It should also be noted that in the child studies cited, exposure to the visuals occurred across several sessions over periods of 6 weeks. Repeated exposure and time to internalize the information appears critical whether the learners are children or adults.

The limited effects resulting from the abbreviated training is consistent with the findings reported by Hall and Hord (2001). They summarized studies showing that the single inservice model of training is largely ineffective. Neither of the training groups in this study made greater changes than the control group at posttest and the control group retained greater changes at the delayed posttest. This finding suggests that the concepts presented may have been difficult to grasp in a short workshop and may have actually confused teachers. Concepts such as phonemes are not only unfamiliar, but also different from spelling conventions that teachers typically teach. The short exposure did not provide time and practice for the teachers to understand and internalize the concept of a phoneme and how it corresponds with orthographic patterns. This suggests that for teachers' phonological awareness knowledge to improve, the content presented in this study requires repeated exposure across extended time for understanding and learning.

Previous research showed that visuals are an effective tool for both teaching and retaining abstract concepts in adult learners (Alesandrini, 1984). This study sought to determine if the learning of an unfamiliar approach (i.e., linguistic principles and phonological awareness) for teaching familiar material (i.e., the alphabet and letter-sounds) could be enhanced in the single session training by using analogous and logical visuals (Alesandrini, 1984) designed to depict important linguistic features of letters and sounds. If this could be shown, then this type of visual

could provide an important tool for teacher training. Previous studies have shown that children exposed to Phonic Faces (Norris, 2001) learned more alphabet and letter-sound knowledge at a faster rate than children exposed to letters or words without the visual representations (Brazier-Carter, 2008; McInnis, 2008; Terrell, 2007). Assuming that the visual representation provided cues that enhanced the students' learning, it was anticipated that the visual representations would serve the same purpose in the adult population, and that the adults would respond to the visual cues.

However, the results of this study did not support the expectation that the visual representations would enhance learning in the adult population following one exposure. All of the groups of teachers, regardless of the training condition (PFT, TT, and NT control) made gains in phonological awareness knowledge at the initial posttest. Furthermore, both of the groups of trained teachers (PFT and TT) made similar gains at posttest regardless of the method of presentation (visual representations versus unembellished letters). This suggests that teachers' prior exposure to the phonological awareness test may have been sufficient in increasing their awareness of the principles that were tested. The scores between pretest and posttest changed for the NT control group as well, despite good test reliability established prior to training, which suggests that measurement error was not the source of the unexpected finding. However, since the subjects in the reliability study did not make unexpected gains, attributing the results to the prior exposure from the first testing is an insufficient explanation. One possible explanation for the gains of all groups could be cross-contamination, or experimental treatment diffusion (Campbell & Cook, 1979). Although the teachers were asked not to discuss either training or the test between administrations, it is possible that such discussions occurred since the groups were not separated from each other (the teachers were all located in the same school and worked

together on a daily basis). In at least one case, one teacher in the control group discussed the training and handouts with a peer in the PFT group, although they were instructed to not discuss the inservices with their peers.

Effects of Visual Representations on Teacher Knowledge

The goal of using the visual representations to teach phonological awareness principles was to determine if the use of a visual aid would be beneficial for increasing teacher knowledge. Studies have shown that the use of visual representations help improve students' knowledge of phonological awareness principles (Brazier-Carter, 2008; Castiglioni-Spalten & Ehri, 2003; McInnis, 2008; Gillon, 2000, 2005; Levy & Lysynchuck, 1997; Terrell, 2007; Toregesen et al., 1999). However, in this study, the visual representations did not appear to improve teachers' phonological awareness knowledge. The differences in gains from pretest to posttest and delayed posttest were non-significant, and therefore are considered chance differences.

The question now becomes, why did the visual representations provided by the Phonic Faces (Norris, 2001) not benefit the teachers in the same manner that they benefited the children across multiple studies (Brazier-Carter, 2008; McInnis, 2008; Terrell, 2007)? One difference between previous studies and this current study is that children had multiple exposures to the Phonic Faces across relatively long periods of time (anywhere from 10 to 12 hours of total exposure), whereas in the current study there was one exposure in a short inservice period (two and a half hours). In the studies with children, the students were exposed to only a few pre-selected, targeted letters, whereas in the current study the teachers were exposed to the entire phonemic inventory of sounds. This is probably too much information to absorb in one half-day training session, as compared to collegiate courses, where an entire semester is devoted to the English phonemic inventory.

When comparing the current study with teachers to previous studies with children, the prior knowledge level is different (Brazier-Carter, 2008; McInnis, 2008; Terrell, 2007). In studies with children, metacues (i.e., the visual representations) were used to cue the children to the nature of the alphabet, while the opposite occurred with the current study. Here, the nature of the alphabet was analyzed using metacues (visual representations). This suggests that the teachers, much like the students, would first need to learn the metacues and then use them to analyze the alphabet and words metalinguistically. Because the training session with the visual representations (Phonic Faces, Norris, 2001) was meta in nature, there may have been too many layers of meta to absorb and differentiate in one short training session. In other words, the training was focused on the highest level of learning, metalearning, but should have instead started below metalearning, beginning with the nature of the cues, and worked its way up to metalearning.

Another reason the teachers in the current study may not have benefited from the visual representations is that adult learning is different from child learning. Children begin at lower levels of learning, and learn concrete concepts first, then move up to abstract concepts. Because children are trying to grasp the abstract meaning of visual objects (letters), the concrete depictions of the sound production provide a cue to aid in learning. In comparison, adults already know the abstract meaning of the letters and conventional spelling system, and relate to the phonemes based on that system (i.e., believing that "x" represents one phoneme because it is spelled with one letter, when it really represents two phonemes, /ks/). Therefore, adults are likely to have more difficulty rapidly constructing a system based on phonemes and not letters, because it goes against all of their conventional knowledge of the spelling system. Instead of aiding learning, the visual representations may initially confuse adults. This is supported by one

teacher's statement, "I think the faces are great, I just don't get them. It's not the way I think." Further training on the visual representations and their purposes may be needed for them to be beneficial in increasing teacher knowledge, but more research using visual representations with teachers and other adult populations is needed.

The teachers' methods of instruction could have played a role in their lack of learning from the visual representations. In order for the Phonic Faces (Norris, 2001) to be useful, they would need to be internalized by the learners. While the teachers kept the training information and handouts, they did not actually use the visual representations to work with their students in the classroom. Therefore, the cues were quickly forgotten, and the training did not appear to be effective.

There is also some evidence that the single exposure to the visual cue may actually initially confuse teachers who do not know how to interpret or apply this information. This is supported by two teachers in the PFT group whose scores actually decreased from pretest to posttest on both the initial posttest and the delayed posttest. No other teachers in the NT control group or TT group decreased from pretest to posttest, so the visual representations in the PFT group may have contributed to the decreased posttest scores.

Finally, while teacher gains were shown following the training, they were minimal across conditions. At pretest, the PFT and TT groups averaged 23 points, and the NT group average 22 points out of 49 points on the phonological awareness test. At the initial posttest, mean gains were 3 (26, PFT), 6 (29, TT), and 5 (27, NT) points, far below mastery. The delayed posttest showed the PFT group return to baseline (23), while the TT regressed one point to 28, and the NT control group gained 2 points to score 29. Thus, neither training was effective in imparting lasting knowledge about the structure of language that teachers need to show good phonological

awareness skills in their own repertoire. None of these scores indicates mastery of phonological awareness knowledge, with the highest group mean reaching 59% accuracy, falling far below an acceptable passing range. Apparently phonological awareness is a difficult concept to learn and apply, whether the learner is an adult or a child.

Effects of Teacher Characteristics

This study also examined correlations in teacher characteristics and phonological awareness knowledge. At pretest, scores on the test were negatively correlated with measures of experience and training. This suggests that the material and concepts trained in the present study were different from the participants' prior knowledge. Those with a more extensive background that differed from the linguistic perspective were less likely to score high on the pretest. This finding is consistent with Moats (1994, 2009), McCutchen, Harry, et al. (2002), and Spencer et al. (2008) who found that teachers, even those with advanced degrees, had little knowledge of linguistic terminology, or principles of phonological awareness. Despite a plethora of studies and information appearing in research, this study suggests that teacher knowledge has not expanded to include the linguistic perspective in the past decade. However, the gain scores suggest that the teachers who had the most prior knowledge were most likely to make gains at posttest, as evidenced by positive correlations with experience, more advanced degrees, DIBELS (Good & Kaminski, 2002) training, and a reading endorsement. Therefore, despite the initial negative correlation, it is possible that the more knowledge a teacher had, the better the information from training was received. However, because the NT control group demographic data was not isolated from the PFT and TT groups, it is also possible that teachers with these characteristics make the most gains throughout the year regardless of training.

This finding has important implications. While not ideal, the design of the current study is a reflection of most professional development designs in school systems. In training, one cannot eliminate nor ignore the effect that staff members and teachers have on each other. If training is well-received, then there is the potential for teachers' knowledge to increase by learning from each other (as reflected by the sharing of information with a control group member in this study). The education profession needs to capitalize on this trend and target primary, effective teacher leaders within a staff in order to have the most successful outcomes from professional development trainings. By using the teacher leadership on the staff, professional developers may see more effective evidence based practice being utilized and disseminated in school settings (Hall & Hord, 2001).

Effects of Teacher Training on Student Knowledge

The goal of training teachers in phonological awareness principles is to help them become better, more effective teachers. To evaluate this, the DIBELS (Good & Kaminski, 2002) test scores of the children assessed immediately before teacher training were compared to the end of the year scores. In light of the lack of teacher gains, it was somewhat surprising that the students of the teachers trained using the visual representations made significantly greater gains in the subtest of DIBELS (Good & Kaminski, 2002) closely related to phonemic awareness (i.e., Nonsense Word Fluency). This subtest measures how well the students could apply letter-sound principles to sound out words that followed VC or CVC patterns. The PFT group student gains in NONSENSE WORD FLUENCY were equivalent to the NT control group's student gains, despite the NT group having significantly higher scores at pretest in both NONSENSE WORD FLUENCY and Letter Naming Fluency (LNF). One could conjecture that the exposure and training to the Phonic Faces (Norris, 2001) may have had a subtle effect on teachers'

understanding of phonemes and syllables that was not captured in the teacher posttest. However, this finding could be due to other variables not accounted for in this study. Previous findings (Bos et al., 1999; McCutchen, Abbott, et al., 2002; McCutchen, Harry et al., 2002) have shown that by training teachers in phonological awareness principles, there is a concomitant improvement in students' knowledge and reading ability, but there is not enough evidence to support this finding in the current study.

Summary

Not only does research support the importance of phonological awareness on reading acquisition (Ehri et al., 2001; Foorman, Breier, et al., 2003; Mathes et al., 2005; Stanovich & Siegel, 1994;Yopp, 1992), but studies have also shown the impact that teacher phonological awareness knowledge has on student knowledge (Bos et al., 1999; McCutchen, Abbott, et al., 2002; McCutchen, Harry et al., 2002). These studies show that through intensive professional development trainings, gains in student knowledge of phonological awareness and reading principles occur as a result of increases in teacher knowledge. The current study sought to replicate these findings in a less intensive training, and added the use of visual representations, which had been shown to improve students' phonological awareness (Brazier-Carter, 2008; Gillon, 2000; Gillon, 2005; Levy & Lysynchuck, 1997; Terrell, 2007; Torgesen et al., 1999).

The results of the current study revealed that the visual representation provided by Phonic Faces (Norris, 2001) did not provide an immediate means for becoming aware of and manipulating the structure of words for teachers trained with these cues. Overall, there was no significant difference between the visual representations group (PFT), the traditional training group (TT), and the no training control group (NT). All three groups gained from pre to post test measures, and the TT and NT groups remained higher at the delayed post-test, while the PFT

group returned to its original mean. The lack of differences between groups could be attributed to the lack of effectiveness of the training, the lack of training length and intensity, or experimental treatment diffusion (Campbell & Cook, 1979). The question now becomes, how much exposure and training is needed for the visual representations to be effective in training teachers? Furthermore, over the long term, will an advantage of using visual representations with teacher trainings be shown? Future research with teachers needs to be conducted to answer these questions.

This study has important implications for the efficacy of one-shot professional development trainings. According to Hall and Hord (2001), short inservices, such as the one conducted in this study, are relatively ineffective in training teachers and changing their knowledge and methods of instruction. However, school districts continue to perpetuate these types of trainings, and consider it adequate professional development. In fact, there are school districts in some states (Mississippi being one) that organize half-day early release days for professional development of teachers in which staff training sessions are conducted in two to two and a half hours. The current study supports other research (Hall & Hord, 2001) that half day trainings are ineffective methods of changing teacher knowledge and practice. Until school districts realize these short inservices are ineffective, no long lasting change in teacher knowledge or instruction will occur.

This study also has implications for the roles of SLPs in models of classroom consultation and Response to Intervention (RTI). The American Speech-Language-Hearing Association (ASHA, 2001) identifies SLPs' roles in promoting literacy and providing assistance to general education teachers by sharing their expertise to help enhance teachers' skills in phonological awareness. However, this study shows that the enhancement of teachers'

phonological awareness skills needs more than just a one time, half-day training in the general principles of phonological awareness. Further research needs to be conducted on methods of effective SLP teacher trainings to fully realize the extent of training teachers need in phonological awareness to show gains and change in their knowledge and instructional methodologies.

Limitations and Future Research

Although the current study offered some new information in the field of teacher phonological awareness knowledge, there are several limitations that need be addressed in future research. Limitations indentified include: (a) experimental design, (b) training length, and (c) diversity of participants.

The first limitation of this study is experimental design. This study was not conducted under ideal experimental conditions, as evidence by the potential experimental treatment diffusion (Campbell & Cook, 1979). Further research on the effects of visual representations on teacher trainings needs to be utilized using a separate control condition to eliminate experimental treatment diffusion.

The second limitation is training length. Extending the training period to two or more informational sessions with short follow-ups in the classroom for training groups would better evaluate the effects of visual representations on teacher training of phonological awareness principles.

The third limitation is the diversity of the participants. In addition to the small sample size, the participants were all female, and only two participants were African-American. A more diversified participant pool that is more representative would yield greater results that could be generalized to a larger population.

This study has important implications for future research. Because the current study did not show any differences in gains between trained and untrained groups, it would be beneficial to reevaluate the type of training methods used in the inservices. In addition to longer training length, it would also be beneficial to vary training methods, using multiple instructional methods, such as group activities and interactive learner assessments, to engage learners. It may also be beneficial to vary training methods, using group trainings and/or individual trainings, to evaluate the optimal training techniques, Furthermore, if no significant gains were noted at the initial posttest, then it would be beneficial for the trainer to analyze the test items, and readminister the training targeting the specific areas in which gains were not made. Future research needs to be designed to assess optimal training methodologies and length, in order to ascertain training effectiveness and gains in teacher knowledge that then can be effectively implemented in school environments.

REFERENCES

Alesandrini, K.L. (1984). Pictures and adult learning. *Instructional Science*, *13,* 63-77.

American Speech-Language-Hearing Association. (2001). *Roles and responsibilities of speech-language pathologists with respect to reading and writing in children and adolescents* [Guidelines]. Retrieved from: www.asha.org/policy

Bauman-Waengler, J. (2000). *Articulatory and phonological impairments: A clinical focus.* Needham Heights, MA: Allyn & Bacon.

Bos, C. S., Mather, N., Narr, R. F., & Babur, N. (1999). Interactive, collaborative professional development in early literacy instruction: Supporting the balancing act. *Learning Disabilities Research and Practice, 14,* 227-238.

Brazier-Carter, P. (2008). Language learning through storybook reading in Head Start. Unpublished doctoral dissertation, Louisiana State University, Baton Rouge. Retrieved from: http://etd.lsu.edu/docs/available/etd-06032008-133935/

Campbell, T.E., & Cook, D.T. (1979) *Quasi-experimentation: Design and analysis issues for field settings.* Chicago, IL: Rand McNally College Publishing Company.

Castiglioni-Spalten, M.L, & Ehri, L.C. (2003). Phonemic awareness instruction: Contribution of articulatory segmentation to novice beginners' reading and spelling. *Scientific Studies of Reading, 7,* 25-52.

Cunningham, A. E., Perry, K. E., Stanovich, K. E., & Stanovich, P. J. (2004). Disciplinary knowledge of K-3 teachers and their knowledge calibration in the domain of early literacy. *Annals of Dyslexia, 54,* 139-167.

Ehri, L. C., Nunes, Willows, D. M., Schuster, B. V., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36,* 250-287.

Felton, R. H. (1993). Effects of instruction on the decoding skills of children with phonological-processing problems. *Journal of Learning Disabilities, 26,* 583-589.

Field, A. (2005). *Discovering Statistics Using SPSS.* London, UK: Sage Publications.

Foorman, B. R., Breier, J. I., & Fletcher, J. M. (2003). Interventions aimed at improving reading success: An evidence-based approach. *Developmental Neuropsychology, 24,* 613-639.

Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology, 90,* 37-55.

Foorman, B. R., & Torgesen, J. (2001). Critical elements of classroom and small-group instruction promote reading success in all children. *Learning Disabilities Research & Practice, 16,* 203-212.

Foorman, B. R., Schatschneider, C., Eakin, M. N., Fletcher, J. M., Moats, L. C., & Francis, D. J. (2006). The impact of instructional practices in grades 1 and 2 on reading and spelling achievement in high poverty schools. *Contemporary Educational Psychology, 31,* 1-29.

Gillon, G. T. (2000). The efficacy of phonological awareness intervention for children with spoken language impairment. *Language, Speech, and Hearing Services in Schools, 31,* 126-141.

Gillon, G. T. (2005). Facilitating phoneme awareness development in 3- and 4-year-old children with speech impairment. *Language, Speech, and Hearing Services in Schools, 36,* 308-324.

Good, R. H., & Kaminski, R. A. (2002). *Dynamic indicators of basic early literacy skills* (6th edition). Eugene, OR: Institute for the Development of Educational Achievement. Retrieved from: http://dibels.uoregon.edu/.

Hall, G. E., & Hord, S. M. (2001). *Implementing change: Patterns, principles, and potholes.* Boston, MA: Allyn & Bacon.

Hoffman, P. R., & Norris, J. A. (2006). Visual strategies to facilitate written language development. In R. McCauley & M.E. Fey (Eds.), *Treatment of Language Disorders in Children: Conventional and Controversial Approaches*. Baltimore, MD: Brookes Publishing.

Ladefoged, P. (2006). *A course in phonetics.*(5th ed). Boston, MA: Wadsworth Publishing Company.

Levy, B.A., & Lysynchuk, L. (1997). Beginning word recognition: Benefits of training segmentation and whole word methods. *Scientific Studies of Reading 1*, 359-387.

Mathes, P. G., Denton, C. A., Fletcher, J. M, Anthony, J. L., Francis, D. J., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. *Reading Research Quarterly, 40,* 148-182.

McCutchen, D., Abbott, R. D., Green, L. B., Beretvas, S. N., Cox, S., Potter, N. S., Quiroga, T., et al. (2002). Beginning literacy: Links among teacher knowledge, teacher practice, and student learning. *Journal of Learning Disabilities, 35,* 69-86.

McCutchen, D., & Berninger, V. W. (1999). Those who know, teach well: Helping teachers master literacy-related subject-matter knowledge. *Learning Disabilities Research & Practice, 14,* 215-226.

McCutchen, D., Harry, D. R., Cunningham, A. E., Cox, S., Sidman, S., & Covill, A. E. (2002). Reading teachers' knowledge of children's literature and English phonology. *Annals of Dyslexia, 52,* 207-228.

McInnis, Alicia T. (2008). Phonemic awareness and sight word reading in toddlers. Unpublished doctoral dissertation, Louisiana State University, Baton Rouge. Retrieved from: http://etd.lsu.edu/docs/available/etd-06062008-144403/

Moats, L. C. (1994). The missing foundation in teacher education: Knowledge of the structure of spoken and written language. *Annals of Dyslexia, 44,* 81-102.

Moats, L. C. (2000). *Speech to print: Language essentials for teachers.* Baltimore: Brookes.

Moats, L. C. (2005). *Language essentials for teachers of reading and spelling: Module 2: The speech sounds of English: Phonetics, phonology, and phoneme awareness.* Longmont, CO: Sopris West Educational Services.

Moats, L. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing: An Interdisciplinary Journal, 22,* 379-399.

Moats, L. C., & Foorman, B. R. (2003). Measuring teachers' content knowledge of language and reading. *Annals of Dyslexia, 53,* 23-45.

National Institutes of Child Health and Human Development (2000). *Report of the National Reading Panel: Teaching children to read – An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* Bethesda, MD: NICHD, National Institutes of Health.

Norris, J.A. (1998). I could read if I just had a little help: Facilitating reading in whole language contexts. In C. Weaver (Ed.), *Practicing what we know: Informed reading instruction* (pp. 513–553). Urbana, IL: NCTE Press.

Norris, J. A. (2001). *Phonic faces cards*. Baton Rouge, LA: Elementory.

Norris, J., & Hoffman, P. (2002). Phonemic awareness: A complex developmental process. *Topics In Language Disorders*, 22, 14–46.

Robertson, C., & Salter, W. (2007). *The Phonological Awareness Test – 2.* East Moline, IL: LinguiSystems, Inc.

Royer, J. M., & Cable, G. W. (1975). Facilitated learning in connected discourse. *Journal of Educational Psychology, 67,* 116-123.

Schatschneider, C., Fletcher, J. M., Francis, D. J., Carlson, C. D., & Foorman, B. R. (2004). Kindergarten prediction of reading skills: A longitudinal comparative analysis. *Journal of Educational Psychology, 96,* 265-282.

Spencer, E. J., Schuele, C. M., Guillot, K. M., & Lee, M. W. (2008). Phonemic awareness skill of speech-language pathologists and other educators. *Language, Speech, and Hearing Services in Schools, 39,* 512-520.

Stanovich, K. E., & Siegel, L. S. (1994). Phenotypic performance profile of children with reading disabilities: A regression-based test of the phonological-core variable-difference model. *Journal of Educational Psychology, 86,* 24-53.

Terrell, P. A. (2007). *Alphabetic and phonemic awareness in toddlers.* Unpublished doctoral dissertation, Louisiana State University, Baton Rouge. Retrieved from: http://etd.lsu.edu/docs/available/etd-11072007-162300/

Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40,* 7-26.

Torgesen, J. K., Alexander, A.W., Wagner, R.K., Rashotte, C.A., Voeller, K., Conway, T., & Rose, E., (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities, 34,* 33-58.

Yopp, H. K. (1992). Developing phonemic awareness in young children. *The Reading Teacher, 45,* 696-703.

APPENDIX A

PARTICIPANT CONSENT FORM

Project Title: Effects of Visual Strategies on Teacher Training of Phonological Awareness Principles

Invitation to Participate

You are invited to participate in a project studying the effects of teacher training methods on the principles of phonological awareness. You will learn the basic principles of phonological awareness and its role in reading instruction. The results of the study will provide us with information that will improve our ability to teach principles of phonological awareness.

Explanation of Procedures

You will be given a pre-test on phonological awareness and reading principles. You will then participate in a half-day teacher training on phonological awareness principles. Once training has been completed, you will be given a post-test on phonological awareness and reading principles. Then at the end of the school year, you will be given a final post-test. In addition, students' mid-year and end of the year DIBELS data will be used to measure students' progress in phonological awareness and phonics skills.

Potential Risks and Benefits

There are no known risks for you in this study. This training may improve your knowledge of phonological awareness and reading principles, and may improve your reading instruction.

Assurance of Confidentiality

The information collected will be treated confidentially. The trainings may be video recorded so that we can observe the procedures and make sure they are followed appropriately. All data, including performance records and video recordings will only be viewed by investigators directly

involved in the study. The results may be shared with professionals through presentations of the group data, but your names will not be used.

Withdrawal from the Study

Your participation in the study is voluntary. At any time, you are free to withdraw your consent and discontinue participation.

Offer to Answer Questions

If you have any additional questions or concerns, please feel free to contact either Dr. Janet Norris (225-578-3936) or Rachel Powell (601-823-0110). We will share the results of the study with you when the study is completed.

Permission

This study has been discussed with me and all my questions have been answered. I may direct any additional questions regarding specific aspects of the study to the investigators. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, Institutional Review Board, (225) 578-8692. I, _____, agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of the consent form.

_____ _____

Name Date

APPENDIX B

TEACHER DEMOGRAPHIC QUESTIONNAIRE

Name:_____

Age:_____ Years of Teaching Experience:_____years

Grade(s) Taught (Please List Any Grade You Have Taught and Years with Each Grade [i.e., Kindergarten, 5 years]):_____

_____

Area(s) of Certification (i.e., Elementary Ed, Early Childhood, etc.):_____

_____

Highest Degree Earned (Please indicate any graduate level course work you have, and the area of your graduate work, i.e., Master's, Elementary Ed.):

_____

Please indicate if you have had any formal training in any of the following courses, and if so how many hours of training:

Phonetics (transcribing words by phonemes):

__0-3 hours __3-6 hours __6-9 hours __9+ hours

Reading Acquisition (how reading is learned):

__0-3 hours __3-6 hours __6-9 hours __9+ hours

Reading Instruction (how reading is taught):

__0-3 hours __3-6 hours __6-9 hours __9+ hours

Linguistics or Language Acquisition courses (how language is learned):

__0-3 hours __3-6 hours __6-9 hours __9+ hours

Reading Disabilities

__0-3 hours __3-6 hours __6-9 hours __9+ hours

Have you attended any DIBELS training outside of this school? Yes/No

If so, when and for how many days?_____

Please list any other trainings/coursework/conferences/etc. that you have had in phonemic/phonological awareness instruction:_____

_____

APPENDIX C

PHONOLOGICAL AWARENESS TEST

How many spoken syllables are in each word?

1. nationality	1	2	3	4	5
2. enabling	1	2	3	4	5
3. incredible	1	2	3	4	5
4. shirt	1	2	3	4	5
5. cleaned	1	2	3	4	5

6. A syllable is:

   a. the same as a rime

   b. a unit of speech organized around a vowel sound

   c. a sequence of letters that includes one or more vowel letters

   d. equivalent to a morpheme

How many phonemes or distinct speech sounds are in each word?

7. straight	1	2	3	4	5	6	7
8. explain	1	2	3	4	5	6	7
9. lodged	1	2	3	4	5	6	7
10. know	1	2	3	4	5	6	7
11. racing	1	2	3	4	5	6	7
12. eighth	1	2	3	4	5	6	7
13. chirp	1	2	3	4	5	6	7
14. teacher	1	2	3	4	5	6	7
15. ball	1	2	3	4	5	6	7

16. thin	1	2	3	4	5	6	7
17. knuckle	1	2	3	4	5	6	7
18. sing	1	2	3	4	5	6	7
19. think	1	2	3	4	5	6	7
20. poison	1	2	3	4	5	6	7
21. squirrel	1	2	3	4	5	6	7
22. quick	1	2	3	4	5	6	7
23. box	1	2	3	4	5	6	7
24. start	1	2	3	4	5	6	7
25. fuse	1	2	3	4	5	6	7
26. use	1	2	3	4	5	6	7
27. cat	1	2	3	4	5	6	7
28. show	1	2	3	4	5	6	7
29. stop	1	2	3	4	5	6	7
30. yes	1	2	3	4	5	6	7
31. does	1	2	3	4	5	6	7
32. sigh	1	2	3	4	5	6	7
33. run	1	2	3	4	5	6	7

34. Which word has a schwa (/ə/)?

a. eagerly

b. prevent

c. definition

d. formulate

e. story

Part 2 – True or False

35. _____Students must be able to orally segment and blend the phonemes in complex syllables before they can benefit from instruction in letter-sound correspondence.

36. _____Screening at the end of kindergarten can be efficient, reliable, and valid for predicting a child's silent passage reading comprehension at the end of 3rd grade.

37. _____Phonological awareness exercises should always include letters or print.

38. _____A closed syllable always begins with a consonant.

What is the third speech sound in each of the following words?

example: cat __T___ as in __TOY___ (give a letter that represents the third sound and an example word with the sound circled)

39. joyless_____ as in _____

40. thinker _____ as in _____

41. squish _____ as in _____

42. mission _____ as in _____

43. would _____ as in _____

44. shower _____ as in _____

Read the first word in each line and note the sound that is represented by the underlined letter or letter cluster. Then select the word or words that contain the same sound. Circle *the* words you select.

45. pull	sugar	Tune	cup	fuse
46. weight	height	Friend	cake	paid
47. nose	rays	Rice	hiss	face
48. pretend	basket	Baked	thing	battle
49. wing	think	Candle	sign	hang

Skills Measured

1. Syllable knowledge

   a. Segmentation of syllables: From a multiple choice of numbers one to seven, participants were asked to identify how many syllables were in nationality(5), enabling(3), incredible(4), shirt(1), and cleaned(1).

   b. Definition of a syllable: From a multiple choice of four choices, participants were asked what a syllable was (answer: a unit of speech organized around a vowel sound).

   c. Open/closed syllables: In true/false format, participants were asked if the statement "a closed syllable always begins with a consonant," was true or false (false).

2. Phoneme knowledge:

   a. Phoneme segmentation: From a multiple choice of numbers one to seven, participants were asked to identify how many phonemes were in straight(5), explain(7), lodged(4), know(2), racing(5), and eighth(2).

   b. Definitions of phonemes: From the words eagerly, prevent, definition, formulate, and story participants were asked to identify which word had the "schwa" /ə/ sound (definition); in true/false format, participants were asked if the statement "students must be able to orally segment and blend the phonemes in complex syllables before they can benefit from instruction in letter-sound correspondence," was true or false (true).

3. Other Reading knowledge:

   a. Screening knowledge: In true/false format, participants were asked if the statement "Screening at the end of kindergarten can be efficient, reliable, and valid for predicting a child's silent passage reading comprehension at the end of 3rd grade," was true or false (true).

   b. Phonological awareness knowledge: In true/false format, participants were asked if the statement "Phonological awareness exercises should always include letters or print," was true or false (false).

APPENDIX D

PHONOLOGICAL AWARENESS TEST ANSWERS

How many spoken syllables are in each word?

1. nationality	1	2	3	4	5
2. enabling	1	2	3	4*	5
3. incredible	1	2	3	4	5
4. shirt	1	2	3	4	5
5. cleaned	1	2	3	4	5

*Due to dialectal variations, the examiner accepted either answer as correct for number 2.

6. A syllable is:

   a. the same as a rime

   b. a unit of speech organized around a vowel sound

   c. a sequence of letters that includes one or more vowel letters

   d. equivalent to a morpheme

How many phonemes or distinct speech sounds are in each word?

7. straight	1	2	3	4	5	6	7
8. explain	1	2	3	4	5	6	7
9. lodged	1	2	3	4	5	6	7
10. know	1	2	3	4	5	6	7
11. racing	1	2	3	4	5	6	7
12. eighth	1	2	3	4	5	6	7
13. chirp	1	2	3	4	5	6	7
14. teacher	1	2	3	4	5	6	7

15. ball	1	2	3	4	5	6	7
16. thin	1	2	3	4	5	6	7
17. knuckle	1	2	3	4	5	6	7
18. sing	1	2	3	4	5	6	7
19. think	1	2	3	4	5	6	7
20. poison	1	2	3	4	5	6	7
21. squirrel	1	2	3	4	5	6*	7
22. quick	1	2	3	4	5	6	7
23. box	1	2	3	4	5	6	7
24. start	1	2	3	4	5	6	7
25. fuse	1	2	3	4	5	6	7
26. use	1	2	3	4	5	6	7
27. cat	1	2	3	4	5	6	7
28. show	1	2	3	4	5	6	7
29. stop	1	2	3	4	5	6	7
30. yes	1	2	3	4	5	6	7
31. does	1	2	3	4	5	6	7
32. sigh	1	2	3	4	5	6	7
33. run	1	2	3	4	5	6	7

*For number 21, both “5” and “6” were acceptable answers, because one could argue there was a schwa before /l/.

34. Which word has a schwa (/ə/)?

a. eagerly

b. prevent

c. definition

d. formulate

e. story

Part 2 – True or False

35. False__Students must be able to orally segment and blend the phonemes in complex syllables before they can benefit from instruction in letter-sound correspondence.

36. True __Screening at the end of kindergarten can be efficient, reliable, and valid for predicting a child's silent passage reading comprehension at the end of 3rd grade.

37. False__Phonological awareness exercises should always include letters or print.

38. False__A closed syllable always begins with a consonant.

What is the third speech sound in each of the following words?

example: cat __T___ as in __TOY___ (give a letter that represents the third sound and an example word with the sound circled)

39. joyless__l___ as in __lady___

40. thinker __ng___ as in __thing___

41. squish __w___ as in __wake___

42. mission __sh*___ as in _shop____

43. would __d___ as in __dog___

44. shower __er*___ as in __water/run___

*For number 42, if a participant wrote "ss" for the sound, and listed a word with /sh/, then it was counted as correct. For number 44, credit was also given for /w/ as is in woman, as /w/ may be produce medially in southern dialect.

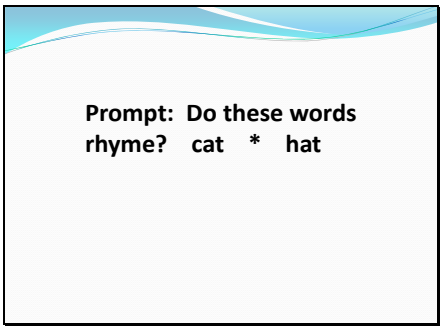
Read the first word in each line and note the sound that is represented by the underlined letter or letter cluster. Then select the word or words that contain the same sound. Circle *the* words you select.

45. p<u>u</u>ll	Sugar	Tune	cup	fuse
46. w<u>ei</u>ght	Height	Friend	cake	paid
47. no<u>s</u>e	Rays	Rice	hiss	face
48. pre<u>t</u>end	Basket	Baked	thing	battle
49. wi<u>ng</u>	Think	Candle	sign	hang

APPENDIX E

PHONOLOGICAL AWARENESS VISUAL STRATEGIES TRAINING HANDOUTS

Slide 12



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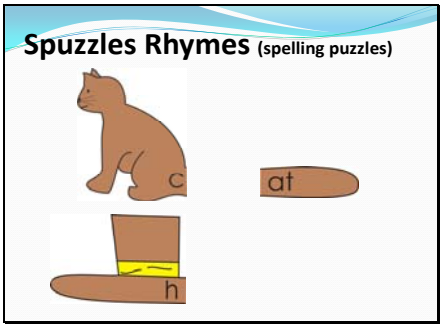

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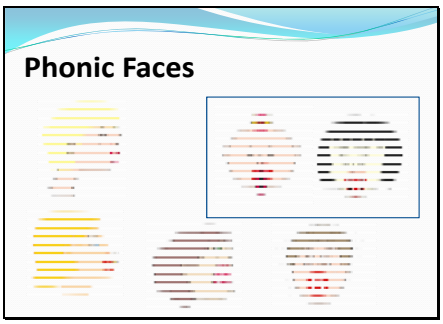

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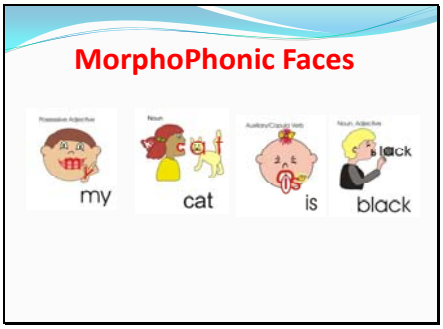
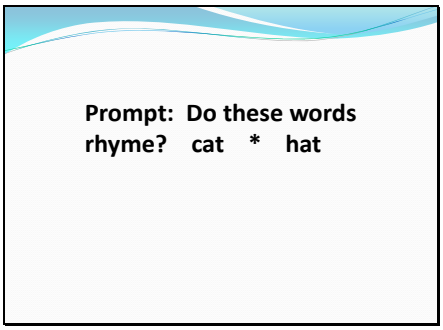


APPENDIX F

PHONOLOGICAL AWARENESS TRADITIONAL TRAINING HANDOUTS

Slide 12



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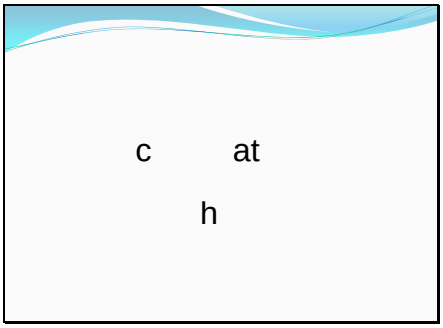

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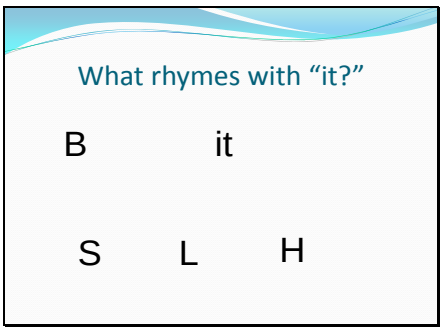

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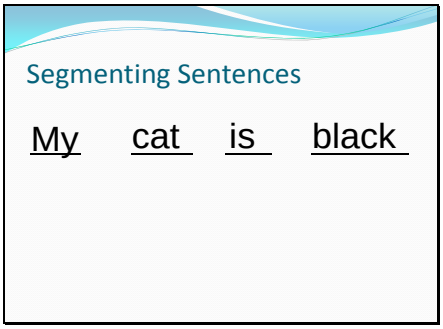

APPENDIX G

PERMISSION TO REPRINT LETRS CONSONANT AND VOWEL CHARTS

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Thank you for your interest in Sopris West. I received your request for permission to use Consonant Phonemes by Place and Manner of Articulation Chart, pg. 24 and Vowel Chart, pg. 36 from our product, *Language Essentials for Teacher of Reading and Spelling: LETRS*. We are happy to grant you permission to use these pages for no charge.

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If you have any questions/comments, please feel free to be in touch.

Thank you,

Sharon Pendergast

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VITA

Rachel Kennedy Powell graduated from the University of Southern Mississippi in 2001 with a Bachelor of Arts degree in speech-language pathology. She received her Master of Science degree from the University of Southern Mississippi in 2003. Upon graduation, she was employed as speech-language pathologist in Washington Parish School System, where she served Head Start, Franklinton Primary School, and Franklinton High School. The following year she was employed as the first speech-language diagnostician for Washington Parish School System, where she conducted all speech-language evaluations for that school system. She is currently employed by Brookhaven School District in Brookhaven, Mississippi, where she serves as a speech-language pathologist at Mamie Martin Elementary School.

Mrs. Powell has been actively involved in state associations in both Louisiana and Mississippi. In Speech Pathologists and Audiologists in Louisiana Schools (SPALS), she served as the Region II Co-representative, Liz Borel Award Chairperson, and program co-chairperson, and was also an active member of the Louisiana Speech-Language-Hearing Association (LSHA). In the Mississippi Speech-Language-Hearing Association (MSHA), she has served as the Chairperson for the MSHA Task Force on Commentary for the Mississippi Department of Education Policies and Procedures for Individuals with Disabilities Education Act (IDEA) 2004, the Convention Door Prizes Chairperson, the Birdies for Charity Chairperson, and as an Advocate for Policies on Language Disorders. She has been elected to serve as the Vice President of School Issues for the 2010-2013 term. Nationally she is a member of the American Speech-Language-Hearing Association (ASHA), and a member of ASHA Division 16, School Issues.

Mrs. Powell has presented at both the state and national level. At ASHA, she presented the poster *Morphophonic Faces Intervention for Sight Words Reading of At-Risk Students*. At MSHA, her presentations include *Phonology versus Articulation: Implications for Intervention*, and *Language Disorders: Educational Impact: General Curriculum*. She presented *Considerations for Language Intervention Policies* to the Mississippi Department of Education. In addition, she is serving as a trainer on the new Mississippi Department of Education Policies and Procedures for IDEA 2004.

In addition to her professional endeavors, Mrs. Powell is actively involved in her community. She serves as a board member for the Brookhaven Trust, and is an active member of First Baptist Church Brookhaven. She and her husband Michael Powell have one daughter, Kennedy Elizabeth, and they reside in Brookhaven, Mississippi.