ENHANCING EARLY LITERACY SKILLS OF PRE-KINDERGARTENERS WITH HISTORIES OF EXPRESSIVE PHONOLOGICAL IMPAIRMENTS: A PRELIMINARY STUDY

A Thesis by

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We have examined the final copy of this Thesis for form and content and recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts with a Major in Communication Sciences and Disorders.

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ABSTRACT

Seven boys who had received intervention for highly unintelligible speech were tested for metaphonological awareness skills and alphabetic knowledge at the beginning of the summer prior to their entering kindergarten. Five of these boys participated in 12 small-group [2-hour] sessions that incorporated lessons from a comprehensive multisensory early literacy program. Two of the seven boys were not able to participate in the sessions because of summer activity conflicts. Post-treatment scores were compared with pre-treatment scores for each of the boys and for the two groups. Results indicated that the children in the treatment group made substantially greater gains on tasks measuring metaphonological awareness skills and alphabetic principle knowledge during the 6-weeks period than the boys who did not receive services.
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LIST OF TERMS

Alliteration – Two words beginning with the same phoneme. Often used in phonological awareness tasks (Clarke-Klein & Hodson, 1995).

Alphabetic Knowledge – Understanding of letter names and the relationship between individual phonemes and graphemes; otherwise known as alphabetic principle (Perfetti, 1984).

Blending – A phonological awareness task that requires the ability to combine syllables or phonemes to create words; otherwise known as synthesis (Torgesen, 1999).

Manipulation – A variety of higher-level phonological awareness tasks including elements of isolation, deletion, substitution, and reversals of syllables and/or phonemes (Troia, 2004).

Metaphonological Awareness – An awareness that is similar to phonological awareness but exists at a more conscious level (Hodson & Strattman, 2004).

Onset – The initial consonant(s) in a syllable preceding the vowel. Generally one of the easier phonological segmentation tasks involves onset-rime identification (Trieman & Zukowski, 1996).

Phonemic Awareness – A component of phonological awareness that involves knowledge and manipulation of individual phonemes within words (Torgesen, 1999).
Phonological Awareness – An awareness to the sound structures that make up speech (Torgesen, 1996). This awareness involves rhyme awareness: the awareness and manipulation of onset and rime within words (Torgesen, 1999). Phonological awareness also includes the ability to attend to and manipulate phonemes, syllables, and words within a language (Catts & Kamhi, 1999).

Rime – The vowel and following consonant(s) in a syllable. Related to rhyming ability or the identification and generation of paired words having the same rime (Bryant, 1998). Also related to the phonological awareness skill of onset-rime awareness/identification (Torgesen, 1999).

Segmentation – A phonological awareness task involving the recognition, identification, and separation of components of sentences and/or words from larger linguistic elements. This can occur with whole words, syllables, onsets and rimes, or phonemes as ranked from easiest to most difficult (Jenkins & Bowen, 1994).
CHAPTER I
INTRODUCTION

Literacy is crucial to the success of individuals in today’s society (Adams, Treiman, & Pressley, 1998). Reading scores nationally have shown little improvement over the past 10 years despite legislated initiatives (e.g., No Child Left Behind). According to the National Center for Education Statistics (NCES; 2004), only 31% of fourth-graders in the United States were performing at or above the “proficient” level, and 37% of fourth-graders were performing below the “basic” level. By eighth grade, only 32% were performing at or above the “proficient” level, and 26% were still performing below the “basic” level. The NCES (2004) defined the “proficient” level as “solid” academic performance at grade level. “Basic” level was defined as partial mastery of grade level skills and prerequisite knowledge.

According to Stanovich (1986), once a child has fallen behind in reading or if he/she has a risk-factor for reading failure, he/she will continue to fall farther and farther behind his/her peers in reading achievement until a large gap exists between reading levels of children who are at-risk and their typically developing peers. Stanovich termed this phenomenon “Matthew effects.”

Snow, Burns, and Griffin (1998) reported a number of factors that are known to influence reading success or failure, including cognitive abilities, hearing, language abilities, attention abilities, English proficiency, literacy exposure in the home, and phonological awareness. If any one or more of these
factors is impaired, limited, or delayed in any way, that child will be at-risk for literacy problems.

The National Reading Panel (NRP; 2000) identified five primary factors that are crucial to reading and literacy success: phonemic awareness, phonics, comprehension, fluency, and vocabulary. Phonological awareness and letter name and sound knowledge have been identified as the major predictors of reading success or failure in children (Share, 2004; Wagner, Torgesen, & Rashotte, 1994).

Children with histories of speech/language impairments are especially at-risk for literacy problems (Nathan, Stackhouse, Goulandris, & Snowling, 2004; Webster & Plante, 1992, 1995). Researchers agree that early identification and intervention is the best way to prevent later literacy problems (Snowling, 1998; Stanovich, 2000). According to the American Speech-Language-Hearing Association (ASHA; 2001), the scope of practice of a speech-language-pathologist includes aiding children in the development of spoken language as it relates to both communication and the formation of a foundation for reading and writing. The development of literacy begins long before children enter school and is embedded in language development.

Early intervention for phonological awareness with children at-risk for reading problems has been shown to be effective in improving phonological awareness and later literacy skills for those children (Ball & Blachman, 1991; Blachman, Tangel, Ball, Black, & McGraw, 1999; Gillon, 2000a, 2002a, 2005; Hatcher, Hulme, & Snowling, 2004; Lundberg, Frost, & Peterson, 1988). Children
with histories of expressive phonological impairments are particularly at-risk for poor phonological awareness and thus for literacy problems (Bird, Bishop, & Freeman, 1995; Hodson, 1994a; Larrivee & Catts, 1999).

It was recognized that further research was needed in this area. This study was designed to evaluate the outcomes of a comprehensive early literacy program on phonological awareness skills and alphabetic knowledge of pre-kindergarteners who have histories of expressive phonological impairments.
CHAPTER II
LITERATURE REVIEW

The United States is in the midst of a literacy crisis (NCES; 2004). Phonological awareness and alphabetic knowledge have been identified as two of the major factors in literacy success (Snow, Burns, & Griffin, 1998). Children with histories of speech/language problems are at-risk, especially those with expressive phonological impairments (Bird, Bishop, & Freeman, 1995; Clarke-Klein & Hodson, 1995; Hodson, 1994a). Programs that explicitly teach the phonological awareness and phoneme-grapheme relatedness elements of early literacy knowledge help improve the chances for literacy success in populations of children with histories of speech/language delays (Gillon, 2000a; Laing & Espeland, 2004).

The purpose of this chapter is to outline the rationale behind this study and its objectives and to review the relevant literature. The chapter begins with a discussion of the elements that the National Reading Panel (NRP; 2000) found to be crucial to literacy success followed by a discussion of the stages of literacy acquisition in children who are developing typically. In the next section, studies that have been conducted on populations of children with and without risk factors for reading impairments and have found a causal connection between phonological awareness and literacy are discussed. Investigations of the effects of phonological awareness intervention with populations of children with and without risk factors for reading impairments are addressed in the third section. Five different approaches to phonological awareness instruction are presented in
the fourth section. Finally, the need for a study that addresses phonological awareness intervention with children who have histories of expressive phonological impairments is highlighted and the research questions for this study are presented.

**Literacy**

*Elements for Literacy Success*

The National Reading Panel (NRP; 2000) reported five main skill areas that are crucial for children to become literate. These are phonemic awareness, phonics, comprehension, vocabulary, and fluency.

*Phonemic Awareness.* Phonemic awareness was defined by the NRP as the ability to manipulate phonemes in spoken syllables and words. Phonemic awareness is one specific component of phonological awareness, which also includes the ability to identify and manipulate syllables as well as sounds in words and sentences and a general awareness of phonemes in speech and how they are combined (Hodson, 1994b; Hodson & Strattman, 2004; Gillon, 2002b).

*Phonics.* The NRP defined phonics as the formation of letter-sound correspondences and awareness of spelling patterns. The panel reported that phonemic awareness and phonics are both crucial elements to literacy success in children, and recommended that explicit instruction in both of these elements be provided in an “entertaining, vibrant, and creative manner” (p. 11). The panel further recommended that children be taught during their early elementary school education to isolate phonemes, connect phonemes to letters and letter patterns,
and blend the sounds together to form words in a process known as synthetic phonics instruction.

Comprehension. The area of comprehension refers specifically to issues regarding text comprehension. Text comprehension was defined by the NRP as strategies for problem solving and thinking processes by which readers derive meaning from a text. The NRP reported that many of these strategies can be acquired informally but are more effective if taught explicitly.

Vocabulary. According to the NRP, knowledge and understanding of vocabulary is crucial for the ability to comprehend text. The panel recommended that vocabulary development be taught both directly and indirectly. The NRP reported that both oral and print vocabulary expansion was crucial to comprehension given that larger vocabularies (both oral and print) can be correlated directly to easier comprehension of text.

Fluency. The NRP defined fluency as being able to read with speed, accuracy, and expression. This was considered to be an important element of comprehension commonly overlooked in education. The NRP suggested that fluency be addressed through teacher-guided re-reading of familiar materials as well as other reading instruction practices.

In summary, the NRP emphasized that none of these elements are effective when addressed in isolation. All are necessary elements for the successful creation of literacy in children. Different elements crucial to literacy are taught at different times, however. The earliest of these elements to be taught are phonological awareness and alphabetic knowledge. The elements of
fluency, vocabulary, and comprehension are developed and taught at a later point in children’s development.

For this study, literacy in preschool children was addressed. Therefore, the focus of this study was primarily on the earliest literacy elements identified by the NRP of phonological awareness and alphabetic knowledge.

Stages of Literacy Acquisition

Researchers have studied the acquisition of decoding words in print and have identified four stages in reading development: (a) prealphabetic/logographic, (b) partial-alphabetic/transition, (c) full-alphabetic/alphabetic, and (d) consolidated-alphabetic/orthographic (Kamhi & Catts, 1999; Chall, 1983; Frith, 1985; Ehri, 1997; Ehri & Snowling, 2005). These stages of literacy acquisition are addressed in this section.

Prealphabetic or Logographic Stage. The prealphabetic or logographic stage is characterized by readers who recognize words through memorization of visual features or contextual cues (Frith, 1985; Ehri & Snowling, 2005). An example of this would be recognition of the “Coke” logo without decoding the actual word. Readers at this level of development do not yet have the ability to use phoneme-grapheme knowledge to decode words.

Partial-Alphabetic or Transition Stage. The partial-alphabetic or transition stage is a transition from the prealphabetic reliance on visual cues alone to the alphabetic ability to decode (Ehri, 1997). This stage is characterized by the reader’s use of some alphabetic cues (e.g., initial letter) in combination with
contextual cues to guess words (Ehri & Snowling, 2005). Readers at this level of development are still unable to fully decode or use analogy to decipher words.

*Full-Alphabetic or Alphabetic Stage.* The full-alphabetic stage marks the point in development when the reader is able to fully understand phoneme-grapheme correspondence and use this knowledge to decode words (Chall, 1983; Frith, 1985). This stage in reading development is the first point at which the reader is capable of reading unfamiliar words without the assistance of contextual cues (Ehri, 1997). According to Ehri and Snowling (2005), The prealphabetic and partial-alphabetic stages can emerge without any direct reading instruction. The full-alphabetic phase, however, requires direct instruction in both phonemic awareness and phonics before this phase is able to emerge in the reader.

*Consolidated-Alphabetic or Orthographic Stage.* The consolidated-alphabetic stage is the last stage of reading development. This stage does not develop unless the reader acquires knowledge of spelling patterns that are sufficient for recognition of words without the need for decoding processes (Kamhi & Catts, 1999). Readers in this stage of development are able to recognize larger units within words (e.g., morphemes) and read them visually without decoding (Ehri & Snowling, 2005). This ability allows readers to read words by analogy of the larger units, thus providing a faster method than decoding individual sounds for deciphering unfamiliar words.

In general, not all readers are able to progress through every stage of literacy acquisition. Deficits in various areas of language can cause a reader to
become “stuck” at a lower level of acquisition. Deficits in expressive phonology and/or phonological awareness can drastically influence a child’s ability to progress through the stages of becoming literate. In the following section, these language areas and their impact on reading and literacy will be discussed in more detail.

*Phonological Awareness and Literacy*

According to the NRP (2000), phonological and phonemic awareness are crucial for successful literacy acquisition. A number of studies have been conducted demonstrating this link and the effects of poor phonological awareness skills in children.

*Studies in Typical Populations*

Liberman, Shankweiler, Fischer, and Carter (1974) investigated the correlation between reading and phonological awareness. This study was conducted with 135 preschool through first-grade children who participated in a number of syllable and phoneme segmentation tasks. The results indicated that preschoolers performed better on tasks of syllable segmentation than on tasks of phoneme segmentation. Based on these results, the researchers concluded that phoneme segmentation was a more difficult task than syllable segmentation. The results also revealed a significant increase in segmentation abilities in children in first-grade. The research indicated that this may be due to a possible interaction between this measure of phonological awareness and the reading instruction the children were receiving for the first time in first-grade.
In a longitudinal study conducted by Bradley and Bryant (1983), the phonological awareness skills of 368 children were analyzed along with their reading levels. The children in this study were between the ages of 4 and 5 years at the outset of the study and had not yet begun the process of learning to read. Phonological awareness was measured using sound categorization tasks that included rhyme matching and initial sound identification (i.e., alliteration). The results of the study revealed a correlation between the phonological awareness skills of sound categorization at 4 and 5 years of age and the reading and spelling levels over the following 3 years even when intelligence levels and overall educational achievement gains were accounted for. The researchers concluded that the phonological awareness levels children have before they enter kindergarten influence their later reading success or failure.

Bryant, Bradley, MacLean, and Crossland (1989) investigated the connection between nursery rhyme knowledge, phonological awareness, and reading. The participants were 64 children between the ages of 2:10 and 3:9 (years:months) at the outset of the study, all of whom were from homes where English was the primary language spoken. Nursery rhyme knowledge was analyzed through recitation of familiar rhymes. Phonological awareness was measured through tests of rhyme identification, word-initial phoneme identification, and word-final phoneme identification. Other measures included object naming, reading, spelling, intelligence, and vocabulary. These skills were tested once per year over a 4-year period. Results of their study indicated that nursery rhyme knowledge at an early age was significantly correlated with
measures of both phonological awareness and reading. Based on these results, the researchers suggested that knowledge of nursery rhymes influenced phonological awareness levels, and that phonological awareness levels then influenced reading development. There was no direct effect of nursery rhyme knowledge upon reading development except through the influence of phonological awareness.

Muter, Hulme, Snowling, and Taylor (1997) further investigated the relationship between rhyming ability and reading success and found that phonological awareness tasks involving phoneme segmentation were better predictors of later reading ability. This claim has been countered by Bryant (1998), whose investigations revealed that sensitivity to both onset and rime as well as phoneme segmentation in words was equally important in predicting reading success. Hulme, Muter, and Snowling (1998) claimed that phonemic segmentation is a better predictor of early reading skills than onset-rime sensitivity. This is an issue that continues to be debated.

Finally, in a longitudinal study by Wagner, Torgesen, and Rashotte (1994), the elements of phonological awareness most closely correlated with various elements of reading ability were examined. The 244 children in the study were followed from kindergarten through second grade. Results of the study indicated that letter-name knowledge most influenced phonological awareness, and phonological awareness was more predictive of later decoding abilities. The results did not indicate, however, that early decoding abilities had any influence
on later phonological awareness. The researchers concluded that phonological awareness had a causal influence upon later decoding abilities in children.

*Studies in Populations with Histories of Language Delay and/or Expressive Phonological Impairment*

The previous studies all addressed the impact of poor phonological awareness with children who had no documented speech or language impairments. The following paragraphs address studies in which phonological awareness and speech/language impairments are both factors in children’s reading success.

In a longitudinal study, Bishop and Adams (1990) investigated the effects of language impairment at age 4:0 to literacy development at ages 4:6 and 8:6. The results indicated that children whose language impairments were resolved by age 5:6 did not demonstrate any significant deficits in literacy development. The children who did have remaining language impairments at age 5:6 also had impairments in their literacy development. Although phonological awareness was not measured in this study, the results did reveal that the degree of expressive phonological impairment at age 4:0 was most predictive of adjusted reading accuracy at age 4:6. Overall, however, the researchers concluded that language levels at age 4:0 were more predictive of reading success at age 8:6 than measures of expressive phonological impairment. This was especially true in children who had impairments in both language and expressive phonology.

Webster and Plante (1992) compared 15 children with expressive phonological impairments with 15 children with typical language development on
measures of phonological awareness. The two groups were matched on both mental age and gender and all participants were within normal limits on I.Q. with an average age of 3:6. Results indicated that a correlation existed between intelligibility and detection of rhyme but not between intelligibility and detection of alliteration. The researchers explained this difference in performance between the two phonological awareness tasks by stating that both groups were performing at “floor levels” (p. 1202) for alliteration detection tasks (i.e., these abilities had not yet begun to emerge) but were performing at higher levels for rhyme detection tasks (i.e., these abilities had begun to emerge in the typical control group). The researchers then concluded that rhyme detection abilities must develop earlier in children than alliteration detection abilities.

In a follow-up study, Webster and Plante (1995) examined the relationship between expressive phonological impairments and phonological awareness in 45 children with a mean age of 3:6 at the start of the study including children from the previous study (Webster & Plante, 1992). Rhyme detection and alliteration detection measures were compared and related to expressive phonological measures over a 3-year period. Results of the study revealed that as a child’s expressive phonological measures improved, so too did his/her phonological awareness measures in an exponential growth pattern such that, as the child’s expressive phonology approached that of typical children, the amount of growth in his/her phonological awareness increased by larger percentages in an exponential pattern. The researchers concluded that as the expressive
phonological abilities of children improved, their phonological awareness abilities would increase as well.

Bird, Bishop, and Freeman (1995) compared the performance of 31 boys with expressive phonological impairments to age and I.Q. matched peer controls on measures of their phonological awareness abilities and literacy levels. The children were between the ages of 5:0 and 7:4 at the outset of the study. Phonological awareness and literacy levels were compared three times at mean ages 5:9, 6:5, and 9:7. Only 19 of the children in the experimental group were identified with purely expressive phonological impairments. The rest of the children in the control group were also identified as having additional language problems. Phonological awareness was measured using tasks of rime matching, onset matching, and onset segmentation and matching. The results revealed that children with expressive phonological impairments with or without the presence of additional language impairments scored consistently below their typical age and I.Q. matched peers on measures of phonological awareness and literacy over all three testing periods. The researchers also observed that the group with both language and expressive phonological impairments tended to have lower I.Q. levels than the group with only expressive phonological impairments. This meant that the control peers were unequal, so the group having both language and expressive phonological impairments had control peers with lower I.Q. levels than the group with only expressive phonological impairments. When the researchers accounted for differences in the I.Q. levels of the control peers, the group with both language and expressive phonological impairments
demonstrated less overall improvement on reading and phonological awareness measures than did the group with isolated expressive phonological impairments. The children in the group with isolated expressive phonological impairments scored within normal limits on phonological awareness and reading measures, even though they remained below their age and I.Q. matched peers. Thus, the results of this study indicate that, when I.Q. is taken into consideration, children with language and expressive phonological impairments will score below normal limits on measures of phonological awareness and reading, and children with isolated expressive phonological impairments will score within the low end of normal limits on the same measures. Despite this apparent reading success in children with isolated expressive phonological impairments, the researchers cautioned that certain literacy tasks (e.g., nonword reading) were still able to reveal weaknesses in their underlying literacy skills.

Clarke-Klein and Hodson (1995) investigated the effects of preschool expressive phonological impairments on later spelling abilities with 61 third-grade children, 29 of whom had histories of expressive phonological impairments. The spelling assessment consisted of one 45-word test of 25 true words and 20 nonsense words and one spelling test that allowed for analysis of the strategies that were employed by the children when spelling. The results of the study indicated that the children with histories of expressive phonological impairments evidenced more misspellings due to phonological deviations when compared to their typical peers. These children also demonstrated lower phonological awareness scores (measured through tasks of rhyme categorization, alliteration
categorization, and phoneme matching, phoneme identification, and phoneme manipulation) than their peers. The children with histories of expressive phonological impairments also demonstrated consistently poorer spelling strategy usage when spelling unfamiliar words compared to their typical peers. The researchers concluded that expressive phonological impairments were a factor in phonological awareness and spelling difficulties.

In another study conducted by Larrivee and Catts (1999), 30 children between the ages of 5:8 and 7:3 (mean age 6:2) with expressive phonological impairments were compared with typically developing children (mean age 6:2) on measures of expressive language, reading, and phonological awareness in kindergarten and at the end of first grade. Phonological awareness was measured using tasks of syllable segmentation, initial sound identification, phoneme blending, and phoneme isolation. The results of the study indicated that children with expressive phonological impairments performed significantly lower on measures of reading achievement. Within the group of children with expressive phonological impairments, it was found that the children who demonstrated more severe impairments (assessed through the production of multi-syllabic words) at the outset of the study also had lower phonological awareness and reading scores than did the children with less severe phonological impairments.

Finally, in a study conducted by Rvachew, Ohberg, Grawburg, and Heyding (2003), differences in phonemic perception and phonological awareness were examined between 13 children with and 13 children without histories of
expressive phonological impairments, all of whom were between the ages of 4:0 and 4:11. Phonemic perception was measured through a task of identification of correct and incorrect pronunciations of words (i.e., discrimination). Phonological awareness was measured through tasks of rime matching, onset matching, and onset segmentation and matching. The results of the study indicated that the children with expressive phonological impairments were significantly behind in phonemic perception and phonological awareness when compared to typically developing peers. No significant differences were found between the two groups on early literacy measures of alphabet knowledge, literacy knowledge, and basic word knowledge.

These studies all demonstrate that children who experience expressive phonological impairments are at greater risk for problems in their phonological awareness abilities and are thus at-risk for later literacy deficits. In the next section, the effects of treating phonological awareness problems in children will be addressed.

*Effects of Phonological Awareness Intervention*

In the previous section, links between expressive phonological impairments, phonological awareness, and literacy were presented. A number of studies have been conducted regarding the efficacy of conducting phonological awareness intervention as it relates to later literacy success with typically developing children and children who demonstrate expressive phonological impairments and/or language delays.
Bradley and Bryant (1983) examined the efficacy of phonological awareness intervention with 65 children who scored at least two standard deviations below the mean on sound categorization. These children were divided into four groups and provided instruction during 40 sessions over a 2-year period. One experimental group received phonological awareness instruction in sound categorization, and another experimental group received the same phonological awareness instruction along with instruction in phoneme-grapheme relationships. One control group received instruction in semantic conceptual categorization, and the final control group received no instruction. Results of the study revealed that both experimental groups outperformed both control groups on measures of reading and spelling at the end of the 2-year treatment period. Between the experimental groups, the group that received instruction in both phonological awareness and phoneme-grapheme relationships outperformed the group that received only phonological awareness instruction on posttest measures of reading and spelling. No posttest differences were observed between the two control groups on these measures. The researchers concluded that phonological awareness instruction was more effective when coupled with instruction in phoneme-grapheme relationships.

In a study conducted by Lundberg, Frost, and Petersen (1988), 235 kindergarten children received daily phonological awareness instruction for a period of 8 months. These children were compared with 155 children who received no phonological awareness instruction over a period of 2 years. None of
the children in either group were able to read prior to the study. Phonological awareness instruction consisted of activities in sound discrimination, rhyming, and segmentation of words, syllables, and phonemes. The two groups were compared on measures of phonological awareness, reading, letter knowledge, and spelling. Results on posttest measures revealed that a higher percentage of children in the experimental group had acquired some reading abilities than in the control group. Differences between the two groups on measures of pretreatment and posttest letter knowledge were not significant. Measures of phonological awareness revealed that, prior to treatment, the control group outperformed the experimental group. Posttest measures of phonological awareness, however, revealed that the experimental group outscored the control group, thus demonstrating much larger gains than the control group. The researchers concluded that phonological awareness instruction can improve reading and phonological awareness abilities, but phonological awareness instruction alone does not influence letter knowledge.

Ball and Blachman (1991) examined the effectiveness of phonological awareness instruction and instruction in phoneme-grapheme relationships for 90 students in three different urban public schools. The children were divided into two experimental groups and one control group. The first experimental group received instruction in both phonological awareness (in the form of phoneme segmentation tasks) and phoneme-grapheme relationships. The second experimental group received instruction in phoneme-grapheme relationships only with no additional phonological awareness instruction. The control group
received no instruction in either phonological awareness or phoneme-grapheme relationships. The results of the study indicated that only the first experimental group improved significantly on measures of phonological awareness (tested through phoneme segmentation). All three groups improved equally on letter name knowledge. Both experimental groups outperformed the control group on posttest letter sound knowledge. On posttest measures of reading and spelling, both experimental groups outperformed the control group, but the experimental group that received instruction in letters and phonological awareness significantly outperformed the group that received instruction in letters alone. The researchers concluded that development of reading and spelling abilities was aided most when children were taught both phoneme-grapheme relationships and phonological awareness. They explained this by stating that reading and spelling skills require knowledge of how words can be broken into phonemes as well as knowledge of phoneme-grapheme relationships.

Brennan and Ireson (1997) evaluated the effects of phonological awareness instruction in conjunction with reading instruction in three kindergarten classrooms with 38 total children. The children were divided into two experimental groups that received phonological awareness instruction in rhyming and segmentation activities at the word, syllable, and phoneme level and one control group that received instruction in a reading and writing program that had only informal phonological awareness elements. The results of the study revealed that the two classes of children who received direct phonological awareness instruction along with reading instruction significantly outperformed
the class that received only reading instruction and informal phonological awareness instruction on measures of phonological awareness, reading, and spelling. The researchers concluded that formal phonological awareness instruction was more effective than informal phonological awareness instruction in enhancing literacy in children.

In their study, Torgesen, et al. (1999) examined the intensity of phonemic awareness instruction that was most effective in enhancing reading abilities in children. The children received one-on-one instruction for 88 hours during kindergarten, first, and second-grade. One group of children received explicit instruction in phonemic awareness, one group received a lower intensity phonemic awareness instruction approach, and one group received an instructional approach that had no phonemic awareness components. The results of the study indicated that posttest measures of word level reading were strongest in the group that received highly explicit phonemic awareness instruction and lowest in the group that received no phonemic awareness instruction. Posttest measures of reading comprehension revealed no significant differences between the three groups. The researchers concluded that explicit instruction in phonemic awareness was able to enhance word-level reading abilities.

In a study conducted by Blachman, Tangel, Ball, Black, and McGraw, (1999), methods of reading instruction that included phoneme awareness and alphabetic code knowledge components were compared with those that did not with groups of first-grade children in low income, inner-city areas. Both groups of
children received basal reading instruction as well as phonetically based spelling instruction. The treatment group also received instruction in phoneme awareness (11 weeks during kindergarten) and alphabetic code knowledge (throughout first-grade). The treatment group consisted of 60 children, and the control group consisted of 62 children. The results of the study revealed that at the end of first-grade, the children who received phoneme awareness and alphabetic code knowledge instruction as a part of their reading instruction outperformed children who received reading and spelling instruction alone on measures of word recognition, letter knowledge, and spelling. When the children were reevaluated at the end of second-grade, the treatment group still outperformed the control group on measures of word recognition, but no significant differences were observed between the two groups on measures of spelling unless only the children who were in the lowest 25% on spelling were considered from both groups. Results of this comparison revealed that the children from the treatment group used better strategies despite their misspellings than did the children from the control group.

Another study by Hatcher, Hulme, and Snowling (2004) evaluated the effectiveness of different elements of phonological awareness instruction with 410 preschool children, some of whom were at-risk for reading delays. They examined groups of children who received reading instruction with rhyme and phonological awareness instruction, reading instruction with rhyme instruction, reading instruction with phonological awareness instruction, and reading instruction with no phonological awareness component. The phonological
awareness instruction consisted of identification and manipulation of syllables and phoneme blending, segmentation, deletion, substitution, and transposition. The rhyme instruction consisted of identification and manipulation of syllables, rhyme matching, rhyme generation, and onset-rime linkage activities. The results of the study indicated that the children who were typically developing benefited equally from all reading instruction approaches on measures of reading, thus demonstrating that children who were typically developing were not in need of phonological awareness instruction in order for them to be successful in reading. The children who were at-risk for reading failure demonstrated the most gains on measures of word reading and non-word reading from instruction that included phonological awareness instruction (with or without rhyme instruction). The group that received rhyme-only instruction did not improve significantly on measures of word and non-word reading. The group that received rhyme and phonological awareness instruction demonstrated greater gains on reading measures than the group that received phonological awareness only instruction. The researchers concluded that phonological awareness instruction can be beneficial to children who are at-risk for reading problems if that instruction includes elements of both rhyme and phonological awareness.

*Studies in Populations with Histories of Language Delay and/or Expressive Phonological Impairment*

The previous studies all addressed the effects of phonological awareness intervention with children who had no documented speech or language
impairments. The following paragraphs address studies in which children with speech/language impairments are a part.

In a study by van Kleeck, Gillam, and McFadden (1998) the phonological awareness skills of children with speech/language disorders who received phonological awareness intervention were compared to phonological awareness skills of older children with similar speech/language disorders who did not receive phonological awareness intervention. There were two treatment groups of eight children each (ages 3:9-4:4 and 4:9-5:6) who received phonological awareness intervention focusing on rhyming and phoneme awareness and one non-treatment comparison group of eight children (ages 5:0-7:9) who had received similar reading instruction without the phonological awareness components. The results of the study revealed that the children who received phonological awareness intervention scored significantly higher on posttest measures of phoneme awareness when compared to the control group. Pretest and posttest measures of rhyming revealed that both treatment groups began at the same level, but the younger treatment group outperformed the older one on posttest rhyming measures. Neither treatment group was able to match the non-treatment comparison group on posttest measures of rhyming, however. The researchers concluded that rhyming development cannot be influenced by intervention but must develop on its own. They did suggest, however, that instruction in phoneme awareness can positively influence phoneme awareness abilities.

Gillon (2000a) conducted a study examining the effects of integrating phonological awareness instruction with speech-language intervention with
children, ages 5-7, who demonstrated spoken language impairments (SLI). The intervention group consisted of children with SLI receiving speech-language and phonological awareness intervention. The normal comparison groups consisted of children with SLI receiving speech-language intervention only, children with SLI receiving no intervention and typically developing children receiving regular classroom literacy instruction. Results of the study indicated that the children who received speech-language and phonological awareness intervention improved more in word recognition, reading, comprehension, and speech production than the other two SLI normal comparison groups. In addition, the intervention group performed at levels similar to the typically developing normal comparison group on posttest measures of phonological awareness.

In a follow-up study, Gillon (2002a) re-evaluated the children in the SLI treatment and control groups for maintenance of phonological awareness skill levels after treatment. Results of follow-up testing revealed that the intervention group of students who received both phonological awareness and speech-language intervention were no longer considered at-risk for reading problems. The treatment and non-treatment SLI control groups who received no phonological awareness treatment, however, continued to remain below grade level on measures of phonological awareness and reading.

In a study conducted by Rvachew, Nowak, and Cloutier (2004), the effects of teaching phonemic perception in 17 preschool children with moderate to severe expressive phonological impairments were examined and compared to a control group of 17 children with expressive phonological impairments who did
not receive instruction in phonemic perception. Phonemic perception was taught through exercises that required the children to discriminate between correct and incorrect productions of words. Phonological awareness was tested through rime matching and onset matching activities. The results of the study indicated that children who received instruction in phonemic perception improved significantly more on measures of phonemic perception when compared to children who did not receive the instruction, but measures of phonological awareness remained the same for both groups. The researchers of this study concluded that teaching phonemic perception does not influence phonological awareness abilities in children with histories of expressive phonological impairments.

Laing and Espeland (2004) investigated the effects of phonological awareness intervention in 11 preschool and kindergarten children between the ages of 3:6 and 5:6. The six children in the experimental group had language or expressive phonological impairments; the five children in the control group were developing typically. Phonological awareness was assessed through rhyme detection, rhyme production, and initial sound categorization tasks. The experimental group received an 8-week low-intensity phonological awareness whole-class intervention program focusing on instruction in rhyme identification, rhyme production, sound categorization, and phoneme-grapheme relationships. These intervention sessions occurred for 15 minutes, twice per week in addition to regular preschool classes. The control group attended regular preschool classes but did not receive phonological awareness instruction. Results of the study indicated that the experimental group demonstrated greater gains on
measures of phonological awareness than the control group, but the initial scores of the control group remained higher than the posttest scores of the experimental group. The researchers concluded that phonological awareness instruction can directly contribute to gains in phonological awareness abilities for children with speech/language impairments, but that this short-term, low-intensity approach to phonological awareness instruction is not adequate to cause children with speech/language impairments to catch up with their peers who are typically developing.

In an additional study by Gillon (2005), the effectiveness of teaching children between the ages of 3 and 4 years with expressive phonological impairments letter knowledge and phonemic awareness in conjunction with speech-language intervention was examined. The experimental group consisted of 12 children with expressive phonological impairments who received instruction in letter knowledge and phonemic awareness in addition to attending regular kindergarten or preschool classes. The control group consisted of 19 children with typically developing speech and language who did not receive instruction in letter knowledge or phoneme awareness outside of their regular kindergarten or preschool classroom. The methods used to teach letter knowledge and phoneme awareness were structured into lessons that began with creating a context that varied from a “munching monkey” who eats toys that begin with the “m” sound to moving a toy bear from letter to letter while identifying the letter name. Phoneme awareness and letter knowledge skills that were taught consisted of initial phoneme detection, categorization, matching, and isolation; letter name/sound
recognition and matching; and onset-rime/phoneme blending. Phoneme awareness activities were integrated into sessions that focused on speech production goals. The results of this study indicated that the experimental group made greater gains on measures of rhyme oddity, phoneme matching, and letter recognition tasks. By the end of the study, the experimental group outperformed the control group on all experimental measures of phonological awareness and scored within normal limits on a standardized test of phonological awareness abilities during both the initial posttest and 1-year later. The author concluded that it was possible for the children to make progress on speech-sounds as well as acquire phoneme awareness and letter knowledge simultaneously.

These studies indicate that phonological awareness intervention can be effective in improving both phonological awareness and reading levels in children with expressive phonological impairments as well as typically developing children. These studies have also demonstrated that there are many methods for teaching phonological awareness that are effective in improving both phonological awareness and literacy skills in children with expressive phonological impairments, all of which must explicitly teach phonological awareness skills in order to be effective. It remains unclear, however, which method of explicit intervention might prove to be the most effective for this population.
Phonological Awareness Instruction Programs

There are many phonological awareness intervention programs available on the market. The unique features of five of these programs will be summarized in the following section.

The Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LiPS)

The LiPS (Lindamood & Lindamood, 1998) program teaches phoneme identification and sequencing skills through sensory input. Individuals are instructed to answer various questions about the placement of their articulators as they speak certain words. These questions are designed to direct the sensory awareness that individuals have for their oral-motor, visual, and auditory feedback systems as they produce phonemes while speaking. As individuals’ perceptions of phonemes improve, they are taught to identify the specific phonemes in words and determine the number and order of those phonemes. This instruction is aided by materials that include pictures of the mouth in various speech positions used to direct sensory awareness of phonemes, colored block manipulatives that serve as a visual aid for phoneme sequencing, and letter tiles that are used in spelling and reading activities. According to the authors, the LiPS program is designed for use with individuals of all ages.

Phonemic Awareness in Young Children

Adams, Foorman, Lundberg, & Beeler (1998) designed a program to complement a variety of pre-reading programs with children in preschool, kindergarten, and first-grade. This program is designed to be used in groups for
15-20 minutes per day during every day of classroom instruction. Phonological awareness is targeted through word-play and sound-play activities that include listening games, rhyming activities, word segmentation, syllable segmentation, initial and final phoneme identification, initial and final phoneme segmentation, phoneme manipulation (e.g., blending, adding, deleting), and phoneme-grapheme relationship instruction. These elements are taught through games such as poems, finger plays, and chants. The Phonemic Awareness in Young Children program also includes a phonological awareness screening measure that can be administered to groups of up to 15 children at one time.

The Gillon Phonological Awareness Training Programme

Gillon's (2000b) program is designed to teach phonological awareness skills to children between the ages of 5 and 7 years who are struggling in phonological awareness and/or reading. Phonological awareness skills that are targeted include rhyming, phoneme identification, phoneme discrimination, phoneme segmentation, phoneme blending, phoneme-grapheme relationships, and decoding of phonetically regular words. Children are taught these skills through games and activities such as bingo, manipulation of colored blocks, and illustrated worksheets.

Road to the Code

Blachman, Ball, Black, Tangel (2000) designed a program to augment existing instruction and teach phonological awareness in kindergarten and first-grade classroom settings. The program consists of 44 sessions designed to last 15-20 minutes to be taught four times per week over an 11-week period to
groups of four to five children. Three main activities are used in this program. The first is “say-it and move-it,” which is used to teach phoneme segmentation by moving manipulatives as phonemes are spoken. The second is letter name and sound introduction for eight total letters over the total time for the program. The third and final component to each lesson consists of additional phonological awareness activities such as sound categorization, phoneme segmentation, and rhyming.

*Animated-Literacy*

Stone’s (2005) early literacy instruction program is designed to stand alone or supplement classroom reading programs. It is primarily used with children from preschool to second-grade, although it can be adapted for use with older populations. This program teaches phonological awareness tasks that include rhyming, syllable and phoneme segmentation, onset-rime manipulation, phoneme isolation, phoneme manipulation, phoneme deletion, and phoneme blending, as well as other early literacy concepts of phoneme-grapheme relationships, decoding, spelling, vocabulary development, and writing. The program uses four main components to teach these elements of phonological awareness and early literacy skills: pattern song substitution activities, alphabet character stories, songs, and gestures, drawing and labeling activities, and a “toybox” of manipulatives. For a more detailed description of these components, see Appendix A.
Research Questions

Previous research indicates that phonological awareness and alphabetic knowledge are crucial elements for success in literacy (Bradley & Bryant, 1983; Bryant, et al., 1989; Liberman, et al., 1974; Wagner, et al., 1994). Children with expressive phonological impairments are especially at-risk for delays in these areas of early literacy (Bird, et al., 1995; Clarke-Klein & Hodson, 1995; Larrivee & Catts, 1999; Rvachew, et al., 2003). Early intervention in these areas can help these at-risk children experience literacy success (Gillon, 2000a, 2002a, 2005; Laing & Espeland, 2004; Rvachew, et al., 2004; van Kleeck, et al., 1998).

The primary question this study examined was: Do participants with histories of expressive phonological impairment demonstrate gains on measures of phonological awareness and alphabetic knowledge following a short-term, small-group treatment program based on Animated-Literacy? A secondary research question was: How do each of the treatment group participants perceive the different activities presented during the treatment sessions and at home, and is there any relationship between an individual participant’s satisfaction with treatment and/or home activities and how he performed following treatment?
CHAPTER III

METHOD

The primary purpose of this study was to examine the outcomes of a treatment study involving teaching metaphonological skills and alphabetic principles through an adaptation of the Animated-Literacy reading program (Stone, 2004) on the early literacy skills of “at-risk” pre-kindergarten children with histories of impaired expressive phonological development. In the following sections, the participants, the assessment measures, the treatment procedures, and the data analysis for the study will be described.

Preliminary Procedures

A letter describing the study and its procedures was provided to each of the participant’s parents. The letter also contained a space for a parent signature allowing the child to participate in the study. A copy of this letter is included in Appendix B.

Participants

The participants in this study were seven, pre-kindergarten boys between the ages of 4:11 and 5:10 (years:months) at the onset of the study (mean 5:5). All of these children had received treatment for highly unintelligible speech for a period of 1 to 2 years immediately prior to the study. Five of the participants had received speech services at the Wichita State University Speech-Language-Hearing Clinic (WSU Clinic), and the other two (twins) had received speech services through the public school as well as some prior instruction in Animated-
Literacy. All seven of the participants had histories of middle ear pathologies (See Table 1).

Table 1
Participant otologic information

<table>
<thead>
<tr>
<th>Participant</th>
<th>Otitis media occurrence</th>
<th>Otologic history</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>Occasional otitis media</td>
<td>No PE tubes</td>
</tr>
<tr>
<td>T-2</td>
<td>Occasional otitis media</td>
<td>No PE tubes</td>
</tr>
<tr>
<td>T-3</td>
<td>Frequent otitis media</td>
<td>2 sets of PE tubes</td>
</tr>
<tr>
<td>T-4</td>
<td>Frequent otitis media</td>
<td>1 set of PE tubes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partial adenoidectomy</td>
</tr>
<tr>
<td>T-5</td>
<td>Frequent otitis media</td>
<td>No PE tubes</td>
</tr>
<tr>
<td>N-1</td>
<td>Occasional otitis media</td>
<td>No PE tubes</td>
</tr>
<tr>
<td>N-2</td>
<td>Frequent otitis media</td>
<td>1 set of PE tubes</td>
</tr>
</tbody>
</table>

Prior to the onset of the study, two tests were administered to determine the overall current level of functioning of the participants. Both of these also aided in the identification of any participants whose scores placed them considerably above or below the mean of language abilities for this group of individuals so that a particular individual’s performance in the study could be addressed if anything unusual was found.

The first of these tests was the Peabody Picture Vocabulary Test-3 (PPVT-3; Dunn & Dunn, 1997). The PPVT-3 measures receptive vocabulary and has been found to have a high correlation with IQ. The standard scores for all seven of the participants were above 100 (mean 113; See Table 2).
Table 2

Participant receptive vocabulary information

<table>
<thead>
<tr>
<th>Participant</th>
<th>PPVT-3 standard score</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>110</td>
</tr>
<tr>
<td>T-2</td>
<td>110</td>
</tr>
<tr>
<td>T-3</td>
<td>132</td>
</tr>
<tr>
<td>T-4</td>
<td>114</td>
</tr>
<tr>
<td>T-5</td>
<td>107</td>
</tr>
<tr>
<td>N-1</td>
<td>116</td>
</tr>
<tr>
<td>N-2</td>
<td>100</td>
</tr>
</tbody>
</table>

The other test that was administered prior to the study was the Hodson Assessment of Phonological Patterns-3 (HAPP-3; Hodson, 2004). This test provides a measure of the participants’ expressive phonological skills at the onset of the study. The scores for all seven participants on the HAPP-3 at the onset of the study placed them in the “mild” to “low moderate” range of expressive phonological impairment. The HAPP-3 scores for the seven participants ranged from 9 to 56 for total occurrences of major phonological deviations (TOMPD; mean 29; see Table 3). Also included in Table 3 is the original severity of the participants’ expressive phonological abilities. These scores are represented as TOMPD for five of the participants. Two of the participants did not have the HAPP-3 administered to them until later in their phonology treatment; their scores are represented using the Arizona Articulation Proficiency Scale-3 (AAPS-3; Fudala, 2001) as well as a later HAPP-3 score.
Table 3

**Participant Expressive Phonology Information**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Original Expressive Phonology Score</th>
<th>Original Severity</th>
<th>Current TOMPD</th>
<th>Current Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>76 (SS on AAPS-3) 77 (TOMPD on HAPP-3 10 months after initial evaluation)</td>
<td>“moderate”</td>
<td>23</td>
<td>“mild”</td>
</tr>
<tr>
<td>T-2</td>
<td>75 (SS on AAPS-3) 59 (TOMPD on HAPP-3 10 months after initial evaluation)</td>
<td>“moderate”</td>
<td>9</td>
<td>“mild”</td>
</tr>
<tr>
<td>T-3</td>
<td>90 (TOMPD on HAPP-3)</td>
<td>“high moderate”</td>
<td>33</td>
<td>“mild”</td>
</tr>
<tr>
<td>T-4</td>
<td>194 (TOMPD on HAPP-3)</td>
<td>“profound”</td>
<td>30</td>
<td>“mild”</td>
</tr>
<tr>
<td>T-5</td>
<td>70 (TOMPD on HAPP-3)</td>
<td>“moderate”</td>
<td>21</td>
<td>“mild”</td>
</tr>
<tr>
<td>N-1</td>
<td>83 (TOMPD on HAPP-3)</td>
<td>“high moderate”</td>
<td>32</td>
<td>“mild”</td>
</tr>
<tr>
<td>N-2</td>
<td>144 (TOMPD on HAPP-3)</td>
<td>“severe”</td>
<td>56</td>
<td>“low moderate”</td>
</tr>
</tbody>
</table>

**Measures: Pre- and Post-Treatment**

This study evaluated achievements in metaphorological awareness and alphabetic knowledge that were obtained through the use of *Animated-Literacy*. The dependent variable in this study was the changes in scores of phonological awareness and alphabetic knowledge measures that the participants demonstrated during pre- and post-testing.

The dependent variable was measured using the Assessment of Primary Literacy Skills (APLS; Hodson, 2005). The APLS measures various aspects of phonological awareness and alphabetic knowledge. The subtests of the APLS were comprised of phonological awareness tasks at the word/syllable level,
rhyme generation, alphabetic principle knowledge, and phonological awareness tasks at the phoneme level. The syllable/word level phonological awareness tasks included syllable/word segmentation, rhyme detection, syllable/word synthesis, and syllable/word manipulation with deletion, substitution, and transposition tasks. The rhyme generation/supply required the child to name as many words that rhyme with the stimulus word as possible during a 10-second period. The alphabetic principle knowledge tasks included letter naming, sound identification, and the written spelling of four monosyllabic, three-letter words. Finally, the phoneme level phonological awareness tasks consisted of initial consonant categorization, phoneme blending/synthesis, phoneme segmentation, final consonant categorization, and phoneme manipulation with deletion, substitution, and transposition tasks.

The APLS was administered to each participant before the treatment period began and after the last treatment session by a certified speech-language pathologist who was not an instructor during the treatment sessions. Pre- and post-treatment scores for each participant were then compared to examine any changes in the participants’ scores following the treatment period.

In addition, a survey was conducted to determine activities that were favored or disliked by participants. Participants were presented with pictures and materials from classroom and home activities that were incorporated throughout the study. The classroom activities were presented through photographs taken of the class during (a) pattern song, (b) alphabet character story, (c) book discussion, (d) drawing, (e) toybox, and (f) snack activities. The home activities
were presented through samples of the materials that were sent home with the children including (a) alphabet character song practice, (b) alphabet character picture coloring, (c) drawing, (d) pattern song practice, and (f) mixed-up sentence puzzles from drawing pages. For each element presented, the participants were instructed to place a colored block in one of four boxes with graphic representations of their opinions according to the following scale:

😊 = I really liked it.

😐 = It was okay.

👎 = I did not like it.

🚫 = I did not do it.

During presentation of the homework activities, the “I did not do it” option was provided in order to gather information about the amount of work that was done outside of the treatment sessions. These child reports were compared with parent reports about which activities were done at home and approximately how often.

_Treatment Procedures_

The participants were divided into a treatment group consisting of five children and a non-treatment control group consisting of two children. Determination of group inclusion was dependent on the participants’ abilities to attend all treatment sessions.

The children in the non-treatment control group participated in pre- and post-testing with a 6-week interval between testing sessions. They received no instruction in phonological awareness during this time. After the study was over,
they did receive the materials that were provided to the treatment group participants to work on at home.

The participants in the treatment group received treatment at the WSU Clinic during the summer of 2005. These treatment sessions occurred twice per week for 2 hours each, resulting in a total of 24 hours of treatment time for each child. Treatment was administered in a group setting, with individual attention given to participants as necessary within the context of the group “classroom.”

Treatment consisted primarily of lessons adapted from the *Animated-Literacy* (Stone, 2004) early literacy program. Children in the treatment group received instruction in class and home practice materials for each alphabet character, pattern song, and drawing as well as a book of alphabet songs with an accompanying CD recording of those songs.

*General Lesson Plan*

Each activity (i.e., character, drawing, or song) began with a group discussion to access prior knowledge and establish a context for the lesson. This discussion was followed by a short picture book that expanded the context of the lesson and introduced the vocabulary that was needed for the lesson (e.g., actions and activities for the alphabet character or rhyming pairs for *A Hunting We Will Go*). The lesson’s character, drawing, or song was then introduced, followed by focused practice incorporating new information with patterns that were introduced in the previous lessons (e.g., using the new character’s sound in *Are You Sleeping*). A sample lesson plan is in Appendix C.
Each of these elements of treatment began with instruction followed by group and individual practice within the group setting (e.g., turn-taking during group games). Gradually, the participants were expected to perform these tasks spontaneously with no assistance. A complete list of lessons presented during each day of treatment is available in Appendix D.

*Alphabet Characters*

Two alphabet characters were introduced during each session, resulting in a total of 24 alphabet characters by the end of the treatment period. Each alphabet character’s story was adapted for these participants by shortening the length and including only the most salient aspects of the plot with minimal details. The primary goal of the story was to provide (a) the plot that each character’s song followed, (b) a context for the specific gesture that was associated with the character’s phoneme, and (c) the spelling pattern(s) associated with that phoneme each time that phoneme was used for the rest of the treatment period.

The order in which the phonemes and characters were introduced was also adapted for use in this study. Only 24 phonemes (of the total 45 characters in *Animated-Literacy*) were introduced. These characters and phonemes were selected and ordered based on the following considerations:

1. Many of the earliest acquired phonemes (e.g., /p/, /b/, /m/, /i/, /u/, /a/) were targeted near the beginning of the treatment period.

2. Each phoneme that was introduced was then used to spell a word when combined with previously introduced phonemes (Stone, 2004).
3. Similar phonemes were separated to reduce confusion (e.g., /s/ was not introduced during the same week as /ʃ/; Stone, 2004).

4. Phonemes that are typically difficult for children with histories of unintelligible speech (e.g., /r/, /dʒ/, /l/) were included.

5. Phonemes/spellings that occur less frequently in the English language were not targeted (e.g., /z/, “x” /ks/).

A total of 10 vowels and 14 consonants were introduced over the treatment period with most sessions containing one vowel and one consonant. A complete list of the phonemes and corresponding alphabet characters and gestures targeted in this study and the order in which they were presented are included in Appendix E. Phonemes that were not introduced in complete lessons were incorporated with brief introductions to the character name and gesture throughout the treatment period using the sound substitution songs and “toybox” of reading manipulatives activities so that the participants received some exposure to all of the phonemes in the English language.

**Drawing and Labeling**

A second element of *Animated-Literacy* that was utilized in treatment sessions was the drawing and labeling component. Two drawings were included in each treatment session, with the exception of the first session, which introduced only one drawing. Each drawing corresponded to an alphabet character and used that character’s phoneme in its name/label (e.g., *Polly Panda*). Each drawing activity consisted of a step-by-step instructor-led drawing of a picture (e.g., *pup*). After the picture was drawn, the children segmented the
sounds that were in the word that named the drawing. Finally, the children identified the letters and spelling patterns for the sounds in each word used to label the drawings with the assistance of the instructors. Each drawing’s label contained only the phonemes that the children had already been taught, thus allowing them to immediately see the relevance of the sounds and spelling patterns they were learning and how those sounds and spelling patterns are used to read and write words.

The drawing activities had very few adaptations from the original Animated-Literacy lesson plans. The order of the drawings, however, was different than the original Animated-Literacy order and was adapted as necessary to accommodate the changes in the character sequence. A complete list of the drawings that were used and the sequence they were presented in this study is included in Appendix E.

Pattern Sound and Word Substitution

The third component of Animated-Literacy included in the treatment sessions involved phoneme and word substitution activities in selected pattern songs. The use of different songs addressed various elements of phonological awareness. The song, Are You Sleeping, addressed phoneme manipulation by teaching the children to manipulate and substitute syllable onsets and rimes, and to teach the distinction between vowels and consonants (e.g., change “ding, dong, ding” to “ping, pong, ping”). Phoneme-grapheme correspondence was emphasized during this activity with the use of alphabet character flashcards and a pocket chart that required the participants to substitute sounds using the
grapheme cue instead of the auditory phoneme cue. The song, *Apples and Bananas*, also addressed phoneme manipulation through substitution of the vowels as well as teaching children to identify the vowels in different words/names. This song also addressed syllable segmentation through counting the number of vowels that were substituted into each food that was included in the song. Finally, the song, *A Hunting We Will Go*, addressed the phonological awareness skill of rhyme identification and generation.

The contexts created by these and similar songs were used to facilitate more focused practice of phonological awareness skills after the song was introduced. This occurred through rapid drill-like activities that required the children to combine the various onsets and rimes learned with *Are You Sleeping* without singing the entire verse, count vowels (syllables) for various foods that might substitute into the song, *Apples and Bananas*, and provide various rhyming pairs that might fit into *A Hunting We Will Go* and other rhyming songs. A list of all songs used in this study and the specific elements of phonological awareness that each song addressed are available in Appendix F.

“Toybox” of Manipulatives

The specific phonological awareness tasks of syllable and phoneme segmentation, blending, phoneme-grapheme correspondence, and rhyming were also targeted through the use of manipulatives organized by vowel sound in the Animated-Literacy “Toybox” of reading manipulatives. Once the concepts of sound segmentation and blending were introduced with the drawing activities, these concepts were addressed using more focused instruction that taught the
children to listen to words, segment their sounds, then blend the sounds back together for decoding and spelling. These activities consisted of children blending sounds together, identifying the toy that matched the word they created, and segmenting the sounds in each word that labeled a toy. The gestures introduced with the alphabet characters were used to facilitate this process by providing a multisensory association for each phoneme. Phoneme deletion was taught through gesturing the sounds in words without initial and/or final phonemes. Rhyming was addressed through use of word sorts of manipulatives into rhyming groups and pairs.

Data Analysis

Pre- and post-treatment scores on the APLS were compared for each child, within and across the treatment and non-treatment groups. Scores from the phonological awareness and alphabetic knowledge areas of the APLS were also compared for individual variations between pre- and post-treatment scores. Finally, results of the survey were analyzed by assigning numerical values of 1-3 to each rating (😊=3, 😊=2, and 😒=1). These results are discussed as they relate to individual differences for participants on pre- and post-treatment APLS scores.
CHAPTER IV

RESULTS

In this study, the outcome of teaching metaphonological skills and alphabetic principle knowledge through an adaptation of the *Animated-Literacy* reading program (Stone, 2004) was examined. The early literacy skills of “at-risk” pre-kindergarten children with histories of impaired expressive phonological development were assessed through administration of the APLS prior to and following a 6-week period. During this time, five participants received treatment in phonological awareness and alphabetic knowledge skills; two participants did not receive treatment. Results will be discussed with pre- and post-treatment scores on the APLS as well as phonological awareness and alphabetic knowledge subtest scores for both the treatment and non-treatment groups. Ratings from the post-treatment survey administered to the treatment group also will be addressed.

*Comparison of Pre- and Post-Treatment Scores*

**APLS Overall Scores**

Individual pre- and post-treatment raw scores out of a maximum of 100 points are presented in Table 4. Pre-treatment APLS scores for the treatment group ranged from 24 to 70 points. Post-treatment scores for the treatment group ranged from 38 to 86 points. This resulted in a range of 14 to 37 points improvement from pre- to post-treatment. The non-treatment group’s pre-treatment scores were 51 and 28 points, and the post-test scores were 51 and 35 points. One of the non-treatment participants did not change at all, and the other
demonstrated a 7-point change. The pre- to post-treatment difference was larger for all participants in the treatment group than the non-treatment group (see Figure 1).

Two participants in the study (T-5, N-2) demonstrated lower scores than the rest of the participants prior to treatment (24 and 28 points respectively). The participant who received treatment (T-5) improved by 14 points (24 points pre-test, 38 points post-test); however, his post-treatment score was lower than any of the other pre-treatment scores of the treatment group. The low-scoring participant who did not receive treatment (N-2) demonstrated a slight change of 7 points (28 points pre-test, 35 points post-test). The other participant in the non-treatment group (N-1) scored similarly to the treatment group in the pretest (51 points) but demonstrated no gains from pre-treatment to post-treatment.
Table 4

*Pre- and post treatment APLS total scores*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-treatment score*</th>
<th>Post-treatment score*</th>
<th>Pre- to post-treatment difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>70</td>
<td>86</td>
<td>+16</td>
</tr>
<tr>
<td>T-2</td>
<td>54</td>
<td>75</td>
<td>+21</td>
</tr>
<tr>
<td>T-3</td>
<td>55</td>
<td>78</td>
<td>+23</td>
</tr>
<tr>
<td>T-4</td>
<td>42</td>
<td>79</td>
<td>+37</td>
</tr>
<tr>
<td>T-5</td>
<td>24</td>
<td>38</td>
<td>+14</td>
</tr>
<tr>
<td>N-1</td>
<td>51</td>
<td>51</td>
<td>+0</td>
</tr>
<tr>
<td>N-2</td>
<td>28</td>
<td>35</td>
<td>+7</td>
</tr>
</tbody>
</table>

*Based on number correct out of 100 total points possible*
Pre- and post treatment APLS total scores

The phonological awareness scores for all of the participants improved from pre- to post-treatment. The treatment group, however, demonstrated greater gains with improvement ranging from 6 to 19 points. The non-treatment group made smaller gains of 1 and 4 points. See Table 6 and Figure 3 for individual pre- and post-treatment results.
Table 5

*Pre- and post treatment APLS phonological awareness scores*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-treatment score*</th>
<th>Post-treatment score*</th>
<th>Pre- to post-treatment difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>36</td>
<td>49</td>
<td>+13</td>
</tr>
<tr>
<td>T-2</td>
<td>33</td>
<td>43</td>
<td>+10</td>
</tr>
<tr>
<td>T-3</td>
<td>34</td>
<td>40</td>
<td>+6</td>
</tr>
<tr>
<td>T-4</td>
<td>21</td>
<td>40</td>
<td>+19</td>
</tr>
<tr>
<td>T-5</td>
<td>19</td>
<td>29</td>
<td>+10</td>
</tr>
<tr>
<td>N-1</td>
<td>29</td>
<td>30</td>
<td>+1</td>
</tr>
<tr>
<td>N-2</td>
<td>24</td>
<td>28</td>
<td>+4</td>
</tr>
</tbody>
</table>

* Based on number correct out of 60 total points possible
Figure 2

**Pre- and post treatment APLS phonological awareness scores**

![Bar chart showing pre- and post treatment APLS phonological awareness scores](image)

**APLS Alphabetic Knowledge scores**

There was greatest group variation in alphabetic knowledge pre-test and post-test scores for both groups. Pre-test scores ranged from 4 to 34 points, and post-test scores ranged from 7 to 39 points. Four of the participants initially scored between 21 and 22 points (T-2, T-3, T-4, N-1). The three participants with
these pre-test scores who received treatment scored 35 points or above in alphabetic knowledge after treatment. The non-treatment participant demonstrated a 1-point loss from pre-test to post-test. The resulting point change ranged from 14 to 18 for the treatment participants and -1 for the non-treatment participant. The remaining participants who scored well below or above 21-22 points on the pre-test (T-1, T-5, N-2) demonstrated only 3-4 point gains in scores. See Table 5 and Figure 2 for individual pre- and post-treatment results.

Table 6

Pre- and post treatment APLS alphabetic knowledge scores

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pre-treatment score*</th>
<th>Post-treatment score*</th>
<th>Pre- to post-treatment difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>34</td>
<td>37</td>
<td>+3</td>
</tr>
<tr>
<td>T-2</td>
<td>21</td>
<td>35</td>
<td>+14</td>
</tr>
<tr>
<td>T-3</td>
<td>21</td>
<td>35</td>
<td>+14</td>
</tr>
<tr>
<td>T-4</td>
<td>21</td>
<td>39</td>
<td>+18</td>
</tr>
<tr>
<td>T-5</td>
<td>5</td>
<td>9</td>
<td>+4</td>
</tr>
<tr>
<td>N-1</td>
<td>22</td>
<td>21</td>
<td>-1</td>
</tr>
<tr>
<td>N-2</td>
<td>4</td>
<td>7</td>
<td>+3</td>
</tr>
</tbody>
</table>

* Based on number correct out of 40 total points possible
Within the treatment group, every child except T-5 improved most on the subtest that was initially the lowest for each child. Two of the treatment group participants demonstrated greater gains on the phonological awareness component of the APLS, and three demonstrated greater gains on the alphabetic knowledge component. In the non-treatment group, one of the participants demonstrated gain only on the phonological awareness component of the APLS, and the other demonstrated a small amount of gain (3-4 points) on both the
phonological awareness and alphabetic knowledge components. See Tables 5 and 6 for individual results.

**Participant Survey Results**

Survey results were analyzed based on a potential maximum of 3 points for the ☺ response, 2 points for the ☻ response, and 1 point for the ☻ response. The total points for each participant were then calculated with the potential maximum points to provide a percentage of participant satisfaction. Table 7 displays the percent satisfaction for both the classroom activities and the homework activities. Each of the participants was involved in all of the classroom activities; therefore, percent satisfaction for classroom activities was calculated based on six total activities. Homework activities were suggested but not mandatory; therefore, percent satisfaction for each participant was calculated based on only the number of activities each participant reported using at home (ranging from 2-5 total activities). Participant satisfaction ranged from 89% to 100% for most of the participants on both the classroom and homework activities. Only T-5 had a lower satisfaction scores, with 78% classroom satisfaction and 60% homework satisfaction.
Table 7

*Participant survey – level of satisfaction scores*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Level of satisfaction: Classroom activities</th>
<th>Level of satisfaction: Homework activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>89%*</td>
<td>100%**</td>
</tr>
<tr>
<td>T-2</td>
<td>94%*</td>
<td>100%**</td>
</tr>
<tr>
<td>T-3</td>
<td>94%*</td>
<td>100%**</td>
</tr>
<tr>
<td>T-4</td>
<td>89%*</td>
<td>93%***</td>
</tr>
<tr>
<td>T-5</td>
<td>78%*</td>
<td>60%***</td>
</tr>
</tbody>
</table>

* Based on 6 total activities

**Based on 2 total activities according to both child and parent report

***Based on 5 total activities according to both child and parent report
CHAPTER V
SUMMARY AND DISCUSSION

In this study, an intensive, short-term early literacy program was used to instruct children in phonological awareness and alphabetic knowledge skills. The participants in the study included seven children, all of whom had histories of expressive phonological impairments and had been dismissed from treatment prior to the onset of the study. All of the participants were pre-kindergarten boys between the ages of 4:11 and 5:10, placing them within the critical age at which phonological awareness must be established in order for them to succeed in literacy when they enter kindergarten (Nathan, et al., 2004). At the beginning of the study, all of the participants scored within the mild to moderate range of expressive phonological impairment. The participants were divided into treatment and non-treatment groups consisting of five members and two members, respectively. Assignment to these groups was based on each participant’s ability to attend the treatment sessions.

Prior to the treatment period, the APLS was administered to each participant in both groups to obtain pre-test measures of phonological awareness and alphabetic knowledge. The treatment program, Animated-Literacy (Stone, 2004), was then implemented with the participants in the treatment group during 2-hour sessions occurring twice per week for 6 weeks. The non-treatment group participants received no services during this period. After the treatment period was completed, the APLS was re-administered to participants in the treatment and non-treatment groups to obtain post-test measures of phonological
awareness and alphabetic knowledge. Pre-test and post-test results for the APLS were compared within each group and between both groups on the measures of total score, phonological awareness score, alphabetic knowledge score, and percent change from pre-test to post-test. Based on pre-test scores, each of the participants in the non-treatment group was similar to either a specific individual or a group of participants assigned to the treatment group. In addition to the APLS, a short survey was administered to participants in the treatment group and the responses were analyzed to obtain a percent satisfaction measure for activities that occurred during the treatment sessions and activities performed as homework.

The results of this study demonstrated improvement in the phonological awareness skills and alphabetic knowledge of five pre-kindergarten children with histories of expressive phonological impairments following a systematic, short-term intervention period of 6 weeks (24 total hours of treatment time). These results are in agreement with the findings of Gillon (2000), who found instruction in phonological awareness and phoneme-grapheme correspondence improves phonological awareness and early literacy performance for children with varying degrees of speech disorders. Both of these studies have provided further evidence that the integration of phonological awareness and alphabetic knowledge components within the same instructional period is successful in improving phonological awareness and alphabetic knowledge skills.
Group Results

Four out of the five treatment group participants improved to at least 75 points correct on their post-treatment APLS scores. In comparison, the non-treatment group participants reached a maximum of only 51 points on post-test APLS scores. On phonological awareness scores, four out of the five treatment group participants improved to a minimum of 40 points, while the non-treatment group improved to a maximum of only 30 points during post-testing. Finally, on the alphabetic knowledge subtest, four out of the five treatment group participants improved to at least 35 points correct. The non-treatment group, however, reached a maximum of only 21 points on post-test alphabetic knowledge scores.

Individual Participant Results

One participant in the treatment group (T-5) did not make the same level of gains as the other treatment group participants. T-5's initial pre-treatment score on the APLS of 24 points was substantially lower than the scores of the other participants in the treatment group (18 points lower than the second lowest score). His final score of 38 points, although indicating some improvement, did not meet the next lowest initial pre-treatment score of 42 points.

In addition to his lower initial score, there are a number of variables that may have contributed to T-5’s smaller gains from pre- to post-treatment. One of these variables was his satisfaction with the treatment session activities. T-5 was the only participant to report a dissatisfied (.withOpacity:0x00000000 opacity:0) response for any activity. His overall percent satisfaction based on the six primary treatment activities was only
78%. The rest of the treatment group ranged from 89-94% satisfaction. T-5’s homework satisfaction score was also lower, with only 60% satisfaction compared to 93-100% satisfaction for the remaining treatment group participants.

One possible explanation for this was the method by which the homework activities were presented to him. It was discovered 3 weeks into the treatment period, T-5’s homework was being treated as a drill instead of the play and exploration that clinicians intended by giving instructions such as, “teach your parents Polly Panda’s song.” Once it was discovered that T-5 was reluctant to attend sessions because he did not want to receive more homework pages, his parents were instructed in strategies to help make homework more enjoyable. After these changes were made, T-5 became more willing to attend sessions with fewer refusals and less crying. He also became more interactive with clinicians and participated more in group activities during the second half of the treatment period. Given his initial low scores on the APLS, it is also possible he was unable to participate as fully in the treatment sessions near the beginning of the treatment period due to the differences between him and the rest of the treatment group participants. As he began to understand some of the concepts and activities repeatedly targeted throughout the treatment, he participated more.

T-5 also seemed to be generally farther behind other participants at the onset of the study. An example of this was with his drawing abilities. All of the participants were able to copy the simple step-by-step directions for drawing basic lines and shapes except for T-5, who was unable to perform any of the basic copying skills without one-on-one, hand-over-hand assistance in the first
treatment session. Copies of the first drawings for each treatment group participant can be found in Appendix H. T-5 also interacted less with the other participants, rarely participated verbally during initial sessions, was more easily upset (e.g., crying when his grandmother left the treatment room), and was less engaged with the clinicians compared to the other treatment group participants.

It is possible that T-5 would have benefited greatly from additional treatment time and/or more intensive/individual treatment. He had to work during the entire 6-week treatment period to simply “catch up” to the rest of the treatment group participants’ starting abilities.

A comparison can be made between T-5 and one of the non-treatment group participants (N-2). Both of these participants’ initial pre-test scores on the APLS were low (T-5=24 points, N-2=28 points). By the end of the treatment period, T-5’s APLS score had improved to 38 points (a 14 point gain), and N-2’s APLS score had improved to 35 points (a 7 point gain). T-5 initially had the lower score, but after treatment, he outscored N-2. It is possible that the post-test score improvement of T-5 is due not to the specific treatment methods used in this study, but simply to the fact that he received treatment/attention that N-2 did not.

When phonological awareness and alphabetic knowledge subtest results are compared, T-5 demonstrated larger gains from pre-test to post-test (10 points) on phonological awareness. He exhibited smaller gains from pre-test to post-test (4 points) on the alphabetic knowledge subtest. In contrast, N-2 did not demonstrate this difference between subtests, with equivalent gains made on his
phonological awareness scores (4-point change) and his alphabetic knowledge scores (3-point change).

One other treatment group participant (T-1) demonstrated relatively low percent gains from pre- to post-treatment on the APLS. His overall score change was 16 points (70 points pre-test, 86 points post-test), with a 13-point change on the phonological awareness component (36 points pre-test, 49 points post-test) and a 3-point change on the alphabetic knowledge component (34 points pre-test, 37 points post-test). The reason for this smaller gain was most likely due to his high initial treatment score of 70 points. With a high initial score, changes would be expected to be less dramatic. The most difficult tasks on the APLS are designed for first-grade students, and the participants in this study were all pre-kindergarten age. It was not expected, therefore, for any of the participants to score at 100 points on the APLS during either pre- or post-testing situations.

It is also notable that the participant who made the greatest changes from pre-test to post-test (T-4; 42 points pre-test, 79 points post-test) was the participant with the most impaired original expressive phonology before receiving phonology treatment (based on his HAPP-3 TOMPD of 194). This participant made equivalent gains on both the phonological awareness (19 points improvement) and alphabetic knowledge (18 points improvement) components of the APLS.

Additional Comments

There were several limitations to this study. First, the number was small; there were only 5 treatment group participants and only 2 in the non-treatment
group. The non-treatment children did not receive services of any kind during the treatment period; thus it cannot be concluded that the pre- to post-treatment changes evidenced in the treatment group were due to the specific treatment used.

Additionally, the participants in this study received treatment for only 6 weeks. It was apparent in the case of one participant that this time frame was inadequate for him to demonstrate large gains in phonological awareness and alphabetic knowledge.

Further research in this area is needed. Research should include random assignment of more participants in larger treatment and non-treatment groups and a longer duration of treatment. Participants should include not only pre-kindergarten boys with histories of expressive phonological impairments, but also girls, children of varying ages, and children from varying socioeconomic backgrounds. A variety of treatment strategies should be compared with multiple treatment groups. Studies are needed involving children with expressive phonological impairments that are not contaminated by additional language deficits. These treatment outcomes should be compared with children possessing a variety of other language/learning disorders as well as children with no history of developmental, language, and/or learning delays. Finally, a longitudinal study should be conducted evaluating the long-term effects of improving phonological awareness and alphabetic knowledge on later literacy and school success.
LIST OF REFERENCES
REFERENCES


Hodson, B. W. (2005). *Assessment of primary literacy skills.* Unpublished manuscript, Wichita State University, KS.


APPENDIXES
APPENDIX A

ANIMATED-LITERACY OVERVIEW

In the following, Animated-Literacy (Stone, 2004) and the theoretical foundations that this program is based upon are addressed. All lessons in Animated-Literacy follow a basic structure or lesson plan that is described here. There are four main elements to Animated-Literacy: Alphabet characters, drawing, pattern songs, and toybox, each of which is discussed individually in the following sections.

*The Basic Lesson Plan*

Animated-Literacy is based on a whole → part → whole premise of learning. This model of learning can be seen in infants as they learn language. First, they learn the prosodic elements of their language before they are born and during the first few months of life (DeCasper, Lecanuet, Busnel, Granier-Deferre, & Maugeais, 1994). The prosody of language provides them with an emotional framework that serves as the “whole” or the context within which the rest of their language acquisition will fall into. Immediately after birth, infants begin to communicate by copying facial expressions, followed by gestural interactions (Meltzoff & Moore, 1983). The next elements of language that infants experiment with and learn about are individual speech sounds and combinations within their native language. The manipulation of these sounds constitutes the “part” or decontextualized element of their early language learning. Finally, children begin to combine their sound manipulations into meaningful units of words followed by
phrases and sentences, thus completing the cycle back to a meaningful “whole” complete with contextual meaning.

Every lesson in Animated-Literacy follows a similar sequence by beginning with accessing prior knowledge to enhance the learning opportunities presented to children during the lesson. Prior knowledge is first accessed through group discussions relating to the subject material that will be presented in the lesson. Following the access of prior knowledge, more context is added through the reading of stories related to the topic or theme of the lesson. Once a rich context for the lesson has been established, the new material that is the main component of the lesson is presented. This material is accompanied by stories, songs, gestures, and toys to further build a rich context, to provide novelty and complexity, to aid in comprehension of lesson material, and to encourage active participation in the lesson. Once the primary elements of the lesson have been introduced within the context provided, the context is removed to allow for focused practice of the specific skill presented in the lesson. The focused practice allows for mastery of the skill so that automaticity may eventually be attained. Following the focused practice, the new skill is returned to context and prior knowledge by inserting it into skills and routines learned in previous lessons.

In this way, Animated-Literacy follows a developmental sequence and provides children with multiple opportunities to learn new information and connect it to prior knowledge and context while still obtaining enough practice at
each skill to achieve mastery and automaticity. A sample lesson plan is located in Appendix C.

**Alphabet Characters**

Alphabet characters are utilized to teach letter knowledge and phoneme-grapheme correspondence. There is one alphabet character for each phoneme in the English language (45 total). Each alphabet character is introduced through a story that involves bombardment of that character's phoneme. The story is followed by a gesture that is associated with the character's action, and a short song that summarizes the story, presents the context for the gesture, and introduces the letter(s) and/or spelling patterns that are associated with the character's sound. A list that includes each character along with its phoneme and gesture and Stone's (2004) order to present them is available in Appendix G.

The use of gestures in association with each phoneme is supported by evidence in speech development that speech follows and is determined by actions during early stages and only later in development can speech precede and determine actions (Vygotsky, 1978). Once the individual gesture for a character is learned, it is used in conjunction with other character gestures to aid in sound segmentation and blending activities.

The character songs are associated with gestures and finger plays that are designed to increase vocabulary comprehension within the song. The musical element of each character's song serves to provide emotional relevance, novelty, and increased context for the gestures associated with the character's
story. All of these elements further aid the children in learning and retaining information about the character, phoneme, gesture, and spelling patterns.

**Drawing and Labeling**

The drawing and labeling component follows each new alphabet character and provides a context for the character’s sound to be used in text. The drawings are designed to provide a strong emotional context for initial instruction in sound segmentation and blending with each new phoneme and gesture as well as an opportunity for beginning to utilize orthographic patterns for phonemes and gestures. Once again, Vygotsky’s (1978) premise of actions determining words before words can determine actions is utilized with the drawing by allowing children to have a concrete, emotionally salient object that will incorporate each new phoneme.

The order in which drawings are presented is dependent on the order the alphabet characters are presented, because each drawing’s label uses only the phonemes that have already been introduced. A complete list of the original drawing sequence as they correspond to each character suggested by Stone (2004) can be found in Appendix G.

**Pattern Sound and Word Substitution Songs**

The pattern sound and word substitution song component of Animated-Literacy adapts a variety of traditional children’s songs for teaching elements of sound manipulation, rhyming, and grammatical structure by substituting elements of each song and manipulating sounds, rimes, or words. The sound manipulation songs teach onset-rime segmentation and manipulation, initial phoneme isolation
and substitution, vowel isolation and manipulation, syllable segmentation and counting, and phoneme blending. The rhyming songs teach rhyming pair identification, matching, and rhyme generation with both nonsensical and real words. The word substitution songs teach parts of speech including noun, adjective, pronoun, verb, preposition, and conjunction, as well as grammatical rules such as cohesiveness and agreement. The word substitution songs also build vocabulary through encouraging use of low-frequency words.

The pattern song activities are modeled after stages of speech development in children. The sound manipulation songs are modeled after patterns of babbling and sound play (Golinkoff & Hirsh-Pasek, 1999). The pattern song activities provide a rich context in which to practice these skills. Skills are practiced within the context of the song initially, then are removed from that context and taught explicitly to encourage additional practice in these skills. Once songs are sung, song frames are filled out by children, allowing them to build writing and spelling skills within the rich emotional context of each song as well as encouraging fluency through repeated reading of these familiar songs.

A “Toybox” of Reading Manipulatives

The final component of Animated-Literacy is the “toybox” of reading manipulatives, which allows children to practice skills of phoneme segmentation, blending, and rhyme matching and generation. This component includes a cabinet of toys organized by vowel sounds that are used to provide the context for children to practice using character gestures and phonemes to label toys. This labeling activity also follows the natural development and language usage of
children, who spend much of their early speech labeling objects and requesting labels for other objects (Golinkoff & Hirsh-Pasek, 1999). The use of the “toybox” of reading manipulatives progresses from reading labels and matching words with toys to sentence construction and comprehension. During these activities, students learn to decode and read sentences and use manipulatives to illustrate their meaning. These activities begin with simple two, three, and four word sentences and progress to sentences of greater length and complexity.
PARENT CONSENT FORM

PURPOSE: Your child is invited to participate in a study of phonological awareness intervention. We hope to learn if the incorporation of music in teaching phonological awareness can be effective for children with phonological speech deficits.

PARTICIPANT SELECTION: Your child was selected as a possible participant in this study, is between the ages of 4 and 5 years old, and has received treatment for phonological speech deficits.

EXPLANATION OF PROCEDURES: If you decide to have your child participate, he/she will be tested in language, phonological awareness, and speech sound production both before and after treatment. The treatment will consist of six weeks of group (two, 2-hour sessions per week) instruction in phonological awareness using the activities of singing, reading, discussing, and playing games. The treatment and the tests will be provided by students in the Department of Communication Sciences and Disorders at Wichita State University, who will be supervised by the faculty advisors involved in this research project.

DISCOMFORT/RISKS: There will be no risks or discomforts.

BENEFITS: Your child will benefit from participation in this study by receiving instruction in phonological awareness: an important pre-reading skill that will help them perform better in school and have greater chances for literacy success.

CONFIDENTIALITY: Any information obtained in this study in which you can be identified will remain confidential and will be disclosed only with your permission.

COMPENSATION OR TREATMENT: Wichita State University does not provide medical treatment or other forms of reimbursement to persons injured as a result of or in connection with participation in research activities conducted by Wichita State University or its faculty, staff, or students. If you believe that you have been injured as a result of participating in the research covered by this consent form, you can contact the Office of Research Administration, Wichita State University, Wichita, KS 67260-0007, telephone (316) 978-3285.

REFUSAL/WITHDRAWAL: Participation in this study is entirely voluntary. Your decision whether or not to participate will not affect your future relations with Wichita State University and/or Wichita State University Speech and Hearing Clinic. If you agree to participate in this study, you are free to withdraw from the study at any time without penalty.

CONTACT: If you have any questions about this research, you can contact me at: Kimberly Stone, Wichita State University Box 99, (316)691-5818 or Barbara Hodson, Wichita State University Box 75, (316)978-6342. If you have questions pertaining to your rights as a research subject, or about research-related injury, you can contact the Office of Research Administration at Wichita State University, Wichita, KS 67260-0007, telephone (316) 978-3285.

You are under no obligation to participate in this study. Your signature indicates that you have read the information provided above and have voluntarily decided to participate.

You will be given a copy of this consent form to keep.

_______________________________     ____________________________      _____________________
Signature of Parent or Legal Guardian      Name of Child      Date

_____________________________________________                         __________________________
Witness Signature                                                                                                   Date
APPENDIX C
SAMPLE LESSON PLAN

Polly Panda

Step 1: Access Prior Knowledge
- Discuss traveling to school, painting, favorite colors, and/or favorite subjects in school

Step 2: Read Related Literature
- Spot Goes To School (Hill, 1984)
- Mouse Paint (Walsh, 1989)

Step 3: Tell Polly Panda’s Story
- A panda that attends preschool and paints the letter “p” on various items.

Step 4: Introduce Polly Panda’s Sound and Gesture

Step 5: Sing and Gesture Polly Panda’s Song

Step 6: Use Polly’s Sound and Gesture to Sing “Are You Sleeping”
APPENDIX D

DAILY LIST OF LESSONS

Monday, June 6
Introduction Name Game
Are You Sleeping (Insert first sound in children’s names into bell sounds)
Polly Panda
Break
Uncle Upton
Pup Drawing

Wednesday, June 8
Are You Sleeping (Character names and vowel vs. consonant contrast introduction)
Ollie Ostrich
Pop Drawing
Break
Mimi Mermaid
Mom Drawing

Monday, June 13
Are You Sleeping (Introduce Old MacDonald and animal sounds)
Timmy Tiger
Top Drawing
Break
A Hunting We Will Go (Rhyming pair matching)
Baby Barnaby
Tub Drawing

Wednesday, June 15
Are You Sleeping (Combine character sounds with animal sounds)
Leaping Eve
Bee Drawing
Break
A Hunting We Will Go (Matching toys in rhyming pairs)
Crazy Camel
Pup In Cup Drawing

Monday, June 20
Are You Sleeping (Character sounds and animal sounds)
Bay Ai Bay
Actress Annie
Cat Drawing
Break
Here Sits A Monkey (Match toys in rhyming pairs)
Toybox (Segment and blend phonemes)
Nellie Newt
Ant Drawing

Wednesday, June 22
Are You Sleeping (Introduce consonant clusters with bell sounds)
Apples and Bananas (Introduce vowel substitution)
Rosie Raccoon
Rat Drawing
Here Sits A Monkey (Additional rhyming pairs and triplets)
Break
Toybox (Segment and blend phonemes)
Lou Lou Moose
Moon Drawing

Monday, June 27
Are You Sleeping (Consonant clusters and animal sounds)
Griselda Green
Gum Drawing
Apples and Bananas (Vowel substitution in new foods)
Break
It Ain’t Gonna Rain No More (Reverse order of rhyming pairs and triplets)
Toybox (Segment and blend phonemes)
Edgar Elf
Tent Drawing

Wednesday, June 29
Are You Sleeping (Consonant clusters and animal sounds)
Sadie Seal
Apples and Bananas (New foods and vowel counting)
Sun Drawing
Break
It Ain’t Gonna Rain No More (Rhyme generation without toys)
Arnie Aardvark
Toybox (Segment and blend phonemes)
Star Drawing

Wednesday, July 6
Are You Sleeping (Consonant clusters and animal sounds)
Apples and Bananas (Syllable counting with foods)
Lonnie Lion
Lamb Drawing
Break
Bubble Gum Song (Introduce new rhyme structure, initial phoneme substitution)
Toybox
Grouchy Owl and Brown Mouse
Owl Drawing

Monday, July 11
Are You Sleeping (Sound blending into words)
Jenny Jaguar
Apples and Bananas (Identify vowel from name and substitute into foods)
Jeep Drawing
Break
Pig Latin (Introduce song and concept with short words)
Kimmy Kangaroo
Toybox
Bubble Gum Song (Rhyme generation)
Mask Drawing

Wednesday, July 13
Are You Sleeping (Sound blending into words)
Apples and Bananas (Names and foods)
Sheriff Shadrack
Toybox
Shark Drawing
Break
Pig Latin (Practice words)
Whirling Irving
Charlie Over The Ocean (Rhyme generation)
Girl Drawing

Monday, July 18
Are You Sleeping (Review)
Apples and Bananas (Review)
Daisy Dragon
Bird Drawing
Break
Pig Latin (Practice words)
Ike
Charlie Over the Ocean (Rhyme generation)
Bike Drawing
## APPENDIX E

### ADAPTED ANIMATED-LITERACY CHARACTER AND DRAWING SEQUENCE

<table>
<thead>
<tr>
<th>Phoneme (Grapheme)</th>
<th>Alphabet Character</th>
<th>Gesture</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/ (P)</td>
<td>Polly Panda</td>
<td>Painting</td>
<td>See /ʌ/</td>
</tr>
<tr>
<td>/ʌ/ (short U)</td>
<td>Uncle Upton</td>
<td>Pointing up</td>
<td>PUP</td>
</tr>
<tr>
<td>/a/ (short O)</td>
<td>Ollie Ostrich</td>
<td>Pointing in mouth</td>
<td>POP</td>
</tr>
<tr>
<td>/m/ (M)</td>
<td>Mimi Mermaid</td>
<td>Moving a mop</td>
<td>MOM</td>
</tr>
<tr>
<td>/t/ (T)</td>
<td>Timmy Tiger</td>
<td>Tickling</td>
<td>TOP</td>
</tr>
<tr>
<td>/b/ (B)</td>
<td>Baby Barnaby</td>
<td>Bowing</td>
<td>TUB</td>
</tr>
<tr>
<td>/i/ (long E)</td>
<td>Leaping Eve</td>
<td>One hand leaping over other</td>
<td>BEE</td>
</tr>
<tr>
<td>/k/ (C)</td>
<td>Crazy Camel</td>
<td>Crunching with hands</td>
<td>CUP</td>
</tr>
<tr>
<td>/æ/ (short A)</td>
<td>Actress Annie</td>
<td>Making addition sign with arms</td>
<td>CAT</td>
</tr>
<tr>
<td>/n/ (N)</td>
<td>Nellie Newt</td>
<td>Nibbling on fingers</td>
<td>ANT</td>
</tr>
<tr>
<td>/r/ (prevocalic R)</td>
<td>Rosie Raccoon</td>
<td>Roping</td>
<td>RAT</td>
</tr>
<tr>
<td>/u/ (long OO)</td>
<td>Lou Lou Moose</td>
<td>Wiggling loose tooth</td>
<td>MOON</td>
</tr>
<tr>
<td>/g/ (G)</td>
<td>Gilda Goose</td>
<td>Gliding/flying</td>
<td>GUM</td>
</tr>
<tr>
<td>/ɛ/ (short E)</td>
<td>Edgar Elf</td>
<td>Exercising/flexing muscles</td>
<td>TENT</td>
</tr>
<tr>
<td>/s/ (S)</td>
<td>Sadie Seal</td>
<td>Surfing/swimming</td>
<td>SUN</td>
</tr>
<tr>
<td>Phoneme (Grapheme)</td>
<td>Alphabet Character</td>
<td>Gesture</td>
<td>Drawing</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>/aə/ (postvocalic AR)</td>
<td>Arnie Aardvark</td>
<td>Reaching up with one arm</td>
<td>STAR</td>
</tr>
<tr>
<td>/l/ (L)</td>
<td>Lonnie Lion &amp; Lizzy Lamb</td>
<td>Sleeping/laying head down</td>
<td>LAMB</td>
</tr>
<tr>
<td>/aʊ/ (OW)</td>
<td>Grouchy Owl &amp; Brown Mouse</td>
<td>Holding side of head</td>
<td>OWL</td>
</tr>
<tr>
<td>/dʒ/ (J)</td>
<td>Jenny Jaguar</td>
<td>Juggling</td>
<td>JEEP</td>
</tr>
<tr>
<td>/k/ (K)</td>
<td>Kimmy Kangaroo</td>
<td>Blowing kisses</td>
<td>MASK</td>
</tr>
<tr>
<td>/ʃ/ (SH)</td>
<td>Sheriff Shadrack</td>
<td>Shaving</td>
<td>SHARK</td>
</tr>
<tr>
<td>/ɜː/ (postvocalic ER)</td>
<td>Whirling Irving</td>
<td>Turning steering wheel</td>
<td>GIRL</td>
</tr>
<tr>
<td>/d/ (D)</td>
<td>Daisy Dragon</td>
<td>Dancing</td>
<td>BIRD</td>
</tr>
<tr>
<td>/aɪ/ (long I)</td>
<td>Ike</td>
<td>Pedaling bicycle with hands</td>
<td>BIKE</td>
</tr>
</tbody>
</table>
## APPENDIX F

### PATTERN SONGS

<table>
<thead>
<tr>
<th>Song Title</th>
<th>Pattern Substituted</th>
<th>Phonological Awareness Element Targeted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are You Sleeping?</td>
<td>Onset and rhyme of bell sound</td>
<td>Phoneme substitution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Establish vowel vs. consonant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phoneme-grapheme correspondence</td>
</tr>
<tr>
<td>Apples and Bananas</td>
<td>Vowel sound in various foods</td>
<td>Phoneme substitution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vowel isolation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syllable segmentation/ counting</td>
</tr>
<tr>
<td>Bay “A” Bay</td>
<td>Initial consonants</td>
<td>Phoneme substitution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phoneme-grapheme correspondence</td>
</tr>
<tr>
<td>A Hunting We Will Go</td>
<td>Rhyming pairs</td>
<td>Rhyme identification/matching</td>
</tr>
<tr>
<td>Here Sits A Monkey in the Tree</td>
<td>Rhyming pairs</td>
<td>(provides new context for pairs from A Hunting We Will Go)</td>
</tr>
<tr>
<td>It Ain’t Gonna Rain No More</td>
<td>Rhymes (multiple words per rime)</td>
<td>Rhyme identification/matching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(provides new context for rhyme pairs as well as reversing order rhymes are presented)</td>
</tr>
<tr>
<td>Charlie Over The Ocean</td>
<td>Rhymes (more than 2 rhymes per verse that are not semantically bound)</td>
<td>Rhyme generation</td>
</tr>
<tr>
<td>Bubble Gum Song</td>
<td>Rhymes (change surrounding phrase to make pair meaningful)</td>
<td>Rhyme generation</td>
</tr>
<tr>
<td></td>
<td>Initial consonants</td>
<td>Phoneme substitution</td>
</tr>
</tbody>
</table>
### APPENDIX G

**ORIGINAL ANIMATED-LITERACY CHARACTER AND DRAWING SEQUENCE**

<table>
<thead>
<tr>
<th>Phoneme (Grapheme)</th>
<th>Alphabet Character</th>
<th>Gesture</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/ (P)</td>
<td>Polly Panda</td>
<td>Painting</td>
<td>See /ʌ/</td>
</tr>
<tr>
<td>/ʌ/ (short U)</td>
<td>Uncle Upton</td>
<td>Pointing up</td>
<td>PUP</td>
</tr>
<tr>
<td>/a/ (short O)</td>
<td>Ollie Ostrich</td>
<td>Pointing in mouth</td>
<td>POP</td>
</tr>
<tr>
<td>/m/ (M)</td>
<td>Mimi Mermaid</td>
<td>Moving a mop</td>
<td>MOP</td>
</tr>
<tr>
<td>/ks/ (X)</td>
<td>Max Ox and Felix Fox</td>
<td>Relaxing</td>
<td>OX</td>
</tr>
<tr>
<td>/æ/ (short A)</td>
<td>Actress Annie</td>
<td>Making addition sign with arms</td>
<td>AX</td>
</tr>
<tr>
<td>/d/ (D)</td>
<td>Daisy Dragon</td>
<td>Dancing</td>
<td>DAD</td>
</tr>
<tr>
<td>/t/ (T)</td>
<td>Timmy Tiger</td>
<td>Tickling</td>
<td>TOP</td>
</tr>
<tr>
<td>/s/ (S)</td>
<td>Sadie Seal</td>
<td>Surfing</td>
<td>STOP</td>
</tr>
<tr>
<td>/r/ (prevocalic R)</td>
<td>Rosie Raccoon</td>
<td>Roping</td>
<td>RAT</td>
</tr>
<tr>
<td>/h/ (H)</td>
<td>Hippy Hippo</td>
<td>Humming on harmonica</td>
<td>RAT IN HAT</td>
</tr>
<tr>
<td>/aə/ (postvocalic AR)</td>
<td>Arnie Aardvark</td>
<td>Reaching up with one arm</td>
<td>STAR</td>
</tr>
<tr>
<td>/dʒ/ (J)</td>
<td>Jenny Jaguar</td>
<td>Juggling</td>
<td>JAM</td>
</tr>
<tr>
<td>/k/ (K)</td>
<td>Kimmy Kangaroo</td>
<td>Blowing kisses</td>
<td>MASK</td>
</tr>
<tr>
<td>Phoneme (Grapheme)</td>
<td>Alphabet Character</td>
<td>Gesture</td>
<td>Drawing</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>/f/ (F)</td>
<td>Farley Fox</td>
<td>Fishing</td>
<td>FOX</td>
</tr>
<tr>
<td>/b/ (B)</td>
<td>Baby Barnaby</td>
<td>Bowing/bending</td>
<td>BUS</td>
</tr>
<tr>
<td>/g/ (G)</td>
<td>Gilda Goose/Griselda Green</td>
<td>Gliding/flying</td>
<td>GUM</td>
</tr>
<tr>
<td>/k/ (C)</td>
<td>Crazy Camel</td>
<td>Crunching with hands</td>
<td>CAT</td>
</tr>
<tr>
<td>/l/ (L)</td>
<td>Lonnie Lion &amp; Lizzy Lamb</td>
<td>Sleeping/laying head down</td>
<td>LAMB</td>
</tr>
<tr>
<td>/e/ (short E)</td>
<td>Edgar Elf</td>
<td>Exercising/flexing muscles</td>
<td>ELF</td>
</tr>
<tr>
<td>/θ/ , /ð/ (TH)</td>
<td>Thick Thorny Thing</td>
<td>Holding throat with hands</td>
<td>BATH-TUB</td>
</tr>
<tr>
<td>/n/ (N)</td>
<td>Nellie Newt</td>
<td>Nibbling on fingers</td>
<td>HEN</td>
</tr>
<tr>
<td>/u/ (long OO)</td>
<td>Lou Lou Moose</td>
<td>Wiggling loose tooth</td>
<td>MOON</td>
</tr>
<tr>
<td>/ʊ/ (short OO)</td>
<td>Woody Woodchuck</td>
<td>Looking through binoculars</td>
<td>BOOK</td>
</tr>
<tr>
<td>/ɪ/ (short I)</td>
<td>Ichabod Ichthyosaurus</td>
<td>Itching</td>
<td>PIG</td>
</tr>
<tr>
<td>/ʃ/ (CH)</td>
<td>Chauncy Chipmunk</td>
<td>Chopping with an ax</td>
<td>CHICK</td>
</tr>
<tr>
<td>/au/ (long O)</td>
<td>Old Joe Crow</td>
<td>Rowing a rowboat</td>
<td>GOAT</td>
</tr>
<tr>
<td>/ɪ/ (long E)</td>
<td>Leaping Eve</td>
<td>One hand leaping over other</td>
<td>BEE</td>
</tr>
<tr>
<td>/w/ (W)</td>
<td>Winkie Walrus</td>
<td>Washing face</td>
<td>WELL</td>
</tr>
<tr>
<td>/æ/ (long I)</td>
<td>Ike</td>
<td>Pedaling bicycle with hands</td>
<td>KITE</td>
</tr>
<tr>
<td>Phoneme (Grapheme)</td>
<td>Alphabet Character</td>
<td>Gesture</td>
<td>Drawing</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>/au/ (OW)</td>
<td>Grouchy Owl &amp; Brown Mouse</td>
<td>Holding side of head</td>
<td>OWL</td>
</tr>
<tr>
<td>/e1/ (long A)</td>
<td>Abe the Hare</td>
<td>Roller skating with hands</td>
<td>CAKE</td>
</tr>
<tr>
<td>/ʃ/ (SH)</td>
<td>Sheriff Shadrack</td>
<td>Shaving</td>
<td>SHEEP</td>
</tr>
<tr>
<td>/ɜː/ (postvocalic ER)</td>
<td>Whirling Irving</td>
<td>Turning steering wheel</td>
<td>GIRL</td>
</tr>
<tr>
<td>/v/ (V)</td>
<td>Vinnie Vulture/ Victor Vampire</td>
<td>Vanishing behind arms</td>
<td>VAN</td>
</tr>
<tr>
<td>/j/ (Y)</td>
<td>Yakety Yak</td>
<td>Yanking a yo-yo</td>
<td>YAK</td>
</tr>
<tr>
<td>/ɔər/ (postvocalic OR)</td>
<td>Orty Orsen</td>
<td>Ordering/shaking finger</td>
<td>HORN</td>
</tr>
<tr>
<td>/kw/ (Q)</td>
<td>Quentin Quail</td>
<td>Throwing a football</td>
<td>QUEEN</td>
</tr>
<tr>
<td>/ɔɪ/ (OY)</td>
<td>Joy</td>
<td>Oiling a toy</td>
<td>BOY</td>
</tr>
<tr>
<td>/hw/, /w/ (WH)</td>
<td>White Whistling Whale</td>
<td>Whistling</td>
<td>WHALE</td>
</tr>
<tr>
<td>/z/ (Z)</td>
<td>Zackary &amp; Zena Zebras</td>
<td>Zipping a jacket</td>
<td>PRIZE</td>
</tr>
<tr>
<td>/ju/, /u/ (long U)</td>
<td>Huey the Mule &amp; June</td>
<td>Chewing</td>
<td>MULE</td>
</tr>
<tr>
<td>/ŋ/ (NG)</td>
<td>Ling &amp; Ping Pong</td>
<td>Ringing a gong</td>
<td>KING</td>
</tr>
</tbody>
</table>
APPENDIX H

PUP DRAWINGS FROM TREATMENT DAY #1

T-1