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Preschool Alphabet and Word Learning: Are Visual Representations Beneficial?

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Preschool Alphabet and Word Learning: Are Visual Representations Beneficial?

by

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Introduction

Learning the alphabet, including letter-sounds, is a critical skill in learning to read. For some children alphabetic knowledge comes about naturally, for others it is less obvious. Letter-sound learning requires a high level of metalinguistic skill, or phonemic awareness. The child must perceive an auditory word as a concept, and segment that concept into parts such as first-middle and final phonemes (Snider, 1997). There is some evidence that making the task more concrete and visual facilitates learning (Bouton 2011; Ehri 2005; Gates & Bocker, 1923; Gough, Juel, & Griffith, 1992; McIntyre, Protz, & McQuarrie, 2008; Terrell, 2007). The purpose of this study is to compare letter-sound and written word learning given three types of alphabet and word stimuli, ranging from low to high visual support for phonemic awareness.

Literature Review

Phonemic Awareness

Phonological awareness is the metalinguistic ability to conceptualize and manipulate segments of language, including sentences, phrases, words, syllables, and phonemes (i.e., our conceptual structure for sounds) (Snider, 1997). Phoneme awareness is the ability to conceptualize and manipulate phonemes for tasks such as rhyming (i.e., changing the onset phoneme to make a new word that maintains the same rime), isolating phonemes from their position in words (i.e., first, middle and last sounds), or blending (i.e., given a sequence of phonemes spoken in segments, mentally blending them to hear the aggregate word) (Torgesen, 1994). A child who is aware of phonemes can begin to make letter-sound associations needed to understand the alphabetic nature of letters (and vice-versa, as learning about letters enables the child to think about the sound it represents) (Ehri et al., 2001). Thus, phoneme awareness and

grapheme awareness are reciprocal skills that for many children facilitate the transition to becoming readers of a language (Snider, 1997).

Snider (1997) indicated that phonemic awareness has been shown to be a developmental language skill, meaning that those prereaders who have difficulties with phonemic awareness will most likely be the students with literacy issues later on. If prereaders with poor phonemic awareness can be identified before school, intervention can take place to reduce the child's risk of becoming a student with reading trouble.

The majority of children begin to show the ability to identify and manipulate phonemes in the preschool years, but they typically do not fully develop until basic literacy (around first grade). Children who are otherwise delayed developmentally, as well as children with dyslexia, will typically have delayed development of phonemic awareness (Torgesen, 1994). Children with delays in phonemic awareness have difficulty conceptualizing the phonemic structure of words and are baffled by questions such as, "What is the first sound in "dog"? They are likely to answer, "woof."

Visual attempts at Phonemes

There have been many attempts made to help individuals visualize phonemes. For instance, cued speech is a communicative method used mainly to assist those who are deaf or hard of hearing with visualizing phonemes via a combination of mouth movements and hand positions. Children with cochlear implants who are exposed to regular cued speech better developed the ability to identify and manipulate phonemes than their peers who did not have exposure to cued speech (Bouton, 2011). In the case of this study of cued speech, children

exposed to visual representations of phonemes developed a better grasp of what phonemes are and how to use them.

The Lindamood Phoneme Sequencing (LiPS) program uses awareness of the oral motor production of phonemes with visual feedback focusing on the appearance of the lips. LiPS allows children to manipulate words at the phoneme level, which in turn has been shown to improve phonemic awareness in first graders. Research shows LiPS improves phonemic awareness leading to improved decoding but does not directly connect the sounds to written letters (letter shapes are arbitrary so child would still have to memorize the connection of the sound to letters) ("Current Efficacy Research," 2011).

Visual Attempts at the Alphabet

Attempts have also been made throughout the literature to use visual representations to teach the alphabet. For instance, *Zoo-phonics* is a method that uses animals drawn into letters to cue the word associated with a letter. This method assists children in remembering a target word, but a child still must possess appropriate phonemic awareness to segment the first sound of the word from the target word ("Zoo-phonics").

Hoogeveen, Smeets, and van der Houven (1987) used an action mnemonic to teach letter-sound (i.e., the letter "h" drawn into a panting dog) with better results than segmenting sound from example word (i.e., /h/ is the first sound of "heart") for children with intellectual disabilities.

Phonic Faces, used in this study, is a method of teaching the alphabet wherein a letter is drawn into a face that represents the speech production gestures made by the lips, tongue, oral cavity and voice so a more direct link can be made from alphabetic letter to the sound that letter

represents. In this method, the child is prompted to make the same oral gesture as depicted in the image of the face, and the consequent sound is produced. By using this method there becomes no need for phonemic awareness because the phoneme does not need to be segmented from a word beginning with that sound (Norris, 2003).

Other Visual Attempts at Word Learning

As children begin to learn to read words, they do not initially use the alphabetic principle. Instead, they look for something salient that visually connects the shape of the word with its meaning (Gough, 1996). Thus, words such as "look" are recognized because the double o's are perceived to be eyes, or "dog" because the "d" appears as a dog's head and the "g" as the back leg (Ehri 2005; Gates & Bocker, 1923; Gough, Juel, & Griffith, 1992). Ehri (1995) noted that beginning readers expect written words to have the same properties as other visual objects in their experience and to function like pictures. Pictures associated with written words are an important cue children use as they transition from letter-shape to letter-sound concepts required for decoding.

Several researchers have used the principle of overlapping pictures and print to help children successfully make their transition into becoming readers. Blischak and McDaniel (1995) superimposed pictures depicting the meaning of words into the printed letters and found greater gains in sight word learning for both typical and struggling readers. Van der Bijl, Alant, and Tönsing (2002) found that using superimposed pictures and print resulted in word learning in children with little or no pre-literacy skills. However, because superimposed words were not dependent on alphabet skills, researchers questioned whether they would lead to generative word learning (Blischak & McDaniel, 1995; Ehri, 1995).

Norris (2006) developed sight words, termed MorphoPhonic Faces, that were a hybrid between alphabet and superimposed word learning. Each word begins with a Phonic Face letter while the meaning is pictured with superimposed print for the rest of the word. Hartman, Hoffman, and Norris, (2007) showed that more MPF words were learned daily compared to plain words, and greater gains were made in phonemic awareness. Williams (2013) found better short and long-term retention occurred for words learned using MPF compared to plain print.

To further explore the effects of visualized representations of letters and words in alphabet and word learning, this study compared the learning of low-SES preK children under three alphabet learning conditions: plain print, Phonic Faces, and MorphoPhonic Faces. The questions of the study were:

1. Will greater gains in alphabet skills (i.e., letter names, letter sounds, words beginning with a letter) be made when letters or words are visualized?
2. Will greater gains in phonemic awareness skills (i.e., rhyme, word segmentation, phoneme isolation) be made when letters or words are visualized?
3. Will greater gains in written word recognition (i.e., preK Dolch words) or oral vocabulary words be made when letters or words are visualized?
4. Will greater gains in word articulation (i.e., speech production) be made when letters or words are visualized?

Methods

This study compared gains in the alphabet principle, phonemic awareness, word recognition, and vocabulary across three conditions: plain alphabet accompanied by pictures beginning with the letter sound, Phonic Face letter accompanied by pictures beginning with the

letter sound, and MorphoPhonic Faces where the spelling of the word is incorporated into the Phonic Face and the picture of the word. PreK students were instructed using the alphabet-word pages that were read and practiced twice weekly for six weeks.

Participants

Seventy-eight juniors enrolled in an undergraduate service-learning class in a major university in the south acted as interventionists for this study. The students were implementing assessment and intervention skills learned in the class. Each student implemented one 30-minute intervention session weekly with the same child. Since children were seen twice weekly, two different students saw the children each week (i.e., one on Tuesday and one on Thursday). Four graduate level students who also were in the class served as fidelity checkers, providing written feedback on the accuracy and completeness of the implementation of the treatment. They also modeled the procedures as needed, and alerted the course instructor when students were having difficulty with child behaviors or other difficulties, in which case the instructor would work with the dyad to implement behavioral strategies.

The participants were 30 prekindergarten children in an urban school, ranked among the lowest achieving elementary schools in the state. The school was predominantly African American, with 27 of the 30 participants AA, and 3 Hispanic. Seventy-six percent of the students in the school received free or reduced lunch. Classroom A had 12 children participating in the study and classroom B had 18. The participants ranged in age from 4.1 to 5.8 years (mean = 4.9), including 19 males and 11 females. To be included in the study, students must have no known significant visual or hearing loss according to school records. Students were tested prior to the beginning of intervention and matches of three students were made based on vocabulary scores and alphabet knowledge for letter names and letter sounds.

The three students in each triad then were randomly assigned to one of the three intervention conditions. Each group had children from both classrooms A and B. A one way Analysis of Variance showed no differences between groups for alphabet skills ($p = 0.99$; df 2) or vocabulary ($p = 0.99$; df 2). Table 1 profiles the demographic characteristics of the three groups

Table 1

Profile of Demographic Characteristics of Children in the Three Alphabet Learning Conditions

Group	Mean Age	Sex		Race		Avg. Pretest Score		
		Male	Female	AA	H	Picture Vocab	Letter Name	Letter Sound
Plain Print (PP)	4;9 years	7	3	8	2	10	7.9	3.9
Phonic Face (PF)	4;10 years	6	4	9	1	11.67	8.78	3.44
MorphoPhonic Face (MF)	4;9 years	6	4	10	0	13.67	7	3

Test Instruments

Dolch-Sight Word List. The Dolch Word List (Dolch, 1936) is a list of 220 commonly used words that should be recognized by "sight" for fast or "fluent" reading. Many of the words do not follow basic phonic principles, so they cannot be sounded out. The list includes the most frequently used words in the English language, such as pronouns, adjectives, adverbs, prepositions, conjunctions, and verbs. The pre-K level words were administered.

Test of Language Development-Primary: 4th Edition (TOLD-P:4). The TOLD-P:4 (Newcomer & Hammill, 2008) is a norm-referenced standardized test that assesses a child's language abilities. It specifically measures children's use of the semantic, grammatical, and phonological components of language. Participants were administered two subtests from the TOLD-P:4: Picture Vocabulary and Word Articulation.

Picture Vocabulary (PV) subtest. The PV subtest was administered to measure the participant's comprehension of word meanings. The examiner will present the child with an array of four pictures. The examiner will then say a word (e.g., dog) and the child was required to point to the picture that most closely represents the spoken word among the pictures (e.g., a book, a dog, a ball, and a baby).

Word Articulation (WA) subtest. The WA subtest was administered to assess the participant's ability to articulate speech sounds. The examiner will present the child with a picture and provide a sentence prompt (e.g., "You wash your hands and face with a bar of _____.") The child was required to complete the sentence by saying the target word (e.g., soap).

The Phonological Awareness Test: 2nd Edition (TPAT:2). Skills in phonological awareness have been linked with children's success and achievement in early reading and spelling (Ball & Blachman, 1991). TPAT:2 (Robertson & Salter, 2007) is a comprehensive, norm-referenced, standardized tool that was designed to assess children's phonological awareness skills. It measures children's knowledge of the oral language segments of syllables and phonemes. Several subtests comprise TPAT:2, however, only the subtests that pertain specifically to the current study were administered.

Rhyming: This subtest assesses children's ability to discriminate rhyming words (Do cat-hat rhyme?) and produce rhymes (What word rhymes with monkey?). Nonsense words are acceptable.

Segmentation of Phonemes. This subtest assesses children's abilities to divide words in individual sounds. The examiner will say a word (e.g., cat) and the child were required to say each sound in the word (e.g., /k—æ—t/).

Isolation: Initial, Medial, and Final subtests. This subtest examines children's abilities to identify a sound in the initial, medial, or final word positions. The examiner will say a word (e.g., cat) and the child were required to identify the beginning sound (e.g., /k/), the middle sound (e.g., /æ/), or the final sound (e.g., /t/).

Letter Identification Assessment (LIA). The LIA assessment (Wright Group Publishing) measures knowledge of both capital and lower case letters, including letter names, letter sounds, and words beginning with that letter. Students are given a page with randomly ordered upper case letters to name; randomly ordered lower case letters to name; and then asked for the letter sound using the letter case with the most correct responses. Finally, the child is asked to name a word that begins with a given printed letter.

Materials

Plain Print Stimuli: Plain Print stimuli were comprised of an alphabet book page consisting of the printed letter and three to four pictures of words beginning with that letter. The pictures were accompanied by the printed word in 24 point font. (see Figure 2a)

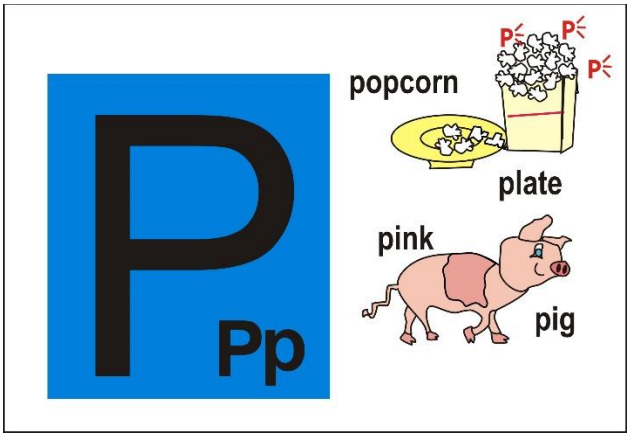

Figure 2a. Stimuli with plain print and pictures accompanied by printed words.

Phonic Face Stimuli: Phonic Faces stimuli were comprised of an alphabet book page consisting of the Phonic Faces alphabet representation and three to four pictures of words beginning with that letter. The pictures were accompanied by the printed word in 24 point font. (see Figure 2b)

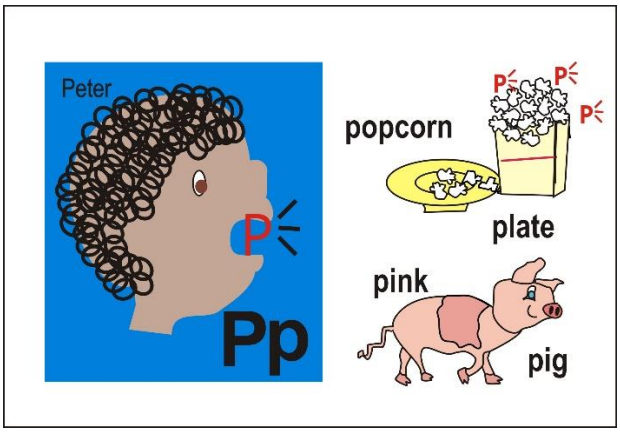

Figure 2b. Stimuli with Phonic Faces letter and pictures accompanied by printed words.

MorphoPhonic Stimuli: MorphoPhonic stimuli were comprised of an alphabet book page consisting of the printed letter and three to four pictures of words beginning with that letter in which the picture is superimposed into the printed words. The MP words were accompanied by the printed word in 24 point font. (see Figure 2c)

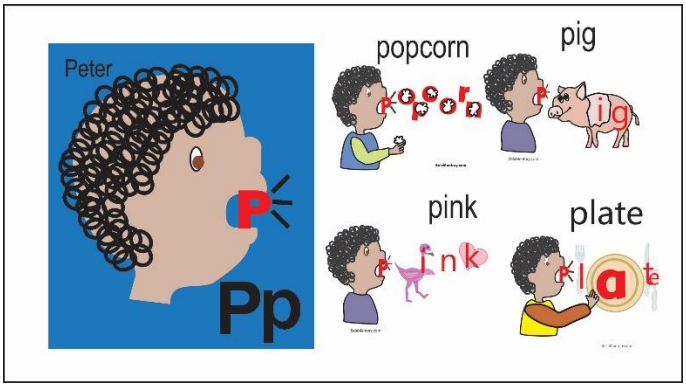

Figure 2c. Stimuli with Phonic Faces letter and MorphoPhonic Face words embedded into pictures.

Procedure

The procedure were the same across days and children. The children were placed in either a) plain print, b) Phonic Faces, or c) MorphoPhonic Faces group.

2 min: pretest

2 min: introduce letter

8 min: intervention

8 min: review and practice

2 min: posttest

Daily Pretest – the 7 target letters and the words from the current and previous weeks of the study were pretested each day using plain print lower case letters (i.e., 4 words the first week, 8 the second and so forth). Children were asked to name the letters and the letter sounds.

Letter Introduction – the child's attention was drawn to the left hand side of the alphabet book page containing the isolated letter (plain print or Phonic Face). The large lower case letter was pointed to and the shape of the letter was discussed and named. In the case of the Phonic Face, the speech production cues were explained to the child. The child was encouraged to repeat the letter name. The small capital and lower case letters were then shown and named either "capital __" or "lower case __".

The child is told that the letters make sounds. In the plain print condition, children are told the sound and asked to repeat it several times. In the Phonic Faces condition, children are told that the letter looks like the mouth making the sound. In the case of letter "P", for example, the line tells your mouth to close and stop the air behind your lips, and the curve tells you to pop your lips open, making the /p/ sound.

Intervention – the child's attention is drawn to the right hand side of the alphabet book page containing the pictures. The child is told to listen carefully because the letter sound can be heard at the beginning of each word.

Plain Print – in the PP condition, each picture is pointed to and the word is produced with an exaggerated first sound. Ask the child to listen for the sound, watch you say the sound, watch as you say the word focusing on the first sound (i.e., /p/ /p/ /p/ pig), and then say the word. Point to the letter "P" and ask what letter is at the beginning of the word, what sound it makes, and then to say the word.

Review and Practice – the target letter and words from the current lesson as well as all previous lessons are reviewed using procedures similar to the intervention steps.

Reliability

The test administrator scored the pre and post-assessments and weekly score sheets, or protocols. All forms were then submitted to the Language Intervention Lab. The lab assistants entered data into Excel files. All assessments and weekly score sheets were rechecked and rescored if scores during data entry or Excel file check did not match the protocol. Raw scores were added from the protocol scoring pages and at least two people checked scores.

Fidelity

The two intervention sessions for the 30 participants were staggered throughout the week, typically on Monday and Friday or Monday and Wednesday. The same clinician provided intervention to the same participant the entire six weeks of the study. Furthermore, a PhD supervisor with American Language-Speech-Hearing Association (ASHA) certification or

graduate student assistants observed undergraduate-child dyads at least part of each session weekly. While observing, if needed, the observers would model the appropriate teaching technique and assist with behavioral or other issues.

Results

Table 2.1

Mean Scores, Standard Deviation, and Gain Score for Alphabet Skills at Pretest and Posttest

Gp	Letter Name					Letter Sound					Letter Word				
	Pretest		Posttest			Pretest		Posttest			Pretest		Posttest		
	$\bar{X}$	SD	$\bar{X}$	SD	**G**	$\bar{X}$	SD	$\bar{X}$	SD	**G**	$\bar{X}$	SD	$\bar{X}$	SD	**G**
PP	8.8	7.7	13.7	7.9	**4.9**	4.3	4.6	8.3	5.0	**4.0**	4.0	6.3	9.0	7.5	**5.0**
PF	8.4	6.0	15.3	6.6	**6.9**	3.4	3.6	11.4	5.4	**8.1**	2.9	4.7	8.9	7.4	**6.0**
MF	7.4	5.9	13.5	6.8	**6.1**	2.9	3.2	9.4	7.4	**6.5**	3.5	5.1	8.2	7.2	**5.3**

Table 2.1 profiles the participant group means for three measures of alphabet knowledge, with standard deviations for the pretest and posttest measurement periods as well as the average group gains in scores. Differences among group means at pretest were all similar and all within the ranges indicated by the group standard deviations for all three measures. The average gain scores were apparently larger for the PF and MF groups compared to the PP group for all three measures. Gains for letter-sounds were twice as great for the PF group compared to the PP group.

To determine if these differences were statistically reliable, a 3 Participant Group X 2 Time Period Mixed Model ANOVA was calculated for each dependent measure. The results of these analyses were similar for all three dependent measures. The main effect for Time Period was significant for Letter Name ($F(1,25) = 39.07$, $p < .0001$) , Letter Sound ($F(1,25) = 56.27$, $p <$

.0001), and Letter Word (F (1,25) = 23.65, p <.0001). These results indicate that, on average, participants improved from pretest to posttest.

However, there were insignificant interaction effects between Participant Group and Time Period for Letter Name (F (2,25) < 1.0, p < 0.81), Letter Sound (F(2,25) < 1.0, p < 0.60) and Letter Word (F (1,25) < 1.0, p < 0.77). The nonsignificant interactions reinforce the significant Time Period effects, showing that the scores of all three participant groups improved from pretest to posttest.

Table 2.2

Mean Scores, Standard Deviation, and Gain Score for Word Articulation, PreK Dolch Words, and Picture Vocabulary at Pretest and Posttest

Gp	Word Articulation					PreK Dolch Words					Picture Vocab Raw Scores				
	Pretest		Posttest			Pretest		Posttest			Pretest		Posttest		
	$\bar{X}$	SD	$\bar{X}$	SD	**G**	$\bar{X}$	SD	$\bar{X}$	SD	**G**	$\bar{X}$	SD	$\bar{X}$	SD	**G**
PP	13.3	4.00	16.5	3.41	**3.2***	0.8	1.03	0.9	0.74	**0.1**	10	5.44	11.17	2.99	**1.17**
PF	15.9	6.08	19	4.14	**3.1***	0.6	0.84	0.8	0.79	**0.2**	11.67	5.33	13.56	4.45	**1.89***
MF	14.9	5.40	19.4	3.17	**4.5***	0.6	0.84	2	2.16	**1.4**	13.67	4.45	16.17	4.66	**2.5***

*= greater than one Standard Error of Measurement

Table 2.2 profiles means, standard deviations, and gain scores between pretest and posttest for word-level skills, including the dependent measures of *word articulation*, *PreK Dolch words*, and *picture vocabulary* for the three conditions. Inspection of the means for *word articulation* shows similar performance across groups at pretest, but greater gains at posttest for the MF group compared to the PP and PF groups. The mean pretest scores for *PreK Dolch words* show similar performance across groups at pretest, but greater gains for the MF groups at posttest. The gains for the PP and PF groups were negligible (the mean words recognized remained less than one) while the MF group averaged two words. The mean pretest scores for *picture vocabulary* show similar performance across groups at pretest, but greater gains for the

PF and MF groups at posttest compared to the PP group. The gains for the MF group were more than twice as large compared to the PP group.

To determine if these differences were statistically reliable, a 3 Participant Group X 2 Time Period Mixed Model ANOVA was calculated for each dependent measure. The results of these analyses were similar for all three dependent measures. The main effect for Time Period was significant for Word Articulation ($F(1,25) = 23.39$, $p < .0001$) and PreK Dolch Words ($F(1,25) = = 5.65$, $p < .025$), but not for Picture Vocabulary ($F(1,25) = 2.21$, $p = 0.15$). These results indicate that, on average, participants improved from pretest to posttest for word articulation and Dolch words, but not for vocabulary.

There were no significant interaction effects between Participant Group and Time Period for Word Articulation ($F(2,25) = .37$, $p < 0.69$), PreK Dolch Words ($F(1,25) = 2.67$, $p < 0.08$) and Picture Vocabulary ($F(1,25) < 1.0$, $p < 0.92$). The significant Time Period effect suggests that the average scores of the three participant groups improved from pretest to posttest at the same rate regardless of teaching strategy for Word Articulation and Dolch words and that the teaching strategy did not have an effect on vocabulary. This final result would be expected since the intervention did not teach vocabulary. The gain scores were greater than the standard error of measurement for word articulation (SEM=1.0) for all three groups and vocabulary (SEM=1.5) for the PF and MF groups.

Table 2.3

Mean Scores, Standard Deviation, and Gain Score for Phonemic Awareness Skills at Pretest and Posttest

Gp	Rhyme Recognition					Segmentation (Words)					Initial Phoneme Isolation				
	Pretest		Posttest			Pretest		Posttest			Pretest		Posttest		
	$\bar{X}$	SD	$\bar{X}$	SD	**G**	$\bar{X}$	SD	$\bar{X}$	SD	**G**	$\bar{X}$	SD	$\bar{X}$	SD	**G**

PP	4.7	1.95	5.7	3.16	**1.0**	5.78	4.2	5.3	3.47	**-0.48**	1.0	1.89	0.9	1.91	**-0.1**
PF	4.9	2.11	5.38	3.16	**.48**	5.2	3.0	3.43	3.05	**-1.77**	0.7	1.64	2.38	3.11	**1.68**
MF	5.5	2.46	7.11	2.88	**1.61***	5.8	2.3	6.22	2.01	**0.42**	0.5	1.08	3	1.66	**2.5***

*= score is greater than 1 Standard Error of Measurement

Three measures of phoneme awareness were used to assess developmental awareness of words and sounds. The mean pretest scores for *Rhyme Recognition* show similar performance across groups at pretest, but greater gains for the MF group at posttest compared to the PP and PF groups. The mean pretest scores for the ability to S*egment Sentences into words* show similar performance across groups at pretest, but loss in scores for the PP and PF groups and negligible improvement in the MF group. The mean pretest scores for the ability to *Isolate the Initial Phoneme in a word* show similar performance across groups at pretest, but greater gains for the PF and MF groups at posttest. The PP mean reflected a small decrease in mean scores while the PF and MF group averaged correct phoneme isolation for 2-3 words.

To determine if these differences were statistically reliable, a 3 Participant Group X 2 Time Period Mixed Model ANOVA was calculated for each dependent measure. The main effect for Time Period was significant for *Rhyme Recognition* ($F(1,25) = 27.12$, $p < .0001$) , S*egment Sentences* ($F(1,25) = =5.65$, $p < .025$), but not for *Isolate Initial Phoneme* ($F(1,25) = 23.51$, $p = 0.07$). These results indicate that, on average, participants improved from pretest to posttest for Rhyming and Segmenting. While statistically significant differences were not found between groups, the gain scores for the MF groups were above the SEM of the Rhyming (SEM=1.05) and Isolation (SEM=1.80) subtests of the TPAT, indicating clinically significant gains.

However, there were insignificant interaction effects between Participant Group and Time Period for *Rhyme Recognition* ($F(2,25) = .52$, $p < 0.32$), S*egment Sentences* ($F(1,25) = 0.04$, $p = 0.80$) and *Isolate Initial Phoneme* ($F(1,25) = 1.31$, $p < 0.29$). The significant Time

Period effect suggests that the average scores of the three participant groups improved from pretest to posttest at the same rate regardless of teaching strategy and that the teaching strategy did not have an effect on phonemic awareness.

Discussion

Early reading skills, including alphabet knowledge and phonemic awareness are highly predictive of who will be a successful reader in first grade and beyond (Snider, 1997). This study looked at the effects of a short-term (six-week) intervention program, with particular interest in the effects of the Phonic Faces alphabet that provided speech production cues and MorphoPhonic Face words with pictures superimposed into the letters.

The first finding of this study is that a 6-week program providing only 6 hours of instruction (twice weekly for 30 minutes) was sufficient to significantly improve every measure, including letter names and sounds, naming words beginning with a letter, three measures of phonemic awareness, and recognition of Dolch words. For measures of alphabet skills, nearly every child, regardless of group, improved in alphabet skills, particularly letter names and letter sounds. These were the skills primarily worked on in the individual sessions and was an expected finding. For several of the children who started with pretest scores of zero, their gains were minimal but the letters and letter-sounds that were recognized at posttest were among those taught in the tutoring sessions. This suggests that the instruction specifically targeting those letters resulted in the child becoming familiar with those concepts. This is particularly encouraging since each letter was only the target letter for one week and reviewed at the end of sessions for one week (4 exposures). The improvements in alphabet skills for all children is

particularly a robust finding since each child had two different student interventionists and 78 different students were implementing the treatments.

While the results were not significant, the trends in the data favored the visualized speech production cues provided by Phonic Faces and MorphoPhonic faces. In all cases, the mean gains for these two groups were higher than the plain alphabet group but the small group sizes and wide variation of scores within each group resulted in non-significant differences. This suggests that the PF and MP groups were making gains at a faster rate than the PP groups and that a longer period of intervention may show significant advantages. There also were trends in the data suggesting the MP words held advantages for skills such as identifying words beginning with a given letter and isolating the first sounds of words (i.e., What sound is at the beginning of "cat"?) While statistically significant differences were not found, the MF group was the only one to achieve clinically significant gains (i.e., greater than the SEM). The pictured separation of the letter and the rest of the word, as well as the superimposed letters over the meaning may have helped children see the difference between sounds and words and given them a better sense of "wordness." Likewise, the MF group was the only to achieve clinically significant gains in the Rhyme subtest. This trend was also seen in the recognition of Dolch words (which were not worked on in the intervention) that resulted in a higher mean gain for the MP group. These findings need to be explored in future, better controlled studies.

Another skill that was not directly addressed in the intervention is articulation, or correct pronunciation of sounds in children's oral speech. Once again, all groups made significant improvement in articulation following the six weeks of intervention on alphabet skills. This finding suggests that working on alphabet skills may have a direct impact on articulation without additional speech therapy working on speech alone. This is particularly important since most

speech therapists do not use print or teach alphabet skills when providing interventions for speech sound errors and thus have no direct impact on literacy. This finding suggests that articulation does change when alphabet skills, emphasizing production of sounds associated with letters is implemented, and warrants further investigation. A control group that does not receive alphabet training would better determine if this effect is a result of alphabet training as opposed to maturation. However, the results do suggest a clinically significant change for all three groups. Thus, these results represent not only statistically significant gains for time but also clinically significant gains for improvement in articulation.

Limitations

This study was considered a pilot study in recognition of the many sources of error in the study. First, 78 different students who were just learning to administer test instruments and provide intervention implemented the treatment. The students varied in their skill level and motivation. Random assignment to treatment groups, structured weekly lesson plans, repetition of the same procedure with different letters, and fidelity checking minimized these differences somewhat, but probability of measurement error and difference in treatment implementation were high.

A second limitation was the wide variation of children in the study. While pretest matches for alphabet skills and vocabulary showed no group differences at pretest, within groups children showed differences. In each group there were children who readily attended to the alphabet learning tasks and cooperated throughout the session. Each group also had children with short attention spans, high levels of distractibility, and less than enthusiastic response to learning alphabet skills. Thus, much of the 30 minute sessions were devoted to managing

behaviors. A more controlled study with a more complete profile of child's characteristics could help determine which children benefit from the instruction.

Each child was exposed to a new letter of the alphabet each week (2 sessions), with a short review of the previous week's letter-sound at the end of the session. This pace was too fast for some of the children who were not able to learn or retain letter names or letter sounds within the four exposures. A study that taught letter-sounds until mastery would provide insights into the learning differences for children with different profiles.

In addition to the hour of instruction during weekly intervention, children were also exposed to the alphabet and letter sounds in the preK classroom, and for some children in their homes. It is possible that students who responded quickly to the intervention also began to learn more in the classroom. Matching subjects followed by random assignment to groups minimized these effects to the extent possible.

Another limitation was some missing data at posttest. While efforts were made to posttest every child on each measure, a few children were absent for successive days and not all testing was completed, although all children completed most measures.

Finally, no true control group receiving no treatment was included in the study.

Conclusion

Despite the limitation of the study, several important findings were derived. Overall, this study showed that six hours of intervention focusing on improving alphabet skills, across six weeks, was sufficient to improve all measures for pre-school students regardless of the amount of visual representation provided by the alphabet stimuli. The study also showed that both non-print measures (i.e., phonemic awareness) and print measures (i.e., alphabet skills and Dolch

words) improved from a print-based intervention. Although some of this improvement could be attributed to learning in the regular classroom, children's low scores at pretest despite six previous months of regular classroom learning and rapid gains during treatment suggest the intervention accelerated learning.

Although no differences of measures in this study were statistically significant between the three groups, three measures did show *clinically* significant differences between groups. The first two, Rhyme and phoneme Isolation were expected because these skills were addressed in the intervention, particularly phoneme isolation. Word articulation was not directly addressed during the six-week intervention program; however differences in pretest and posttest showed improvements for the PP and PF group, and even more improvement in word articulation for the MF group. This suggests that, for preschool children, intervention for *alphabet skills* incidentally caused improvements in *word articulation*. These results could imply, clinically, that intervention aimed at alphabet literacy could be an effective tool to successfully improve a child's word articulation ability. Further, the trends in the data suggest that a better controlled study may result in greater improvements relative to the amount of visual representations used to teach the alphabet, although further study is necessary to support this claim.

References

Blischak, D. M. & McDaniel, M. A. (1995). Effects of picture size and placement on memory for written words. Journal of Speech and Hearing Research, 38, 1356-1362.

Bouton, Sophie, et al. "Reading and Reading-Related Skills in Children Using Cochlear Implants: Prospects for the Influence of Cued Speech." *Journal of Deaf Studies and Deaf Education*, vol. 16, no. 4, 2011, pp. 458–473., www.jstor.org/stable/42659091.

"Current Efficacy Research for the Lindamood Phoneme Sequencing Program (LiPS)." Rev. of *Lindamood Phoneme Sequencing Program*. *Pro-Ed, Inc.* 2011: pp 1-10. Print.

Ehri, L. C. (1995). Phases of development in learning to read words by sight. Journal of Research in Reading, 18(2), 116-125.

Ehri, L. C. (2005). Learning to read words: Theory, findings and issues. Scientific Studies of Reading, 9(2) 167-188.

Ehri, L.C., Nunes, S.R., Willows, D.M., Schuster, B.V., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the Nation Reading Panel's meta-analysis. Reading Research Quarterly, 36;3, 250-287.

Gates, A. & Bocker, E. (1923). A study of initial stages in reading by preschool students. Teacher's College Record, 24, 469-688

Gough, P. B. (1996). How children learn to read and why they fail. Annals of Dyslexia, 46, 3-20. doi: 10.1007/BF02648168

Gough, P. B., Juel, C., & Griffith, P. L. (1992). Reading, spelling, and the orthographic cipher. In P. B. Gough, L. C. Ehri, and R. Treiman (Eds.), Reading Acquisition, (pp. 35-48). Hillsdale, NJ: Lawrence Erlbaum Associates.

Hoogeveen, F.R., Smeets, P.M., & van der Houven, J.E. (1987). Establishing letter-sound correspondences in children classified as trainable mentally retarded. Education and Training in Mental Retardation, 22, 77-84.

McIntyre, L., Protz, S., & McQuarrie, L. (2008). Exploring the potential of LiPS instruction for beginning readers. Developmental Disabilities Bulletin, 36, 18–48

Norris, J.A. (2003). Phonic Faces Manual. Baton Rouge, LA: EleMentory.

Norris, J.A. (2006). MorphoPhonic Faces Dolch Word Cards. Baton Rouge, LA: EleMentory.

Powell, R., Hartfield, L., Hoffman, P. R., Norris, J. A. (2007). MorphoPhonic Faces Intervention for Sight Words Reading of At-Risk Students. Poster session presented at the American Speech-language-Hearing Association national convention, Boston, MA, November 16.

Snider, Vicki E. "The Relationship Between Phonemic Awareness and Later Reading Achievement." *The Journal of Educational Research* 90.4 (1997): 203-11. Web.

Terrell, P.A. (2007). Alphabetic and Phonemic Awareness in Toddlers. Http://etd.lsu.edu/docs/available/etd-11072007-162300/

Torgesen, J. K., R. K. Wagner, and C. A. Rashotte. "Longitudinal Studies of Phonological Processing and Reading." *Journal of Learning Disabilities* 27.5 (1994): 276-86. Web.

Van der Bijl, C., Alant, E., & Tönsing, K. (2002) The effect of picture size and placement on the memory of written words by children with little or no preliteracy skills), South African Journal of Education 22 (1), 40–46.

Williams, A. (2013). *The effects of MorphoPhonic Faces as a method for teaching sight words* (master's thesis). Retrieved from Louisiana State University electronic thesis & dissertation collection.

"Zoo-phonics." *Manoa School Pre-K Rm 13*. N.p., n.d. Web. 11 March 2017.

http://manoaschoolpk-13.weebly.com/zoo-phonics.html