2013

The effects of MorphoPhonic Faces as a method for teaching sight words

Ashley Jean Williams
Louisiana State University and Agricultural and Mechanical College

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_theses

Part of the Communication Sciences and Disorders Commons

Recommended Citation
Williams, Ashley Jean, "The effects of MorphoPhonic Faces as a method for teaching sight words" (2013). LSU Master's Theses. 3672.
https://digitalcommons.lsu.edu/gradschool_theses/3672

This Thesis is brought to you for free and open access by the Graduate School at LSU Digital Commons. It has been accepted for inclusion in LSU Master's Theses by an authorized graduate school editor of LSU Digital Commons. For more information, please contact gradetd@lsu.edu.
THE EFFECTS OF MORPHOPHONIC FACES AS A METHOD FOR TEACHING SIGHT WORDS

A Thesis

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

in

The Department of Communication Sciences and Disorders

by

Ashley J. Williams

B.B.A., University of Memphis, 2008

May 2013
# Table of Contents

Abstract .......................................................................................................................... iii

## Chapter

1 Introduction and Literature Review ........................................................................... 1  
   Ehri’s Model of Word Recognition ........................................................................... 2  
   Teaching Sight Words .............................................................................................. 7

2 Methods .................................................................................................................. 16  
   Design ................................................................................................................. 16  
   Participants ........................................................................................................... 16  
   Test Battery ......................................................................................................... 19  
   Materials ............................................................................................................ 21  
   Procedure ............................................................................................................ 22  
   Intervention ........................................................................................................ 25  
   Printed Card Word Intervention .......................................................................... 27  
   MorphoPhonic Faces Intervention ........................................................................ 27  
   Reliability ............................................................................................................ 28  
   Fidelity ................................................................................................................ 28  
   Data Analysis ...................................................................................................... 29

3 Results ................................................................................................................... 31  
   Word Learning .................................................................................................... 31  
   Learning the Alphabetic Principle ........................................................................ 36  
   Summary ............................................................................................................. 39

4 Discussion ............................................................................................................. 40  
   Future Research .................................................................................................. 43  
   Limitations of this Study ..................................................................................... 44

References .................................................................................................................. 45

Appendix

A Word Features ....................................................................................................... 49  
B Complete Dolch Word List Sorted Alphabetically .............................................. 50  
C Consent Forms ...................................................................................................... 51  
D IRB Approval Form ............................................................................................... 54

Vita ............................................................................................................................. 55
Abstract

Previous studies exploring the use of superimposed pictures for sight word learning provide mixed results, with inconclusive benefits. One criticism is that even when sight word learning is enhanced, it does not improve the learner’s use of the alphabetic principle. A second criticism is that it is only feasible for easily depicted words. This study addressed these criticisms by using pictured sight words representing a hybrid between alphabet and sight word learning, MorphoPhonic Faces (MPF). MPF have the first letter drawn in the mouth of a face suggesting speech production cues. Thus, participants were provided alphabet cues first and then with the meaning superimposed into remaining letters. It was proposed that using MPF to teach sight words would result in gains in sight word learning and letter-sound knowledge and decoding. The second criticism was addressed by teaching words from six grammatical classes: nouns, main verbs, pronouns, auxiliary verbs, adverbs and adjectives that varied in the level of abstraction in meaning.

Four first graders without known disabilities, identified as poor sight word learners, were taught 14 unknown words weekly, half with printed word cards and half with MPF cards. Results revealed no differences in number of words learned by card type; however, increased retention was noted with MPF. Gain scores for measures of phonemic awareness, letter-sounds, and decoding suggested increased alphabet skills. Qualitative analyses revealed that words from all grammatical classes were learned and that sight word learning is a complex process that involves orthographic form and meaning.
Chapter 1: Introduction and Literature Review

Fluent reading is characterized by automatic word recognition that is simultaneously processed as part of the meaning of the text. The fluent reader must link the words in the text to their own linguistic and background knowledge to arrive at an interpretation of the text (Applegate, 2009). For this level of fluency to occur, nearly every word read must be recognized as a sight word. A sight word is any word that is read automatically, with no pauses between word parts (Ehri, 2005; Ehri & Wilce, 1985). Sight words are those that have been read sufficiently to become a word read from memory, without need for decoding. The ultimate goal of reading is for every word to be recognized as a sight word where additional sight words are added continuously.

Most reading curricula include sight word learning as part of their reading instruction. Children may be given Dolch words (i.e., the 220 high frequency words identified by E.W. Dolch, 1946), words from grade-level reading lists, or words associated with the weekly reading text to practice until they are memorized (Hudson, Lane, & Pullen, 2005). These authors note that while it is important for all readers to develop all areas of reading fluency (i.e., decoding, sight word recognition, conversational rate and prosody), it is particularly important for struggling readers. Automatic word recognition is of particular importance to this goal. However, struggling readers often have great difficulty committing printed words to memory despite intensive practice. Sight word learning has been shown to be facilitated for both typical learners and struggling readers by superimposing pictures depicting the meaning of the word into the printed letters of the word (Blishchak & McDaniel 1995). However, because these sight words do not depend on understanding the underlying alphabetic principle of word recognition, readers do not develop the skills needed to decode unfamiliar words (Ehri, 2005).
This study examined the effects of learning words that have elements of both pictured words and decoding, termed MorphoPhonic Faces (MPF) (Norris, 2006). With MPF the first grapheme of a word is depicted using a Phonic Face (Norris, 2006), in which the letter is associated with corresponding speech production cues (e.g., the letter “p” is drawn to represent the top lip on the face; the vertical line stops the air and then the curved “lip” releases the air, resulting in the /p/ sound). The remainder of the word superimposes pictures depicting the word meaning into the print. Thus, a cue to print decoding is presented simultaneously with word meaning. The purpose of this study was to examine whether children would learn and/or retain more words using this MPF condition compared to plain print, and whether gains are also shown in the alphabetic principle.

**Ehri’s Model of Word Recognition**

While some words may be explicitly taught as sight words, current theories suggest that most words achieve automatic recognition through the construction of a cognitive network of connections among letters in spellings, sounds in pronunciations, and meaning knowledge. The patterns of spelling that link the graphemes of writing must form connections to the phonemes of the language while referring to word meaning. These links in turn are connected to syntax, and other higher level language skills through this network (Ehri, 2005; Hoover, & Gough, 1990; Seidenberg & McClelland, 1989). This network of relationships is constructed across time as children learn to read. A more complete structure allows for increasingly more fluent reading and comprehension.

Frith (1985) first suggested the theoretical construct of constructed knowledge in reading, proposing that literacy skills develop through a series of stages. According to Frith, during the logographic reading stage, children first learn to read words by sight, memorizing the whole
word or some salient feature of the word. Juel (1991) refers to this as the “selective cue stage.” However, as the child acquires alphabetical knowledge, the child develops strategies for decoding unknown words that follow predictable patterns of English spelling. At the highest stage, children also construct knowledge regarding irregular patterns, suffixes and other units that enable polysyllabic and irregular words to be decoded. Frith (1985) thought of these as defined stages, in which a reader would move from one to the next without overlapping. Ehri (1995) agreed with the basic idea of Frith’s (1985) stages, but argued that the progression of literacy learning was flexible, with overlapping phases, not strict stages. Ehri (1995) went on to redefine the stages into more categories or phases including the pre-alphabetic, partial alphabetic, full alphabetic and consolidated alphabetic phases.

The pre-alphabetic phase corresponds with Frith’s logographic stage and occurs before the child has knowledge of the alphabet. In this phase a child does not rely on an understanding of the grapheme-phoneme relationship of the alphabet, but instead presumes there are associations between the appearance of words and their meaning. For example, young children in this phase may “read” logos from familiar brand names or labels (Mason, 1980). Therefore, a child who recognizes a store logo (e.g., Wal-Mart) may assume that any store with a sign of the same color or beginning with the same letter says “Wal-Mart” (Fin, 2012). The actual letters and their association to sound are irrelevant, so that the letters may be rearranged and the child would not recognize the change (Masonheimer, Drum, & Ehri, 1984). These words are recognized in their original context, such as on the side of a cereal box or on a toy, but they cannot be recognized without the distinct print size, picture, or other context cues. A variation of reading in the pre-alphabetic phase occurs when children use visually salient cues to recognize a word simply because something in the shape of the letters reminded them of the word’s meaning (Ehri,
2005). *Monkey* and *dog* were two words recognized by 4-year-olds in Gates’ and Bockers’ (1923) research. The recognition was thought to be attributed to the fact that the “y” and “g” of these words look like the tail or hind leg of their respective animals (Gates & Bocker, 1923; Gough, Juel, & Griffith, 1992).

The pre-alphabetic or logographic reading strategy has been exploited to teach sight words to children, especially those who are struggling and may be having difficulty mastering the alphabetic principle. For example, eyeballs will be drawn in words such as “look” or “see” to help children link print to meaning and remember these high frequency words.

The partial alphabetic phase emerges as the child gains skills in phonemic awareness and the grapheme-phoneme relationship based on the alphabet (Ehri, 1995). Ehri (2005) found that a major difference between pre-alphabetic and partial alphabetic readers was that pre-alphabetic readers relied on visual cues because they lacked knowledge of letters, while partial alphabetic readers were able to use limited grapheme phoneme relationship cues to identify words. Stuart, Masterson and Dixon (2000) presented words with feedback to 5 year olds, dividing them into groups who either did or did not have phonemic awareness and alphabet skills. The children in the partial alphabet phase recalled the words significantly better one month after training. Visual memory was highly correlated with performance for the pre-alphabetic group but was negatively correlated for the partial alphabetic group, indicating the alphabet principle and not rote memorization was used by this group to recognize words. In another study, Ehri and Wilce (1985) taught words that were either alphabetically similar to the word (e.g., “LFT” for “elephant”) or visually distinct (“WcB”). Those children who had phonemic awareness and alphabet knowledge remembered more words that were alphabetically similar, while those who lacked alphabet knowledge recalled more visually distinct words.
Additional evidence of only partial use of alphabet cues was present in the errors made by these students. These partial alphabetic readers still lacked full knowledge of the alphabetic system, so they used the letters they could identify to recall a word; Ehri (1995) identified this as phonetic cue reading. Often these connections are only made for the most salient letters of a word, which can lead to confusion with similarly spelled words (Ehri, 1995; Savage, Stuart, & Hill, 2001). Errors in word recognition occurred because of reliance on initial and final letters and the resulting confusion with similarly spelled words, such as *soon* and *spoon* (Ehri, 1995; Savage et al., 2001). Since there is a lack of full knowledge of the alphabetic system, children rely on the letters they can detect to recall words (Savage et al., 2001).

In the full alphabetic phase, children are able to learn sight words by forming complete connections between each of the letters seen in the written form of words and phonemes identified in their pronunciations (Ehri, 2005). Ehri argued that a misconception about sight word learning is that it is purely memorization of the visual features of words and had nothing to do with grapheme phoneme relationships (Ehri, 1995). Ehri (1992) found that this was not the case; sight word learning had both alphabetic and phonological properties at the root. In one experiment, students read familiar words for objects (e.g., car, tree, man, book) compared to CVC nonsense words (e.g., baf, jad, nel, des) and single digits (4, 6, 3, 9). The familiar words were read faster than non-words for students in grades 2 to 4. The skilled readers across grades could read the words as fast as the single digits, indicating the words were read as single whole units and not sounded out. In contrast, poor readers took longer to read both real and nonsense words, indicating difficulty with sight word reading. From this and similar studies, Ehri concluded that children are able to learn sight words in the full alphabetic phase because they know major letter sound relationships. Furthermore, once a child can segment words, they can
assign graphemes to the phonemes that they hear in words in order to pronounce the words accurately, including nonsense words. The full alphabetic phase offers a child a powerful system for rapidly learning any word as a sight word and retrieving it from memory later. In this full alphabetic phase, children are able to use this background of alphabetic knowledge to connect letters in written words to their pronunciations and their meanings in memory (Ehri, 2005). Reading becomes progressively more accurate because the alphabetic patterns underlying sight words are represented completely in memory (Ehri, 1995). Words with the same or a similar structure provide a way for new words to be decoded and read. A child in the full alphabetic phase can use blending of phonemes to obtain correct pronunciations of words. Memorization is often necessary for words that are spelled similarly or not spelled phonetically (Ehri, 1995).

The last phase is labeled the consolidated alphabetic phase. In this phase the reader is able to retain complete information about spellings of sight words and commit it to memory, allowing the reader’s print lexicon to grow rapidly with reading experience (Ehri, 1995). As letter patterns occur repeatedly within the same and different words, the letter sound relationships within these words become consolidated into larger units (Ehri, 1995). This consolidation results in an elaborated network of patterns for units such as morphemes and syllables, or subsyllabic units such as onset and rime or word families (Ehri, 1995). For example, in this consolidated alphabetic phase a word such as, *sweet*, may be processed in two units, *sw* and *eet*, but in the full alphabetic phase, this same word would likely be processed as four units, *s*, *w*, *ee*, and *t*. In this consolidated alphabetic phase the child is able to recognize units within words, thus enabling multisyllabic words to be read more easily and new syllables recognized by analogy to familiar syllables that share rimes (e.g., the irregular rime pattern “ball,” “tall,” “wall,” would predict “zall”). Wright and Ehri (2005) showed that children
learned to read nonsense words that followed allowable patterns of English faster than words that violated the patterns (e.g., JETT versus RRUG), and when asked to spell the words, children remembered to double final consonants but they never doubled initial consonants and often doubled the final consonant for these words instead (e.g., misspelled “LLUK” as “LUKK”). These findings indicate that children process the words according to the allowable orthographic patterns at this stage.

**Teaching Sight Words**

Although sight words may have been learned using the alphabetic principle, rapid reading is dependent upon word recognition without the need for conscious decoding. To be considered a sight word, the words must be recognized instantaneously as a whole word, before decoding occurs (Ehri, 2005). Sight words are recognized accurately and almost automatically whether they are regular or irregular in their spelling pattern (LaBerge & Samuels, 1974). These are words that are read as a single unit, without pauses between the word parts (Ehri, 2005). Most words become sight words after they have been read accurately multiple times in the past and readers recognize them by recalling them from memory (Ehri, 1995). Sight words are known well enough for readers to recognize their pronunciations and meanings without expending any conscious effort to sounding them out (LaBerge & Samuels, 1974), rendering reading fluent and rapid.

Sight words can be taught in multiple ways. Throughout the years researchers have attempted to find the best method for teaching sight words (Gates & Bocker, 1923; Gough et al., 1992; Levy & Lysynchuck, 1997; Solomon, Singh, & Kehoe 1992). Solomon taught 12 sight words to young readers, six with pictures and six plain print. One picture condition showed a large picture and small print to enhance the salience of the picture; the other condition was large
print with a small picture below the word. Plain words were also presented in large and small print formats. Each child received training in all four conditions, three words in each condition. Results indicated that more words were learned in the no-picture condition, with no effect for print size. In a follow up study, Solomon and Wu (1995) compared print only, pictures and print, pictures and print with instructions on associating the print with the picture, and a condition that presented printed words prior to presenting pictures. According to Solomon and Wu (1995) the best method for teaching sight words, once again was print alone. They claimed that none of the picture conditions enhanced learning and that plain print was a more effective tool for teaching sight words.

Samuels (1967) conducted two studies to determine the best method of teaching sight words. In the first experiment, pre-first grade children were presented with three different conditions for learning sight words: a plain print condition, simple stick figure pictures with plain print, and a complex-picture condition with a detailed picture and plain print. Results revealed that the most words were learned in the plain print condition with no effect for print size. In the second study, Samuels (1967) created two conditions, one that used a book with printed words and pictures that went along with the words, and the other used a book with printed words only. The books and the teaching procedures of the books were the same. The results indicated that there was no significant difference in the acquisition of words for better readers who were in the picture or plain print group. However, more words were learned by the poor readers in the plain print condition. Samuels (1967) concluded that pictures had no effect on the better readers’ ability to learn words, but the pictures were distracting to poor readers and interfered with learning sight words. Gough (1996) agreed with these conclusions, arguing that
theoretically, children could not pay attention to print and the pictures below the print simultaneously. Readers could pay attention to one or the other but not both.

Montare, Elman, and Cohen, (1977) conducted a similar study to Samuels (1967) with dissimilar findings. The stimulus conditions included plain words, words with a simple black and white picture above the word, or words and a complex, color picture. Ten participants were assigned to each of the 3 groups. Word recognition was tested after showing and pronouncing the words (i.e., exposure but no teaching). Results showed that the mean number of correct responses produced by the print only condition was 25.6, compared to 39.9 in the simple picture group, and 38.1 in the complex picture group. They also found that those in the simple and complex picture groups never confused words with the same initial letter (e.g., boy and bed) while those in the print only group did. It was concluded that pictures with print above words could serve as useful tools especially in distinguishing between words that begin with the same consonant. However, this research has been criticized because no teaching of the words occurred and long-term retention was not tested (Kibby, 1989). Wu and Solomon (1993) addressed this criticism by using the pictures to provide feedback to the children based on word accuracy. Results showed that words with pictures were learned at the same rate as plain print. However, a third condition accompanied words with pictures but without feedback, which resulted in the fewest words learned. They concluded that there was no advantage to the use of pictures but that regardless of stimuli, feedback was critical to learning.

Other strategies used to teach sight words have been examined. Levy and Lysynchuck (1997) examined the effects of teaching sight words by highlighting their distinctive features by color coding the onsets and rimes of words. They found that typically developing kindergarten and first grade readers could accurately identify more words when the print was enhanced by
color coding, and proposed that this enhancement enabled the children to pay special attention to the patterns in the words. However, Gough (1996) argued that although the ability to learn sight words may have been enhanced by having children pay attention to the onsets and rimes, this strategy would not work well for words spelled with the same rime and would result in greater miscues. The color-coding strategy would not further develop alphabetic knowledge. Kibby (1989) examined teaching words in isolation versus taught in a reading context. Eighty words were taught to 16 disabled readers in both groups. Results revealed no difference in the number of words learned and retained, but the isolated word approach taught twice as many words per minute and thus was judged to be more efficient.

Gates and Bocker (1923) observed children in their first attempts to use print. In these beginning attempts, children would frequently identify words based on distinctive features of the word that often reminded them of the word’s meaning. For example, the word “look” appears to have eyeballs and the “y” on the word “monkey” resembles a tail. This strategy soon fails because few words have these distinctive features and for each additional word it is more difficult to find a distinctive cue. Ehri (1995, 2007) noted that pictures are an important communication system for young children and so it is natural for them to expect letters to resemble word meanings. This serves as a scaffold as children attend to letters and gradually shift from letter shape to letter-sound strategies in their decoding attempts.

In an effort to exploit the natural tendency to recognize words by features suggesting the word’s meaning, several studies have examined sight word learning when pictures are superimposed into the words (e.g., eyeballs in “look”). These have variously been called enhanced words, modified orthography, symbol accentuation or picture integration (Westling & Fox, 2000). Tabe and Jackson (1989) compared pictures juxtaposed next to pictures versus
pictures superimposed into the words. Sixteen disabled nonreaders between the ages of 9;0 and 13;8 were randomly assigned to conditions and trained on words for four consecutive days. The results showed that more words were learned and retained when the pictures and print were superimposed. They concluded that the overlap between picture and print directed the learner’s attention to the word and the picture established a direct link to meaning and pronunciation. A. Miller and E. E. Miller (1968) agreed, stating that if the words are visually depicted to closely resemble the objects they represent (i.e., accentuated words), cues are provided that enable children to discover that the printed words have both meaning and symbolic function.

Blishchak and McDaniel (1995) used the term “enhanced words” in their study with kindergarten-aged children. These children were taught for four consecutive days with enhanced words or plain print, and at posttest they recognized more plain print words that had been taught using the enhanced words. However, their conclusions were that although the superimposed pictures were useful, they could only be used with concrete words and may not help children learn to recognize untrained words. Lacking any attention to the alphabetic principle, children would have no insight to help make the transition to a more generative letter-sound strategy. Van der Bijl, Alant and Tönsing (2002) examined the effects of enhanced words on 40 preschool-age children with little or no pre-literacy skills. Participants were trained using words only, words with large line drawings, words with small line drawings, and enhanced words. Following four consecutive days of training both word identification (i.e., pointing to words read) and recognition (i.e., independent reading of printed words) were tested. Results showed more words identified and recognized for print only and enhanced words compared to words with pictures. This study showed that words can be taught to children with little or no pre-literacy skills.
Jeffree (1981) presented accentuated words to four adolescents with moderate intellectual disability who had previously failed to learn or retain sight words. The students learned more words in the accentuated word condition. A. Miller and E. E. Miller (1968, 1971) showed that accentuated words and movie clips in which pictures morphed into words were more effective in teaching words to individuals with intellectual disability. Sheehy (2005) used word morphing software with 16 individuals previously unable to learn sight words and showed significant gains compared to a print only condition. However, similar results were not found by Pfupaff, Blischak, and Lloyd (2000), who compared what they termed “modified orthography” to plain words with four adults with moderate to severe intellectual disability. They found plain print words superior to the modified orthography. Solomon and Singh (1990) proposed an attention hypothesis, suggesting that when pictures and print are present, attention is drawn to the known stimulus (i.e., a picture) and no associations are established to the unknown words. They termed this the “blocking effect” of pictures. Others suggest that when the individual responds with the picture name, the response cannot be associated with the printed word unless both are attended to at the same time, as in superimposed words (Dorry & Zeaman, 1973; Lang & Solomon, 1979).

Van der Bijl, Alant and Lloyd (2006) suggested that two problems complicate the interpretation of the effectiveness of superimposed words. First, many of the studies presented the superimposed words during training but then tested using plain words. The prompts were eliminated with no fading or transfer strategies applied. Conners (1992) found that flash cards that use picture fading with enhanced words are an effective method for teaching sight words. In this method sight words are introduced with enhanced words and over time the pictures with in the words are eliminated. He found that these flash cards were effective in teaching average readers as well as low readers. Other researchers have also found that picture fading was a
superior method when compared to integrated pictures (Didden, Graff, Nelemans, Lancione, & Vooren, 2006).

The second problem was wide variation in training methods, from merely presenting and pronouncing the words, to explaining the relationship of the pictures to the words, using corrective feedback, and relating the pictured words to printed words. Van der Bijl, et al., (2006) addressed both problems by teaching 10 words to matched groups of students with moderate to severe intellectual disabilities. Students were taught words for two weeks in either a superimposed picture, superimposed picture with fading to print, or a print only condition. Students learned sight words under all three conditions but daily probes showed a consistent advantage for the superimposed words with fading to print condition.

After over 40 years of research using superimposed pictures, the benefits of this strategy are inconclusive, at least in part due to limitations in the studies. Much of the research on sight word learning with superimposed pictures has been done with nouns. The training has been very short term in most studies, often four days to two weeks, and many studies merely showed and pronounced the words. To date there is no evidence of whether learning superimposed words has a positive effect on learning other words, although A. Miller and E. E. Miller (1968) suggested that these words could provide a scaffold to understanding the structure and function of printed words. However, because the alphabetic principle is not a component of word learning using superimposed pictures, researchers propose that they will not lead to generative word learning (Blishchak & McDaniel, 1995; Ehri, 1995, 2005; Gough, 1996).

To address this problem, a variation of superimposed pictures that simultaneously focuses attention on letter-sound and meaning, termed MorphoPhonic Faces (MPF), was developed (Norris, 2006). The first sound of the word is represented as a character, or Phonic Face, in
which the letter provides cues to its phoneme-grapheme connection using speech production
cues. For example, the letter “p” is drawn as the top lip in the face; the vertical line stops the
sound and the curved lip releases the air to produce the /p/ sound. The remainder of the letters are
superimposed into pictures to depict the meaning. Patterns within words, such as blends,
digraphs, or syllables, are grouped within the pictures as units. The meaningful picture provides
the reader with a link to the vocabulary word and in turn, the pronunciation of the word.
Morphemes, such as verb tense, are incorporated into final letters. For example, the MPF for
*found* has a clock pointing backwards inside the *d* to indicate that found is in the past tense. In
addition, the printed word is placed above the superimposed word and used in the training
procedure.

plain text to each of six poor readers ranging in age from 6;2 to 8;7 years. Daily probes indicated
more words recognized following each session for the MPF words, although both conditions
resulted in gains across time. For all participants, gains were first seen in MPF words and scores
were consistently higher. The child with the lowest pretest scores in phonemic awareness,
grapheme awareness and decoding only made gains for the MPF words which neared mastery by
the final session. While he did not recognize the words in plain print, he was successful at
segmenting words into sounds, had nearly mastered letter-sounds, and improved in his ability to
decode CV and CVC words from poor to low average. The other five participants generalized
word recognition from the MPF exposure to plain text. The researchers suggested that the MPF
words functioned to “bootstrap” word learning by aiding in the creation of connections among
graphemes, phonemes and meaning.
This study examined the learning and retention of sight words using MPF compared to printed words for low readers in first grade. The questions of this study were:

1. Do words with pictures superimposed into the letters (MPF) hold an advantage for sight word learning compared to printed words?
   a. Will more words from the Dolch Word List (Dolch, 1948) be recognized following intervention?
   b. Will more words be recognized each week following training with MPF words compared to printed words?
   c. Will more words be retained in successive weeks following training with MPF words compared to printed words?
   d. Will sight word learning differ for words based on grammatical class, orthographic patterns, and word meaning?

2. Will participants improve in skills related to the alphabetic principle and decoding:
   Specifically, will the TPAT score for phoneme and grapheme awareness improve following intervention for sight words?
Chapter 2: Methods

Design

Each participant received intervention using printed word cards for sight words for one group of seven words and an alternate group of seven words using the pictured (MorphoPhonic) word strategy. Word types were compared for number of sight words learned, number of sight words retained, total Dolch (1936) words recognized, and performance on phoneme awareness, grapheme awareness, and early reading skills.

Participants

The participants of this study were 4 first grade students, without known disabilities, who were identified as low readers by their teacher. The students were recruited from three classrooms. Participants ranged in age from 6;2 to 7;0 years (see Table 2.1) and all spoke English as their first language. Two of the children received interventions for English Language/Arts (ELA) outside of the classroom prior to and during the study. Following the return of an IRB-approved informed consent, all potential participants were screened for normal hearing and vision and administered a battery of tests. All participants passed hearing screenings at 20dB and visual acuity. Participants were included if they read fewer than 55 Dolch words (25%), could sound out CVC words at no greater than 60% accuracy on the TPAT, and scored no higher than the instructional level for isolated and passage word recognition subtests of the BRI (first grade subtests). Three of the participants recognized a few words from both the Pre-primer (PP) and Primer (P) reading levels, but none scored above the frustration level for either word list (see Table 2.1). The Dolch, BRI, and CVC measures were given at pretest and repeated at posttest with alternate forms if available.
Table 2.1 Demographic and Inclusion Characteristics of Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>CA</th>
<th>Gender</th>
<th>Race</th>
<th>Lunch</th>
<th>Dolch Words</th>
<th>BRI Words</th>
<th>BRI Passage</th>
<th>CVC Decoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6;2</td>
<td>F</td>
<td>AA</td>
<td>FL</td>
<td>54</td>
<td>15 (Frus)</td>
<td>P (Frus)</td>
<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>6;5</td>
<td>F</td>
<td>AA</td>
<td>FL</td>
<td>46</td>
<td>8 (Frus)</td>
<td>PP (Frus)</td>
<td>50%</td>
</tr>
<tr>
<td>3</td>
<td>6;10</td>
<td>M</td>
<td>AA</td>
<td>FL</td>
<td>13</td>
<td>2 (Frus)</td>
<td>PP (Frus)</td>
<td>0%</td>
</tr>
<tr>
<td>4</td>
<td>7;0</td>
<td>F</td>
<td>AA</td>
<td>FL</td>
<td>49</td>
<td>15 (Frus)</td>
<td>PP (Frus)</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Note. AA= African American; CA = chronological age; FL = free lunch; BRI = Basic Reading Inventory, CVC = consonant vowel consonant.*

Additional tests were administered at pretest and posttest including measures of phonological awareness, grapheme awareness, vocabulary, and visual memory. These represent factors known to affect reading achievement. The profile of subtests from The Test of Phonological Awareness, including 10 measures of phonemic awareness and 15 measures of grapheme awareness are profiled in the following Table (see Table 2.2). The phoneme subtests include measures of rhyme, sentence-word-phoneme segmentation, isolation of phonemes in initial-medial-final word positions, and sound blending syllables and phonemes. The grapheme subtests include measures of letter-sound association for consonants, long and short vowels and vowel diphthongs, and various orthographic patterns found in syllables of long and short vowels. In addition to these measures, the pretest scores for vocabulary and visual memory are included in a later table.
Table 2.2 Tests of Phonemic Awareness and Grapheme Awareness

<table>
<thead>
<tr>
<th>The Test of Phonological Awareness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phoneme Subtest</td>
</tr>
<tr>
<td>Participant</td>
<td>RhyD</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grapheme Letter-Sound Subtests</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>Consonants</td>
</tr>
<tr>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grapheme Decoding Words Subtests</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>VC</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note. RhyD = Rhyming-Discrimination; RhyP = Rhyming-Production; SegS = Segmentation-Sentences; SegSy = Segmentation-Syllables; SegP = Segmentation-Phonemes; IsoI = Isolation-Initial; IsoF = Isolation-Final; IsoM = Isolation-Medial; BlSy = Blending-Syllables; BlPh = Blending-Phonemes; Consonants = Graphemes-Consonants; Vowels = Graphemes-Long & Short Vowels; ConBlends = Graphemes-Consonant Blends; ConDigraph = Graphemes-
Consonant Digraphs; R-vowel = Graphemes-R-Controlled Vowels; VowDigraph = Graphemes-Vowel Digraphs; VowDiph = Graphemes-Diphthongs; VC = Decoding Words-VC words; CVC = Decoding Words-CVC words; CDigraph = Decoding Words-Consonant Digraph; CBlend = Decoding Words-Consonant Blends; VDigraph = Decoding Words-Vowel Digraph; R-vowel = Decoding Words-R-Controlled Vowels; Silent-E = Decoding Words-Silent e words; VowDiph = Decoding Words-Vowel Diphthongs.

The Peabody Picture Vocabulary Test 4 (Dunn L. & Dunn D., 2007) was administered as a general measure of verbal abilities. The mean quotient score on this test is 100 with a standard deviation of 15. All four participants performed in the average range. The Wide Range Assessment of Memory and Learning (Sheslow & Adams, 2003) was administered as a measure of visual memory and aptitude for visual learning. The mean score on this test is 10 with a standard deviation of 3. One participant scored in the above average range, two within the average range and one in the poor range (see Table 2.3).

Table 2.3 Standard Score for Peabody Picture Vocabulary Test (M=100) and Wide Range Assessment of Memory and Learning (M=10)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pretest 1</th>
<th>Pretest 2</th>
<th>Pretest 3</th>
<th>Pretest 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPVT</td>
<td>108</td>
<td>100</td>
<td>84</td>
<td>89</td>
</tr>
<tr>
<td>VM</td>
<td>14</td>
<td>10</td>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

Test Battery

Basic reading inventory 5th edition (BRI). The BRI (Johns, 1991) is an informal reading assessment used to measure words read in isolation (i.e., graded word lists) and in passages (i.e., graded reading passages). Comprehension is assessed using 10 questions about the passage. The word lists and reading passages were administered beginning at the Pre-Primer
(i.e., PP, or beginning first) level for both word lists and reading passages and continued until the participant reached a ceiling (frustration level). However, if students knew a few words from the Pre-Primer level, they were asked to read any words they could from the Primer (i.e., P, or mid-first grade level) even though frustration had been reached. This was done to obtain an accurate representation of their overall word learning. Form A was given at pretest and Form B at posttest.

**Peabody Picture Vocabulary Test- (PPVT- 4).** The PPVT: 4 (Dunn L. & Dunn D., 2007) is a norm-referenced measure of receptive vocabulary that can also be used to screen for verbal ability. The vocabulary presented represents 20 content categories including verbs, nouns, and adjectives. The examiner orally presents a stimulus word while presenting the examinee with a set of 4 black and white drawings. The examinee then selects a response by pointing or indicating the number of the chosen item.

**Wide Range Assessment of Memory and Learning Second Edition (WRAML2).** The WRAML2 (Sheslow & Adams, 2003) is a standardized psychometric instrument that allows the user to evaluate an individual’s memory functioning. The WRAML2 provides evaluation of both immediate and delayed memory ability, as well as the acquisition of new learning. Only the Design Memory subtest of the WRAML2 was administered.

**The Phonological Awareness Test (TPAT).** TPAT (Robertson & Salter, 1997) is a standardized assessment of children's phonological awareness, phoneme-grapheme correspondences, and phonetic decoding skills. The TPAT assesses a student's awareness of the oral language segments that comprise words (i.e., syllables and phonemes). The test is comprehensive and includes a wide range of tasks; performance on each of these tasks has been correlated with success in early reading and spelling. The format of the test allows for an easy
assessment of specific skills. Subtests include Rhyming Discrimination and Production, Segmentation, Isolation, Deletion, Substitution, Blending, Graphemes, and Decoding.

The Dolch Word List. A list of English sight words was compiled to create the Dolch Word List (Dolch, 1948). It was compiled based on words used in children's reading books in the 1930s and 40s. The list contains 220 service words that must be quickly recognized in order to achieve reading fluency. The Dolch Word List is also called Sight Words or The Dolch 220. Many of the 220 Dolch words cannot be sounded out and have to be learned by sight. The list includes the most frequently used words in the English language. The list is divided into grade levels. It includes pronouns, adjectives, adverbs, prepositions, conjunctions, and verbs. The basic list excludes nouns, which make up a separate 95 word list.

Materials

Printed Word Cards (PWC). Words used in the plain words intervention were printed on 3.5 x 4” cardstock with a high gloss finish. The words were printed in large type (90 pt.; AvantGarde Bk BT font) within the bottom half of the card, and again printed centered at the top of the card in smaller print (55 pt. AvantGarde Bk BT) (see Figure 2.1).

MorphoPhonic Faces Cards (MPF). Words used in the MorphoPhonic intervention were also printed on 3.5 x 4” cardstock with a high gloss finish. The first letter/sound of the word was depicted using a Phonic Face that indicated the sound with which the word began. The remainder of the printed word was superimposed into drawings that represented the meaning of the word. The word was printed in black and white at the top of the card in the same print as PWCs (55 pt. AvantGarde Bk BT) (see Figure 2.1).
Figure 2.1 Sample of a MPF on the left and a PWC on the right.

**Procedure**

Each participant was taught 14 words per week, twice weekly (i.e., days 1 and 2). A new set of 14 words was introduced each week for 6 weeks, for a total of 84 words (42 PWC and 42 MPF). Each day the participant was taught 7 words using PWC (A words) and 7 parallel words using MPF (B words) (see Table 2.4). The first three words of each parallel pair focused on a semantic and/or orthographic pattern. For example, week one words were 4 letter quantity terms. The paired words either began with the same first sound but differ in other letters (more/many, much/most) or had the same vowel structure (none/some). Week 2 was comprised of function words beginning with “th”; week 3 had s-blends; week 4 had auxiliary verbs; week 5 words contained the “ou” digraph; and week 6 words were 2-syllable words ending in the consonant+le pattern (little/bubble). The next two parallel pairs each week were nouns, one a polysyllabic word making it visually distinct among the other words (e.g., caterpillar/alligator) and one a single syllable noun (boy/cat) from the Dolch high frequency noun list. The sixth word pair each week was a high frequency verb adhering to the silent-e long vowel pattern (gave/ride). The final word pair was either a one syllable question word or pronoun (who/us). The word patterns were used for qualitative analyses of retained words and errors.
Table 2.4 Parallel Words Taught Using Printed Word Cards (Group “A” Words) and MorphoPhonic Word Cards (Group “B” Words) across Six Weeks of Intervention.

<table>
<thead>
<tr>
<th></th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A Words</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>any</td>
<td>has</td>
<td>spill</td>
<td>might</td>
<td>round</td>
<td>bottle</td>
<td></td>
</tr>
<tr>
<td>all</td>
<td>here</td>
<td>speed</td>
<td>were</td>
<td>house</td>
<td>bubbles</td>
<td></td>
</tr>
<tr>
<td>much</td>
<td>these</td>
<td>start</td>
<td>would</td>
<td>bounce</td>
<td>turtle</td>
<td></td>
</tr>
<tr>
<td>caterpillar</td>
<td>octopus</td>
<td>toothbrush</td>
<td>popsicle</td>
<td>everything</td>
<td>computer</td>
<td></td>
</tr>
<tr>
<td>day</td>
<td>fish</td>
<td>duck</td>
<td>feet</td>
<td>girl</td>
<td>barn</td>
<td></td>
</tr>
<tr>
<td>made</td>
<td>ate</td>
<td>save</td>
<td>bite</td>
<td>hide</td>
<td>race</td>
<td></td>
</tr>
<tr>
<td>which</td>
<td>their</td>
<td>when</td>
<td>our</td>
<td>where</td>
<td>anybody</td>
<td></td>
</tr>
<tr>
<td><strong>B Words</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>many</td>
<td>have</td>
<td>spell</td>
<td>shall</td>
<td>found</td>
<td>saddle</td>
<td></td>
</tr>
<tr>
<td>few</td>
<td>there</td>
<td>spool</td>
<td>was</td>
<td>mouse</td>
<td>puzzles</td>
<td></td>
</tr>
<tr>
<td>none</td>
<td>those</td>
<td>stars</td>
<td>could</td>
<td>ground</td>
<td>candle</td>
<td></td>
</tr>
<tr>
<td>alligator</td>
<td>elephant</td>
<td>birthday</td>
<td>lollipop</td>
<td>anyone</td>
<td>cabinet</td>
<td></td>
</tr>
<tr>
<td>toy</td>
<td>fire</td>
<td>vest</td>
<td>coat</td>
<td>frog</td>
<td>fork</td>
<td></td>
</tr>
<tr>
<td>ride</td>
<td>came</td>
<td>make</td>
<td>gave</td>
<td>take</td>
<td>close</td>
<td></td>
</tr>
<tr>
<td>him</td>
<td>how</td>
<td>whose</td>
<td>whom</td>
<td>her</td>
<td>why</td>
<td></td>
</tr>
</tbody>
</table>

The majority of words were selected from the Dolch word list, Dolch noun list, and first grade word lists. In the case of the visually distinctive polysyllabic words, nouns for familiar animals or objects, were selected and paired if they had the same number of syllables (octopus/elephant) or were compound words (toothbrush/birthday). Words were selected by pairing words for either semantic, grammatical, and/or orthographic similarity, and then randomly assigning one word to list “A” and the other to list “B.”
The study consisted of eight total weeks with the first week devoted to pre-testing, the next six weeks devoted to the intervention phase, and the last week was dedicated to post-testing. Each day, seven of the words were taught using MPF and seven using PWC. The words were selected to examine variables that influence word learning.

The words that were selected from the Dolch word list (see Appendix B) met the criteria that all participants were unable to read the word at pretest. Each week, the 14 target words were presented at the beginning of the first session for a “new word check.” All words were assessed as a single printed word regardless of whether the word was taught as a PWC or MPF word. If the child recognized a word, then a different word was substituted for the intervention. This procedure assured that the words taught each week had not previously been learned by the child since initial pre-testing.

Each set of 7 words was tested 3 times to test for retention. Slightly before the end of the session on day A, the child was given the first retention test on the 14 words taught that week. All words were assessed as a single printed word regardless of whether the word was taught as a PWC or MPF word. On day B, the words were re-taught, and the second retention test administered at the end of class. In subsequent weeks, the new words were presented with substitutions made as needed at the beginning of day A; the new words were taught and then tested for retention at the end of the session. On day B at the beginning of the session, the third retention test was given for the 14 words from the previous week and the new words tested for retention at the end of the session, as shown in Table 2.5.
Table 2.5 Schedule depicting when Baseline, Treatment, and Retention Cycle would occur.

<table>
<thead>
<tr>
<th>A &amp; B words</th>
<th>Pretest</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline week 1</td>
<td>Baseline week 2</td>
<td>Baseline week 3</td>
<td>Baseline week 4</td>
<td>Baseline week 5</td>
<td>Baseline week 6</td>
<td>Treatment week 6</td>
<td>Retention weeks 1-6</td>
<td></td>
</tr>
<tr>
<td>Treatment week 1</td>
<td>Treatment week 2</td>
<td>Treatment week 3</td>
<td>Retention week 2</td>
<td>Retention week 3</td>
<td>Treatment week 4</td>
<td>Retention week 5</td>
<td>Retention weeks 1-6</td>
<td></td>
</tr>
</tbody>
</table>

This procedure continued for eight weeks. For all retention tests and new word checks, the researcher displayed each word in isolation one at a time and asked the child to read the word if possible. If the word was not read within five seconds, a new word was presented. Each word was scored +/- for each response, and word substitutions were noted. Responses were acknowledged as correct or incorrect but were not corrected on any of the daily tests. In week 10, children were given a post-test on all the sight words introduced, including all of those that they had been taught, using the same format as for the other retention tests. The test battery was also re-administered at post-testing.

**Intervention**

All children received both intervention methods during each session. Seven of the words were taught using the PWC and seven using MPF. The words were controlled for word length, number of syllables, grammatical class, word frequency, grade level, orthographic regularity, and iconicity. Two lists of comparable words were generated by first matching word pairs, then randomly assigning one to List A and the other to List B. Half of the children were exposed to List A words as PWC and List B as MPF, while the other participants had the opposite presentation. An example is shown in Table 2.6.
Table 2.6 Weekly Score Sheet where Scorer Indicated Whether Words A or B were Taught First, and Whether a Word List was Taught Using PWC or MPF Cards that Week.

<table>
<thead>
<tr>
<th>Child</th>
<th>Week 2 Day 1 Date</th>
<th>Week 2 Day 2 Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Week 1 retention</td>
<td>Week 2 treatment</td>
</tr>
<tr>
<td></td>
<td>___Print ___Picture</td>
<td>___Print ___Picture</td>
</tr>
<tr>
<td>A Words</td>
<td>more</td>
<td>has</td>
</tr>
<tr>
<td>Teach</td>
<td>much</td>
<td>here</td>
</tr>
<tr>
<td>1st</td>
<td>some</td>
<td>these</td>
</tr>
<tr>
<td>2nd</td>
<td>caterpillar</td>
<td>octopus</td>
</tr>
<tr>
<td>12 min</td>
<td>cat</td>
<td>duck</td>
</tr>
<tr>
<td>Total:</td>
<td>made</td>
<td>save</td>
</tr>
<tr>
<td></td>
<td>who</td>
<td>/7</td>
</tr>
<tr>
<td>B Words</td>
<td>___Print ___Picture</td>
<td>___Print ___Picture</td>
</tr>
<tr>
<td>Teach</td>
<td>many</td>
<td>leave</td>
</tr>
<tr>
<td>1st</td>
<td>most</td>
<td>there</td>
</tr>
<tr>
<td>2nd</td>
<td>none</td>
<td>these</td>
</tr>
<tr>
<td>12 min</td>
<td>alligator</td>
<td>birthday</td>
</tr>
<tr>
<td>Total:</td>
<td>boy</td>
<td>wind</td>
</tr>
<tr>
<td></td>
<td>us</td>
<td>/7</td>
</tr>
<tr>
<td></td>
<td>/14</td>
<td>/14</td>
</tr>
</tbody>
</table>

Children were seen individually in 30-minute sessions with the first and last 2 minutes devoted to retention testing or new word checking, and 24 minutes devoted to instruction. Twelve minutes were assigned to each condition, with alternating order across days. That is, on day A half of the children received PWC intervention for 12 minutes followed by MPF, and half received the opposite. The order of intervention conditions was switched on day B. Prior to every session, the Weekly Score Sheet with the correct word sets and order of intervention was prepared. This form and the corresponding word card sets for each condition were placed in each child’s work folder to assure the correct protocol was followed each day.
Printed Card Word Intervention

The treatment required clinicians to call attention to word cues important in word recognition (Norris, 2006; Powell et al., 2007). Children were shown the word on the printed word card, and attention was directed to the beginning letter(s) while associating the letter sound with the word (i.e., the first letter in found is “f”; It makes the /fffl/ sound). A similar procedure was used to examine the ending letter/sound. Next the word was examined for common letter/phonic patterns such as the “ou” vowel diphthong in the word found. The child was encouraged to think of other words that belong in the same “word family” (e.g., sound, pounding, foundation). The word was compared in length to other words taught (e.g., find also starts with “f” and ends in “nd” but it is a shorter word). Other features such as syllables, affixes, and so forth were examined as needed (see Appendix A). Each of the seven words were discussed and then practiced by scrambling and then presenting the cards, with reminders to attend to salient (i.e., significant or influential) features if the word is not immediately recognized.

MorphoPhonic Faces Intervention

The treatment required clinicians to call attention to word cues that focus attention on both letter/sound cues and meaning. Children were shown the printed word at the top of the card, and then the pictured word was used to emphasize salient features (see Figure 1.2). The first letter was examined by pointing to the Phonic Face and talking about how the first sound is made by the character (i.e., the f bottom is like a tooth biting the bottom lip and the top is like a fan blowing moving air). The final sound was examined for meaning and/or sound (i.e., letter d looks like a clock pointing backwards, meaning the action already happened). The ou vowel diphthong can be covered and then found, showing the relationship to both meaning and sound.
The three letters, *oun* was identified as a sound pattern in words such as *fountain*, *foundation*, or *sound*. Finally, the pan lid was talked about, as in “she removed the lid and found the three letters/faces.” The child was then asked to explain the elements of the word and then imagine the pictures embedded in the printed word. The picture word was then covered and the printed word was practiced by scrambling and then presenting the cards, with reminders to attend to salient features if the word was not immediately recognized.

![Figure 2.2 Sample of a MPF.](image)

**Reliability**

The pre and post-tests were scored by the test administrator and the protocols submitted to the Language Intervention Lab. Lab assistants entered data into Excel files using participant numbers for identification. Any scores that were outliers or did not appear to match the protocol were rechecked and rescored either during data entry and/or as the Excel file was checked. Raw scores were added from the protocol scoring pages rather than the cover summary to assure that at least two people checked scores. In addition, at least 50% of the weekly intervention and retention tests were rescored by the researcher, resulting in 100% agreement.
Fidelity

The two intervention sessions for the four participants were staggered across the week. The same student clinician intervened with the same child across the six weeks, and each child was seen by his or her own clinician. A Ph.D. supervisor with ASHA certification observed at least one of the two weekly sessions for each clinician in its entirety and observed part of the second session (Monday three clinicians saw students; Tuesday two clinicians saw students, and supervision was 1-on-1 for the remainder of the week). Students were observed using a rubric, given corrective feedback if needed, and the supervisor modeled when problems with word learning or behavior occurred (see Figure 2.3).

<table>
<thead>
<tr>
<th>Fidelity Sight Word Learning</th>
<th>Clinician</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 min baseline probe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ used words from NEXT week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ large single word side of card used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ card shown only for 2 sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ did not prompt word or allow child to sound out word</td>
<td></td>
<td></td>
</tr>
<tr>
<td>___ recorded and tallied child’s responses in appropriate manner</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12 min Intervention Plain Words using correct alternating word list (A or B)
| Plain Words taught ___ first 15 min ___ 2nd 15 min |
| child shown card with large and small print |
| use large word to talk about each word |
| first sound |
| last sound |
| blends, digraphs (sh, ch, th, wh) |
| vowel patterns |
| find syllables, show rule |
| irregular patterns |

12 min Intervention MorphoPhonic Words using correct alternating word list (A or B)
| MPF Words taught ___ first 15 min ___ 2nd 15 min |
| child shown card with picture and small print |
| use pictured word to talk about each word |
| first sound giving Phonics-Faces speech production cue |
| talk about the meaning cue and what letter(s) it is on |
| last sound |
| blends, digraphs (sh, ch, th, wh) |
| vowel patterns |
| find syllables, show rule |
| irregular patterns |
| other |
| ask child to read the word using large and small print |
| close eyes and try to “see” the word ask child to spell it forward and backward |
| when all cards have been introduced, practice using game like “war” or “concentration” or “hangman” |

2 min treatment probe (TODAY’S WORDS)
| large single word side of card used |
| card shown only for 2 sec |
| did not prompt word or allow child to sound out word |
| recorded and tallied child’s responses in appropriate manner |

2 min retention probe (LAST WEEK’S WORDS)

Figure 2.3 Measures to insure fidelity.

Data Analysis

The first question addressed differences in the number of words learned each week and retained across weeks for words learned under the MPF and PWC conditions. Many of the words were taken from the Dolch Word List (Dolch, 1948) and a t-test was used to determine if
more words were known at posttest. A two-way repeated measures ANOVA (condition x weeks) was used to compare word learning each week for the MPF and PWC conditions, and also to compare word retention each week for the comparison conditions. Qualitative analyses were used to examine profiles of word learning according to grammatical class, orthographic patterns, and word themes.

The second question asked whether changes in skills related to the alphabetic principle and decoding, specifically phoneme and grapheme awareness, would increase following intervention. A t-test was used to compare gains in word recognition with gains on The Test of Phonological Awareness (TPAT).
Chapter 3: Results

This study looked at differences in sight word learning under conditions of printed word cards (PWC) and pictured words (MPF). All measures of word learning and retention were assessed using printed words, without reference to the pictures used in intervention. The number of words learned each week and the words retained across time were examined, as well as patterns of learning and factors that either facilitated or limited word recognition and retention.

Word Learning

Dolch Words. The first question of this study examined the number of words learned across time and compared learning for PWC versus MPF learning conditions. The Dolch Word List was the source of many of the treatment words, and the number of words recognized from pretest to posttest was examined. Table 3.1 shows a mean of 29.0 words recognized at pretest and 69.6 at posttest. To determine if these differences were reliable, a t-test was used and revealed a significant change ($t(4) = 3.229$, $p < .032$) at posttest as predicted.

Table 3.1 Changes in Dolch Word and PPVT Scores from Pretest to Posttest.

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th>Post</th>
<th>$t$-test value</th>
<th>Sig level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOLCH</td>
<td>29.0 (22.4)</td>
<td>69.6 (47.65)</td>
<td>$t(4) = 3.229$</td>
<td>$p &lt; .032$</td>
</tr>
<tr>
<td>PPVT</td>
<td>36.2 (24.3)</td>
<td>38.0 (23.9)</td>
<td>$t(4) = 0.229$</td>
<td>$p &lt; .830$</td>
</tr>
</tbody>
</table>

The PPVT was examined as a control variable. Table 3.1 shows that changes in the mean scores for the PPVT from pre to posttest were minimal. To determine if these differences were reliable, a $t$-test was conducted and showed no significant difference. Oral vocabulary was not targeted in the treatment, and as predicted minimal changes occurred through maturation or other factors, compared to the large changes in Dolch word recognition.
**Number of Words Learned Weekly.** To determine if there were differences in the number of words recalled immediately following a treatment group, the mean number of words per week for MPF and PWC words were profiled on Figure 3.1.

![Figure 3.1 Mean number of words correct per condition across 6 weeks of intervention.](image)

Visual inspection of the means between word conditions showed small advantages to the MPF words for weeks 1, 4, and 5 while small advantages for PWC words occurred in weeks 2, 3, and 6. In general, changes in the number of words learned each week followed similar patterns across conditions (i.e., MPF and PWC). A two-way repeated measures ANOVA (condition x time) was used to determine if these differences were reliable. Results showed an effect for time ($F(5,15) = 4.24, p < .013$, partial eta squared = .586), but no effect for stimulus condition ($F(1, 3) < 1.0, p < .813$) or time by stimulus condition interaction ($F(5, 15) < 1.0, p < .586$).

The effects for time did not reflect simple growth because a new set of 14 words were introduced each week. The results showed that children learned more words per session in the last week compared to the first. The word sets across weeks were designed to examine the relative difficulty of classes of words. Three of the seven words from each set (A and B)
followed a pattern. Week one focused on quantity terms (any, all, much, many, few, none) which proved more difficult for the MPF condition than PWC. None of the participants learned the word “none,” perhaps because of the discrepancy between the orthographic long-vowel pattern and the actual pronunciation. One participant learned the remaining five adjectives, while another failed to learn any (see Table 3.2). Week two focused on function words beginning with “h” or “th” (has-have, here-there, or these-those) and word condition did not make a difference. Three of these words were mastered by all, but “these” was not learned by anyone. Week 3 words all started with s-blends and showed better learning for MPF. The words were concrete nouns and verbs which may account for greater word learning than the two previous weeks. Interestingly, the word “spill” was learned by all four participants regardless of learning condition, while “spell” was missed by all.

Table 3.2 Number and Percent of Words Learned from Each Grammatical Class per Participant from a Total of 84 Words Taught.

<table>
<thead>
<tr>
<th>Total words</th>
<th>% of Total</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nouns</td>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td>84 Words</td>
<td># 33 39%</td>
<td># 30 91%</td>
<td>19 58%</td>
<td>7 21%</td>
<td>25 76%</td>
</tr>
<tr>
<td>Main Verbs</td>
<td># 20 24%</td>
<td>17 85%</td>
<td>12 60%</td>
<td>5 25%</td>
<td>11 55%</td>
</tr>
<tr>
<td>Pronouns</td>
<td># 14 17%</td>
<td>12 86%</td>
<td>5 36%</td>
<td>2 14%</td>
<td>7 50%</td>
</tr>
<tr>
<td>Mod/Aux</td>
<td># 6 7%</td>
<td>4 67%</td>
<td>1 17%</td>
<td>0 0%</td>
<td>1 17%</td>
</tr>
<tr>
<td>Adverb</td>
<td># 6 7%</td>
<td>5 83%</td>
<td>4 67%</td>
<td>2 33%</td>
<td>4 67%</td>
</tr>
<tr>
<td>Adjective</td>
<td># 5 6%</td>
<td>5 100%</td>
<td>2 40%</td>
<td>0 0%</td>
<td>4 80%</td>
</tr>
</tbody>
</table>
Week 4, which targeted auxiliary verbs (might-shall, were-was, would-could), resulted in the fewest words learned during any week regardless of condition. Surprisingly, “would” which is highly irregular was the easiest word, but “could” was only learned by one participant and “were” was learned by none. Week 5 words were nouns and verbs containing the /ou/ digraph (house, bounce, found, ground, round, mouse) and each was learned by two (different) participants. This suggests the diphthong vowel pattern did not interfere with word learning, but neither did it enhance sight word learning or automatic decoding. Week 6 words were two-syllable nouns containing the C+le structure (bottle, bubbles, turtle, saddle, puzzles, candle). This week resulted in the highest number of words learned, except for the word “saddle” which perhaps was a less familiar vocabulary word.

Weeks 3 and 6 targeted noun and verb words and were the two weeks that showed the highest number of words learned. This finding suggests that more concrete words are easier to remember than more abstract words, regardless of orthographic patterns. In addition to the three pattern words in each list weekly, four other words were taught. One of these words was a polysyllabic noun (i.e., caterpillar, alligator, cabinet, elephant) and these were consistently learned by two-to-four children weekly (65%). One syllable noun words were learned with 71% accuracy, with no regard to orthographic structure (i.e., fish, feet, girl, vest, toy, coat, frog). One syllable verbs ending in silent-e (i.e., made, save, hide, ride, gave) were learned with 58% accuracy. Exposure to the silent-e pattern each week for six weeks did not result in any increase in recognition of these words across time, and in fact only one participant learned the week six words (i.e., race, close). The difficulty with the verbs may be due to confusion created by the silent-E principle, both for decoding and automatic word recognition. Finally, a class of pronouns (i.e., which, their, whose, her) and adverbs that can function as pronouns (i.e., when,
where, why) were learned with 60% accuracy. These findings reaffirm the earlier findings of relative ease for learning nouns, but greater difficulty for function words.

**Number of Words Retained.** To determine if there were differences in the number of words retained across weeks, the mean number of words retained per week for MPF and PWC words were profiled on Figure 3.2.

![Figure 3.2](image)

Figure 3.2 Mean number of words retained per condition across 6 weeks of intervention.

Visual inspection of the means between word conditions showed advantages to the MPF words for weeks 1, 3, and 4 while an advantage for PWC words occurred on week 2, with both ending at the same point for week 6. The number of words retained each week for the MPF remained fairly stable across weeks while the PWC words dropped until the final week. A two-way repeated measures ANOVA (condition x weeks) was used to determine if these differences were reliable. Results showed a significant effect for time \((F(4,16) = 3.053, p < .048, \text{partial eta squared} = 0.433)\) and a word type by time interaction \((F(4,16) = 3.473, p < .032, \text{partial eta squared} = 0.465)\).
While the MPF condition originally resulted in learning fewer of the quantity words (i.e., any, all, much, many, few, none) in week one, the words that were learned were retained at the same level while far fewer of the originally learned words were retained for the PWC learning condition. The opposite occurred for the “h” and “th” function words (i.e., has-have, here-there, or these-those) where only 2/3 of the words learned using MPF were retained compared to most of the words in the PWC condition. S-Blend words were retained at a higher level for the MPF training. Auxiliary verbs that were difficult regardless of learning condition were retained for the MPF condition but decreased by 60% for the PWC condition. While the number of words retained containing the “ou” diphthong was essentially the same between conditions in week five, the retained number represented a 21% increase in word recognition for MPF words and a 32% decrease in PWC words compared to the original learning in week four. These findings suggest that the pictures provided by the MPF hold advantages for sight word retention, including abstract words such as quantify terms and auxiliary verbs.

**Learning the Alphabetic Principle**

**TPAT Gains.** The second question of this study examined whether positive gains were made in the alphabetic principle following intervention. Table 3.3 shows changes in each of the phoneme, grapheme, and decoding subtests of The Test of Phonological Awareness (Robertson & Salter, 1997). The profile shows most participants could rhyme at pretest and were at or near mastery at posttest. All could segment sentences into words; two could segment words into syllables and one could segment words into sounds with 50% accuracy. Posttest shows all participants near 50% accuracy. All but one could detect the initial consonant of a word but only one did better than 50% accuracy for final and medial words. All participants could blend syllables presented orally, and by posttest all had nearly mastered blending phonemes.
Table 3.3 Pretest and Posttest Scores for Phoneme, Grapheme and Decoding Subtests of TPAT

The Test of Phonological Awareness

**Phoneme Subtests**

<table>
<thead>
<tr>
<th>Participant</th>
<th>RhyD</th>
<th>RhyP</th>
<th>SegS</th>
<th>SegSy</th>
<th>SegP</th>
<th>IsoI</th>
<th>IsoF</th>
<th>IsoM</th>
<th>BlSy</th>
<th>BlPh</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7/10</td>
<td>5/9</td>
<td>10/9</td>
<td>5/5</td>
<td>5/5</td>
<td>10/8</td>
<td>5/10</td>
<td>8/9</td>
<td>9/9</td>
<td>7/9</td>
</tr>
<tr>
<td>2</td>
<td>10/10</td>
<td>7/9</td>
<td>10/10</td>
<td>6/5</td>
<td>2/5</td>
<td>10/8</td>
<td>10/10</td>
<td>4/4</td>
<td>8/9</td>
<td>6/9</td>
</tr>
<tr>
<td>3</td>
<td>4/10</td>
<td>9/10</td>
<td>8/9</td>
<td>2/5</td>
<td>3/3</td>
<td>5/8</td>
<td>1/7</td>
<td>4/5</td>
<td>8/9</td>
<td>6/9</td>
</tr>
<tr>
<td>4</td>
<td>9/8</td>
<td>8/10</td>
<td>10/10</td>
<td>2/4</td>
<td>2/6</td>
<td>10/10</td>
<td>3/9</td>
<td>1/7</td>
<td>9/9</td>
<td>5/7</td>
</tr>
</tbody>
</table>

**Grapheme Letter-Sound Subtests**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Consonants</th>
<th>Vowels</th>
<th>ConBlends</th>
<th>ConDigraph</th>
<th>R-vowel</th>
<th>VowDigraph</th>
<th>VowDiph</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21/21</td>
<td>4/10</td>
<td>2/2</td>
<td>0/2</td>
<td>1/2</td>
<td>1/2</td>
<td>0/1</td>
</tr>
<tr>
<td>2</td>
<td>19/18</td>
<td>5/6</td>
<td>3/7</td>
<td>1/3</td>
<td>0/1</td>
<td>0/0</td>
<td>0/0</td>
</tr>
<tr>
<td>3</td>
<td>21/17</td>
<td>0/6</td>
<td>0/0</td>
<td>0/2</td>
<td>0/0</td>
<td>0/0</td>
<td>0/0</td>
</tr>
<tr>
<td>4</td>
<td>19/21</td>
<td>5/6</td>
<td>1/3</td>
<td>0/0</td>
<td>0/0</td>
<td>0/0</td>
<td>0/0</td>
</tr>
</tbody>
</table>

**Grapheme Decoding Words Subtests**

<table>
<thead>
<tr>
<th>Participant</th>
<th>VC</th>
<th>CVC</th>
<th>CDigraph</th>
<th>CBlend</th>
<th>VDigraph</th>
<th>R-vowel</th>
<th>Silent-E</th>
<th>VowDiph</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5/6</td>
<td>3/5</td>
<td>0/2</td>
<td>2/2</td>
<td>1/4</td>
<td>0/0</td>
<td>0/0</td>
<td>0/0</td>
</tr>
<tr>
<td>2</td>
<td>6/7</td>
<td>5/7</td>
<td>0/7</td>
<td>0/0</td>
<td>0/1</td>
<td>0/0</td>
<td>0/0</td>
<td>0/0</td>
</tr>
<tr>
<td>3</td>
<td>0/6</td>
<td>0/5</td>
<td>0/5</td>
<td>0/2</td>
<td>1/3</td>
<td>0/1</td>
<td>0/1</td>
<td>0/0</td>
</tr>
<tr>
<td>4</td>
<td>2/8</td>
<td>0/7</td>
<td>0/0</td>
<td>1/2</td>
<td>0/3</td>
<td>0/0</td>
<td>0/2</td>
<td>0/0</td>
</tr>
</tbody>
</table>
The Letter-Sound Subtests showed that consonant sounds were nearly mastered at pretest and posttest but participants did not know both long and short vowel sounds. One student mastered these by posttest and the others were beginning to produce them, including one participant with no vowel sounds at pretest. Consonant blends were an emerging concept and two began to recognize consonant digraphs at posttest. R-vowels, vowel digraphs and vowel diphthongs were largely unrecognized at pre or posttest.

The decoding subtests for VC and CVC syllables showed that two participants were beginning to blend these syllables at pretest, but all four were successful at posttest. Consonant Blends and Vowel Digraphs were the only other syllables that any participants could decode at all (i.e., 1-2 successes out of 10 trials) but all of the students had at least one success at posttest.

The total score from the combined phoneme, grapheme, and decoding subtests of TPAT was used to determine if these gains were statistically significant. Figure 3.3 shows a mean score of 99.0 at pretest and 135.77 at posttest. To determine if these differences were reliable, a t-test was used and revealed a significant change from pretest (mean 99.00, SD 19.04) to posttest (mean 135.77, SD 11.89), \( t = 4.562 \) (df 3) \( p < .020 \).

![Figure 3.3 Changes in TPAT combined phonemic and print awareness scores from pretest to posttest.](image)

38
Summary

Four participants each were taught 14 words weekly, seven using plain print cards and seven using MorphoPhonic Face cards (Norris, 2006). Results showed no difference in the number of words learned weekly, but better retention of the words across time for the MPF condition. In addition, students did make gains in understanding and applying the alphabetic principle. Further, a wide range of words were learned using the picture word strategy, including abstract words such as auxiliary verbs or adverbs.
Chapter 4: Discussion

Previous studies exploring the use of superimposed pictures for sight word learning have provided mixed results. The use of these pictured words has resulted in better word learning for a range of populations, including typical children in kindergarten and preschool (Blishchak & McDaniel, 1995; Westling & Fox, 2000; Wu & Solomon, 1993), students from kindergarten through adulthood with moderate intellectual disability (Jeffree, 1981; Miller & Miller, 1971; Pufpaff, Blishak & Lloyd, 2000), and older poor readers (Powell, 2007). However, differences in the number of exposures to words, different teaching strategies, and differences in fading picture cues to print have confounded the results. Following 40 years of research with superimposed pictures, the benefits remain inconclusive.

Criticisms have been directed at the finding that even when sight word learning is enhanced through the use of pictures, the approach does not improve the child’s ability to make use of the alphabetic principle. Lacking any attention to the alphabetic principle, the strategy would not guide children to use a more generative letter-sound or orthographic strategy. Generalization would be poor and some children would need to be taught every word using the superimposed pictures (Blishchak & McDaniel, 1995; Gough, 1996). In addition, several studies showed that the superimposed pictures needed to establish a direct link to meaning and pronunciation by designing words to closely resemble the objects they represent. The literature generally agreed (without apparent direct evidence) that the pictured words are only good for concrete words, and for this reason most studies have only included nouns (Blishchak & McDaniel, 1995; Miller & Miller, 1971; Van der Bijl, Alant & Tönsing, 2002).

This study addressed the two main criticisms directed at sight words enhanced through the use of pictures. First, pictured sight words that represent a hybrid between alphabet learning
and holistic sight word learning, termed MorphoPhonic Faces (MPF) were used. The first letter is drawn in the mouth of a face and the shape of the letter suggests relevant speech production cues. Thus, participants first were provided an alphabet cue, followed by the meaning of the word superimposed into the remaining letters. It was proposed that this type of pictured word would provide information about the structure and the function needed to recall and use printed words (Miller & Miller, 1971).

Two of the consonant digraphs occurred in MPF words, “th” (their, these, those) and “wh” (which, why, when, whose, where, whom). They appeared on both list A and B, meaning all students would have been exposed to half of the words with a MPF. At pretest only one child recognized the digraph “wh.” At posttest, three of the children recognized “th” and “wh” but not “sh” or “ch” except for one child who knew “sh”. Essentially, only the digraphs that participants were exposed to using MPF were learned, suggesting that the MPF did help children acquire the alphabetic principle. The only vowel digraph that was learned by one participant was “ou,” which was the target pattern of week 5. Further, while two children made errors on consonant letter-sounds at posttest, none of these were letters that appeared in the initial word position of any word in the study (i.e., “q,” “x,” “y,” and “z”). Finally, all four children improved in their ability to decode pseudowords. While not conclusive, these findings do suggest that attending to letter-sound connections while teaching sight words results in both sight word learning and gaining insights into the alphabetic principle.

This study also examined the second criticism, i.e., that the superimposed picture strategy would only work for concrete nouns (Blishchak & McDaniel, 1995; Miller & Miller, 1971; Van der Bijl, Alant & Tönsing, 2002). To explore this, words from six grammatical classes, including nouns, main verbs, pronouns, auxiliary verbs, adverbs and adjectives were taught
across the six weeks. While differences in grammatical class were found, words from all
categories were learned and retained. The most abstract category, auxiliary verbs which were
depicted with clocks showing ongoing, future or past tense, were the most difficult for all
participants but at least one of the six was learned by all but one participant. Surprisingly, while
nouns were easily learned by all participants and the participants learned more of these because
there were more nouns (39% of the words taught), when converted to percentage of words
learned they were not the highest grammatical class for all participants. Two participants learned
a higher percentage of first adverbs and then verbs and third nouns, while a third participant
learned more adjectives than nouns. While verbs were second easiest for two participants, they
were only fourth for two participants, behind adjectives, adverbs, nouns and pronouns. The
learnability of the words appeared to be more complex than simply the concreteness of the word
and how closely the corresponding pictures resemble the objects they represent (Blishchak &

Gough (1996) suggested that superimposed pictures needed to establish a direct link to
meaning and pronunciation. This suggests that learning sight words has more to do with
associating meaning with print than learning the patterns in the orthography. The words “spell”
and “spill” have the same orthography, but “spill” was learned by all participants while “spell”
was learned by none. While “spell” is a high occurrence word in the life of a first grader, the
picture only suggested the action because the real action of spelling is mental. In contrast, “spill”
is a concrete action and the pictured word represented the agent, instrument and result of the
action. However, pursuing this argument, the word “fire” should have been easily learned, yet it
was one of only a few words that no participant learned. And in contrast to “spell,” mental
actions were easily learned for other words, such as “why” which was retained by all four
participants. In this case, a distinct letter “Y” may have captured the essence of the meaning. This same argument might be made for the work “here” which also was readily learned by all participants, with the globe on the letter “e” capturing the essence of the meaning. However, the parallel word “there” was only remembered by two participants, suggesting that the more unfamiliar “th” digraph may have rendered this word more difficult to learn (see Figure 4.1). These findings suggest a complex relationship between meaning and form is involved in learning sight words.

Future Research

Future research could involve testing the efficacy of MPF with additional populations, including children with moderate intellectual disability, dyslexia, autism, and apraxia. Children at different ages also may reveal if there is a minimum and maximum chronological age that may benefit. This study only taught words for one week, so a longer learning period might result in different profiles of learning. Also, correlations between factors such as vocabulary, visual memory, phonemic and graphemic awareness might provide insights into who is most ready to
benefit from sight word instruction as well as who might learn best using this approach. A
greater number of participants is also needed to increase the reliability of the findings. Finally,
individual MPF words should be rated by judges to determine how well they represent the
intended concept and redrawn if below a criterion.

Limitations of this Study

Several factors present limitations for the generalization of the findings of this study.
First, only four participants participated and a larger population is needed to make any
generalizations. Replication with similar participants as well as participants from different
schools, SES levels, and ethnic groups needs to be conducted. The findings also cannot be
generalized to other populations who may benefit, including with students with disabilities. The
study was conducted during the school year when students received daily instruction in reading
and two received additional small group instruction. Thus, it cannot be said that all learning of
sight words and changes in TPAT scores occurred as a result of the sight word intervention only.
All of the testing for learning and retention was conducted using single printed words with no
pictures, and no period of fading was used to gradually eliminate the picture cues. Thus, greater
learning may have occurred from the MPF condition that would have become visible with
different assessment procedures. Different instructors worked with each child and while efforts
were made to standardize procedures, differences in personality and skill level could have had an
effect on outcomes. Participants only had two 12 minute exposures to the words, and for at least
one participant, this pace proved to be too fast to acquire many new words.
References


Frith U. (1985). Beneath the surface of developmental dyslexia. In K. Patterson, J. Marshall & M. Coltheart (Eds.), Surface dyslexia: Neuropsychological and cognitive studies of


from spoken to printed words. *American Journal of Mental Deficiency,* 76, 200-208.


Appendix A: Word Features

- beginning letter
- ending letter
- common letter patterns (phonic patterns)
- beginning consonant blends (e.g., bl as in black)
- beginning digraphs (e.g., tf as in chance; wh as in white)
- ending blends (e.g., jas in wish; η as in song)
- vowel diphthongs (e.g., ou as in out; oi as in oil)
- common spelling patterns (word families, phonograms)
  - e.g., ank as in thank; est as in west; ork as in fork;
- length of the word in comparison to other words taught
- the syllables of the word (beginning, middle, ending)
- inflections (ed, s, er, est, 's)
- derivations (ly, en)
- distinctive letters (e.g., x, y, k, j, g, q, u, w, z)
- compound words
- what the learner sees as distinctive

Examples:
  - knife:
    - point out that the word knife begins with the letters kn by drawing a circle around these letters; draw a line under the letters ife and state that these letters are at the end of the word knife;
    - using a finger or a card, cover the last three letters and ask student what letters come at the beginning of knife;
    - cover the first two letters and ask what letters come at the end.
  - pepper:
    - point out that the word pepper has three p's in it;
    - point out (underline) the initial p;
    - point out (drawing a circle) that in the middle of pepper there are two p's;
    - point out that the end of pepper contains the letters er;
    - cover the er and draw child's attention to the beginning syllable pepp.--(but do not call it a syllable unless the child knows what they are) as you say it;
    - cover the pepp and draws child's attention to the er sound as you say it;
    - cover the er and ask child what first part (or first syllable) says,
    - then cover pepp and ask what the last part says.

- Distinctive visual characteristics of words that were pointed out, when appropriate, in teaching sight vocabulary.
Appendix B: Complete Dolch Word List Sorted Alphabetically

| a       | about | call | came | can    | clean | cold | come | could | cut | did | do | does | don't | draw | drink | eat | help | her | here | him | his | hold | help | hot | how | I    | if  | in  | in   | into | is   | it   | its  | jump | just | keep | know | laugh | let | light | like | little | live | long | look | made | make | many | may  | me   | much | must | my   | myself | never | new | no   | not | now | of   | in   | off  | old  | on   | once | one  | only | open | or  | our  | out | own  | pick | play | please | pretty | pull | put  | ran  | read | red  | ride | right | round | run  | said | saw  | say  | see  | seven | shall | she | show | show | sing | sit   | six  | sleep | small | so  | some | soon | start | stop | take | tell | ten  | thank | that | the  | their | them | then | there | these | they | think | think | this | those | three | to   | today | together | too   | try  | two  | under | up   | upon  | us   | us   | walk | want | warm | was  | wash | we   | well | went | were | what | when | where | which | white | who  | why  | will | wish | with | work | would | write | yellow | yes  | you  | your |
Appendix C: Consent Forms

Consent for Participation

Project Title: The Effects of MorphoPhonic Faces as a Method for Teaching Sight Words
Performance Site: ___________________________ Elementary School

Child Assent Form

I, _________________________________, agree to be in a study to find ways to help children learn better in school. I will have to do work with my teacher and the Speech-Language Pathologist. I will allow my teacher and the Speech-Language Pathologist to share my papers and test scores with people from Louisiana State University, but my name will not be used. I have to follow all of the classroom rules and do all of my work. I can decide to stop being in the study at any time without getting in trouble.

Child's Signature: ______________________________ Age: _______ Date: __________________
Witness* ______________________________ Date: ______________________________

* (N.B. Witness must be present for the assent process, not just the signature by the minor.)

Institutional Review Board
Dr. Robert Mathews, Chair
203 B-1 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu | lsu.edu/irb
Consent for Participation

Project Title: The Effects of MorphoPhonic Faces as a Method for Teaching Sight Words

Performance Site: __________________________ Elementary School

Investigators: The following investigator is available for questions, M-F, 8:00 a.m. – 4:30 p.m.
Dr. Jan Norris COMD, Louisiana State University (LSU), (225) 578-3936

Purpose of the Project: Your school and LSU are working together to provide the best possible method of teaching sight words. LSU teachers and students will work with your school’s Speech-Language Pathologist and classroom teachers throughout this semester. This project will measure changes that children make in speech, language, and literacy when the LSU teachers and students use plain word cards and MorphoPhonic Faces to teach sight words.

Inclusion Criteria: The participants of this study will be 4 first grade students, from the same classroom. To qualify for the study, at initial testing participants will read fewer than 20 Dolch words and score no higher than the instructional level for all subtests of the Basic Reading Inventory.

Exclusion Criteria: Students who are not in the selected first grade classroom will be excluded. At initial testing, students who read more than 20 Dolch words and score higher than the instructional level for all subtests of the Basic Reading Inventory will be excluded.

Description of the study: The aim of this study is to determine if MorphoPhonic Faces (MPF), created by Dr. Norris (2002), enable first graders to learn sight words more effectively than plain word cards (PWC). I hypothesize that MPF combined with multiple cues to word structure and meaning will provide a stronger scaffold for low readers and result in better sight word learning and retention compared to PWC, even when the PWC are taught using the same word learning strategies.

Four first grade students will be taught 8 sight words a week for 8 weeks; 4 will be taught with MPF and 4 will be taught with PWC. A new set of 8 words will be introduced each week, for a total of 32 words. A new word check will be done prior to introducing a new word to insure that the child cannot read the word.

Pre and post-testing will consist of The Phonological Awareness Test (TPAT) by Robertson and Salter, (2002), the BRI by Johns (1991), the Peabody Picture Vocabulary Test (PPVT) by Dunn, L. & Dunn, D. (2007), and Dolch Word List by Dolch (1936). The intervention phase will consist of 3 different retention tests for each set of 4 words. These are tests frequently given by Speech-Language Pathologist in school settings.

Benefits: Subjects of this study will have the opportunity to increase reading and language skills. These skills are important to higher performance in the classroom and on tests, such as LEAP. The study may identify intervention strategies that teachers and Speech-Language Pathologist can use to improve the reading skills of their students. Better team work between professionals
may also occur which will benefit all children.
Risks: There are no known risks.

Right to Refuse: Participation is voluntary, and a child will become part of the study only if both child and parent agree to the child's participation. At any time, either the subject may withdraw from the study or the subject's parent may withdraw the subject from the study without penalty or loss of any benefit to which they might otherwise be entitled.

Privacy: We will use data to see if our assessments and interventions help children become better readers and writers. The school records of participants in this study may be reviewed by investigators. Your child’s name will not be shared with anyone. We will anonymously enter the test scores into a file for statistical analysis. Results of the study may be published, but no names or identifying information will be included for publication. Subject identity will remain confidential unless disclosure is required by law.

Financial Information: There is no cost for participation in the study, nor is there any compensation to the subjects for participation.

Signatures:

The study has been discussed with me and all of my questions have been answered. I may direct additional questions regarding study specifics to the investigator. If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. I will allow my child to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Parent's Signature: ________________________ Date: ____________________

The parent/guardian has indicated to me that he/she is unable to read. I certify that I have read this consent form to the parent/guardian and explained that by completing the signature line above he/she has given permission for the child to participate in the study.

Signature of Reader: ________________________________ Date: ____________________

Institutional Review Board
Dr. Robert Mathews, Chair
203 B-1 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.6792
irb@lsu.edu | lsu.edu/irb
Appendix D: IRB Approval Form

Application for Exemption from Institutional Oversight

Unless qualified as meeting the specific criteria for exemption from Institutional Review Board (IRB) oversight, all LSU research projects using living humans as subjects, or samples, or data obtained from humans, directly or indirectly, with or without their consent, must be approved or exempted in advance by the LSU IRB. This form helps the PI determine if a project may be exempted, and is used to request an exemption.

-- Applicant: Please fill out the application in its entirety and include the completed application as well as parts A-F, listed below, when submitting to the IRB. Once the application is completed, please submit two copies of the completed application to the IRB office or to a member of the Human Subjects Screening Committee. Members of this committee can be found at http://research.lsu.edu/compliance/policiesprocedures/institutionalreviewboard/IRB%2520Policy%2520Manual%25202013.pdf

-- A Complete Application Includes All of the Following:
(A) Two copies of this completed form and two copies of parts B thru F.
(B) A brief project description (adequate to evaluate risks to subjects and to explain your responses to Parts 1&2)
(C) Copies of all instruments to be used.
(D) If this proposal is part of a grant proposal, include a copy of the proposal and all recruitment material.
(E) The consent form that you will use in the study (see part 3 for more information.)
(F) Certificate of Completion of Human Subjects Protection Training for all personnel involved in the project, including students who are involved with testing or handling data, unless already on file with the IRB.

1) Principal Investigator: Ashley Williams
   Dept: COMD
   Ph: 901-488-8022
   E-mail: awilliams@lsu.edu
   Rank: Second year graduate student

2) Co-Investigators: please include department, rank, phone and e-mail for each.
   Dr. Janet Norris
   Department: COMD
   Rank: Professor, Speech-Language Pathology
   Phone: 225-578-3958
   Email: jnorris@lsu.edu

3) Project Title: The Effects of MorphoPhonic Features as a Method for Teaching Slight Words

4) Proposal? (yes or no) No
   If Yes, LSU Proposal Number

   Also, if YES, either
   o This application completely matches the scope of work in the grant
   o More IRB Applications will be filed later

5) Subject Pool (e.g. psychology students) 4 first grade students identified as low readers
   *Circle any "vulnerable populations" to be used: (children <18; the mentally impaired; pregnant women; the aged; other. Projects with incarcerated persons cannot be exempted.

6) PI Signature: Ashley Williams
   Date: 8-17-12
   (no per signatures)

* I certify my responses are accurate and complete. If the project scope or design is later changed, I will resubmit for review. I will obtain written approval from the Authorized Representative of all non-LSU institutions in which the study is conducted. I also understand that it is my responsibility to maintain copies of all consent forms at LSU for three years after completion of the study. If I leave LSU before that time the consent forms should be preserved in the Departmental Office.

Screening Committee Action: Exempted / Not Exempted Category/Paragraph

Signed Consent Waived?: Yes / No

Reviewer: Mathews

Signature:

Date: 9/17/12
Ms. Ashley Williams attended The University of Memphis in her home town; she graduated with a Bachelor’s Degree in Business Management. During her time at The University of Memphis she had multiple opportunities to work and study abroad. In the summer of 2005, Ashley worked in Huesca, Spain teaching English to Spanish-speaking youth. This experience helped her to realize that a career in the field of speech-language pathology would be very fulfilling to her. She is pleased to be receiving her master’s degree in May 2013 from The Department of Communication Sciences and Disorders at Louisiana State University. In her future practice as a speech-language pathologist she is interested in working with children with articulation disorders, language delays, and reading difficulties such as dyslexia.