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A Comparison of Phonological Awareness Intervention Approaches

This work and its defense approved by:

Chair: Nancy A. Creaghead, Ph.D.
Rhonda Brown, Ph.D.
Jo-anne Prendeville, Ed.D.
Carolyn Sotto, Ph.D.
A Comparison Of Phonological Awareness Intervention Approaches

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2006

by

Lesley J. Raisor

B. A., University of Louisville, 1999
M.S., University of Louisville, 2001
Abstract

The predictive power of phonological awareness for later literacy outcomes has prompted educators to develop interventions targeting these skills in children at-risk for qualifying for special education services. These programs have proven successful in positively affecting later literacy achievement. However, studies comparing different intervention strategies are relatively lacking. Therefore, the purpose of the present study was to compare the effectiveness of two phonological awareness intervention strategies (drill-based and naturalistic). Forty-four at-risk preschool children were assigned to one of three groups (drill-based, naturalistic, or control group). The intervention groups received twenty minutes of intervention, twice a week for four weeks. Results indicate that both intervention methods were successful in increasing preschooler’s phonological awareness skills compared to a non-treatment control group.
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TABLE OF CONTENTS

LIST OF TABLES..............................................................................................................3

LIST OF FIGURES...........................................................................................................4

CHAPTER

I. INTRODUCTION...........................................................................................................5
   Emergent Literacy Perspective......................................................................................6
   Phonological Awareness..............................................................................................7

II. REVIEW OF THE LITERATURE..................................................................................9
   Phonological Awareness Interventions.......................................................................9
   Theoretical Considerations.........................................................................................11
      Children Require Meaningful Interactions with Literacy Materials.........................12
      Learning Environments Scaffold Children's Knowledge and Skills.......................13
      Learning is a Social Experience.............................................................................15
   Purpose.......................................................................................................................16

III. METHOD..................................................................................................................17
   Participants................................................................................................................17
   Assessment Tools/Outcome Measures.......................................................................18
   Graduate Student Training........................................................................................19
   Phonological Awareness Interventions....................................................................19
      Drill-Based Approach.............................................................................................20
      Naturalistic Approach............................................................................................21
   Data Collection/Analysis.........................................................................................23

IV. RESULTS.....................................................................................................................25
   Research Question 1 (Rhyme Discrimination)............................................................25
   Research Question 2 (Rhyme Production)..................................................................27
   Research Question 3 (Sentence Segmentation)..........................................................28
   Research Question 4 (Syllable Segmentation)...........................................................29
   Research Question 5 (Initial Sound Isolation)............................................................30
   Research Question 6 (Total Phonological Awareness)..............................................31
   Research Question 7 (Alphabet Knowledge)..............................................................33
   Research Question 8 (Print Concepts).......................................................................34
   Research Question 9 (Meaning)................................................................................35

V. DISCUSSION...............................................................................................................36
   Efficacy of Naturalistic and Drill-Based Phonological Awareness
   Interventions..............................................................................................................37
   Rhyme Discrimination/Production............................................................................39
   Sentence/Syllable Segmentation.............................................................................40
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Sound Isolation</td>
<td>41</td>
</tr>
<tr>
<td>Total Scores on the Phonological Awareness Test</td>
<td>41</td>
</tr>
<tr>
<td>Alphabet Knowledge</td>
<td>42</td>
</tr>
<tr>
<td>Print Concepts</td>
<td>42</td>
</tr>
<tr>
<td>Meaning</td>
<td>43</td>
</tr>
<tr>
<td>Selecting Intervention Approach</td>
<td>44</td>
</tr>
<tr>
<td>Areas of Future Research</td>
<td>46</td>
</tr>
<tr>
<td>Conclusion</td>
<td>47</td>
</tr>
</tbody>
</table>
LIST OF TABLES

1. Schedule of Treatment for Drill and Naturalistic Groups………………………..23

2. Means and standard deviations for pre-test and post-test measures of phonological awareness subtests for naturalistic and drill intervention groups and control group………………………………………………………..26
LIST OF FIGURES

1. Mean scores for rhyme discrimination subtest of drill and naturalistic intervention groups and control group before and after intervention…………………………………………………………..27

2. Mean scores for rhyme production subtest of drill and naturalistic intervention groups and control group before and after intervention…………………………………………………28

3. Mean scores for sentence segmentation subtest of drill and naturalistic intervention groups and control group before and after intervention………………………………………………………29

4. Mean scores for syllable segmentation subtest of drill and naturalistic intervention groups and control group before and after intervention…………………………………………………….30

5. Mean scores for initial sound isolation subtest of drill and naturalistic intervention groups and control group before and after intervention………………………………………………………….31

6. Mean scores for total phonological awareness subtest of drill and naturalistic intervention groups and control group before and after intervention……………………………..32

7. Mean scores for alphabet knowledge subtest of drill and naturalistic intervention groups and control group before and after intervention. ............................................................33

8. Mean scores for print concepts subtest of drill and naturalistic intervention groups and control group before and after intervention………………………………………………………34

9. Mean scores for meaning subtest of drill and naturalistic intervention groups and control group before and after intervention……………………………………………………………..35
A Comparison of Phonological Awareness Intervention Approaches

Chapter I

Introduction

In a literate society, learning to read is fundamental for a child’s academic achievement. A child who reads well gains crucial experience with texts, increasing his/her knowledge in other academic domains. In contrast, a child who has more difficulty acquiring early reading skills often falls behind his/her peers not only in reading ability, but in other academic content areas as well (Allington, 1984; Cunningham & Stanovich, 1998; Stanovich, 1986; Whitehurst & Lonigan, 2002). Due to the importance of literacy to all areas of an academic curriculum, early reading skills are essential for a child’s success in school. Yet, it is estimated that more than 30% of children experience difficulty in learning to read (Shaywitz, et al., 1992). Further, children who have difficulty acquiring early literacy skills rarely catch up with their peers who read well (Stevenson & Newman, 1986; Torgeson, Wagner, Rashotte, Alexander, & Conroy, 1997), and they are at risk for qualifying for special education services (Lentz, 1988; Whitehurst & Lonigan, 2002).

Children from poverty are at unique risk for experiencing difficulties in learning to read (Alexander & Entwisle, 1996; Snow, Barnes, Chandler, Goodman, & Hemphill, 1991). Often, children from lower socio-economic backgrounds enter school lacking essential early literacy experiences compared to their middle- and upper-income peers. Further, these children are more likely to have problems acquiring oral language skills (Lonigan & Whitehurst, 1998) and other skills, such as print awareness and phonological awareness, thought to be precursors to literacy (Bowey, 1995; MacLean, Bryant, & Bradley, 1987). However, learning to read is greatly impacted by these vital early literacy skills (Whitehurst & Lonigan, 2002; 1998). Because many
children from poverty enter school without a strong foundation of early literacy skills, they are often not ready for the reading instruction that they will encounter in kindergarten and first grade (Snow, Barnes, Chandler, Goodman, & Hemphill, 1991). Children from poverty who additionally experience speech and language delays are at even greater risk for not being prepared for reading instruction (Whitehurst & Lonigan, 2002). Therefore, the importance of the period of literacy development prior to formal schooling (the emergent literacy period) has taken on new significance in the prevention of reading difficulties and academic failure (Whitehurst & Lonigan, 2002).

Emergent Literacy Perspective

The emergent literacy period may be defined as the time in which preschool children learn the foundations of literacy (Catts & Kamhi, 1999). The emergent literacy perspective of early literacy development gained prominence in the 1980’s and is grounded in the socio-cultural theory of child development. As opposed to earlier theories of literacy development, the emergent literacy perspective places importance on what children bring with them to an educational experience (Teale & Sulzby, 1986; Strickland & Morrow, 1989). In the past, reading readiness programs dominated classrooms. These programs were designed to foster auditory and visual discrimination, listening and speaking skills, letter recognition, and knowledge of letter-sound correspondence (Teale & Yokota, 2000). However, by the 1980’s researchers started to recognize the importance of the literacy behaviors (especially the social literacy behaviors) that occur during the birth-five age span.

During this period of development, young children gain oral language abilities, knowledge about print conventions (i.e. print follows left-to-right and top-to-bottom), and awareness of the sound structure of language (i.e. language is made up of words which are in
turn made up of sounds) (Whitehurst, 2000). Although each of these early literacy skills are important for reading development, it is this last ability (often termed phonological awareness or phonological sensitivity) that has received the most attention in early literacy research lately.

**Phonological awareness is the conscious attention to the sound structure of language.** It is a broad skill that includes awareness of phonological strings, awareness of syllables, awareness of phonemes, and awareness of phonetic features (Morias, Alegria, & Content, 1986).

*Phonological Awareness*

Across many disciplines, researchers have demonstrated that young children’s ability to demonstrate phonological awareness (detect/produce rhyme and alliteration, and segment words into phonemes) is a strong predictor of their decoding abilities in later childhood (Bradley & Bryant, 1983; Lieberman, 1974; Roth et al., 1995). It is thought that children who are able to recognize and manipulate sound patterns in oral language in early childhood have the necessary skills to recognize and manipulate patterns in written language—an important early decoding skill (Goswami, 2002). Phonological awareness skills begin to emerge in preschool and appear to follow a typical path of development. Adams (1990) delineated five levels of phonological awareness that define its development. The ability to detect rhyme and alliteration is thought to be the most primitive level. An example of this would be a child’s ability to become aware of rhyme and alliteration in nursery rhymes. Oddity tasks that require a child to determine which word has a different sound (first, middle, or last) than the others in a group of words usually develop next. Third, splitting syllables (separating the onset from the rime) and blending words orally develop. Following that, is the ability to perform phonemic segmentation (tapping the phonemes in words). Finally, the ability to carry out phonemic manipulation tasks develops.
Adams argues that the first four skills usually appear before a child starts kindergarten, while the last skill usually does not emerge until first grade.

Like Adams, Metsala and Walley (1998) have also studied the development of phonological awareness skills, and they have proposed the *lexical restructuring theory* to explain its progression. This theory draws upon how a young child represents the phonological features of his/her growing vocabulary. As a toddler gains more and more vocabulary, he/she must represent the words in the brain in a way that will distinguish them from other words. By the time a young child reaches preschool, she must begin to represent sequences of sounds, or the *segmental phonology* of the words she knows. According to the lexical restructuring theory, segmental representations come about primarily because of expressive vocabulary growth, and it is the degree to which segmental representation has taken place that will determine how easily a child will become phonologically aware (Goswami, 2002).
Chapter II
Literature Review

Phonological Awareness Interventions

The predictive power of phonological awareness for later literacy outcomes has prompted many educators to develop early interventions targeting phonological awareness skills in children at-risk for qualifying for special education services. These training programs have proven successful in positively affecting later literacy achievement (Ball & Blackman 1991; Bradley & Bryant, 1983; Herrera, 1993; Lundberg et al. 1988; Schneider et al., 1997). For example, Ball and Blachman (1991) studied the effects of a traditional classroom-based phonological awareness intervention that involved a total of only 15 hours of direct intervention. Kindergarteners (placed in groups of four or five) were taught to use tiles to represent phonemes in words. They were also engaged in segmentation activities and tasks that targeted letter-sound correspondence. The results of the research revealed large gains in not only phoneme segmentation ability, but also in reading and spelling (Blackman, 1991).

Another traditional approach to skill-training, Lindamood-Bell (a popular commercial program) used analytical word activities that included teaching children how sounds are made with the mouth and tongue for sound awareness. The program demonstrated success in increasing the phonological awareness skills of preschoolers, although the researchers found that more extensive training may be required for phonologically challenged children (Honig, 1996).

Gillon (2000) developed a structured phonological awareness program to train these skills in children with speech and language impairments. Children’s awareness of syllables, rhymes, and phonemes increased after intervention. Likewise, in a review of 52 studies related to phonological awareness training, the National Reading Panel (2000) discovered that
phonological awareness training exerts a strong and significant impact on reading and spelling development of children at-risk for reading disabilities. However, most of these interventions have targeted phonological awareness skills in a highly structured, drill-type format that is grounded in more of the reading readiness perspective. Although children exposed to these interventions made gains in phonological awareness skills, the traditional drill-type methodology employed in the interventions stands in contrast to the constructivist philosophy of the emergent literacy construct. As opposed to earlier theories of literacy development, the emergent literacy perspective places importance on what children bring with them to an educational experience.

McGee & Purcell-Gates (1997) argued that traditional approaches to phonological awareness training (like the drill-type approaches discussed above) are removed from children’s daily literacy experiences and are not responsive to individual differences in children’s knowledge. Likewise, the National Reading Panel (2000) has argued that phonological awareness instruction should be integrated into a child’s general literacy learning. Further, although many of the traditional drill approaches have been effective in increasing the skills of school-aged children (five and six-year-olds), this training approach may not be developmentally appropriate for younger preschool children.

Despite the fact that most phonological awareness interventions are drill-based, some researchers have described methodologies that are more naturalistic. For example, Richgels, Poremba, and McGee (1996) studied an approach to phonological awareness training that more closely aligns with the constructivist aspects of the emergent literacy philosophy. These researchers described ways in which educators can guide children in a meaningful and functional literacy-based context for learning phonological awareness. This type of approach to phonological awareness training, often termed naturalistic or contextual phonological awareness
training, utilizes children’s books to teach children about the sounds of language. Ukrainetz et al. (2000) investigated the effects of this type of sound training in young children. They discovered that the naturalistic instruction led to gains in phonological awareness compared to a non-treatment control group. In pilot research for this project, conducted by the student-investigator during the summer of 2002, a naturalistic phonological awareness intervention (an intervention that targets phonological awareness in the context of natural literacy experiences) led to significant gains in phonological awareness skills of children with language learning problems.

Theoretical Considerations

The proposed research is based upon a diverse body of literature related to developmental theories and practice in Education, Literacy, Psychology, and Speech-Language Pathology. As discussed in an earlier section, traditional methods of training phonological awareness skills in children have relied upon a drill-approach to training. In this type of training, children are viewed as passive participants who are required to produce a response when given a stimulus (Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000). The traditional drill-approach to phonological awareness training has typically used shaping procedures, with structured hierarchies controlling task complexity (McFadden, 1998; Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000). These types of systematic drill approaches are closely aligned with the behaviorist views of learning (Ormrod, 1999). In contrast, a naturalistic approach to emergent literacy intervention draws from contemporary views of learning, particularly the socio-cultural/constructivist theories. Specifically, there are three areas that lay the conceptual framework for the development of a naturalistic phonological awareness intervention: (1) children require meaningful interactions with literacy materials; (2) optimal learning
environments **scaffold** children's knowledge and skills in a particular domain; (3) learning is a **social** experience. Each of these three areas will be discussed below.

(1) **Children require meaningful interactions with literacy materials**—In a discussion on cultivating written language development in preschool children, Vygotsky (1978) argued that children’s interactions with written language should be meaningful and incorporated into tasks that are necessary and relevant in their lives. Further, Wells (2000) has proposed that learning is not simply the acquisition of isolated skills, but involves the whole person. Therefore, optimal literacy learning environments would encourage use of authentic literacy materials (books and toys). Additionally, phonological awareness activities would be one part of a whole literacy curriculum, which supports the development of all emergent literacy skills.

The importance of shared book reading (between preschoolers and their caregivers) for oral and written language development has been well-documented (Wells, 1985; Senechel, LeFevre, Thomas, & Daley, 1998; Whithurst et al., 1988). Wells (1986) found that of several literacy-developing activities, listening to stories was the most important to later literacy development. In storybook reading practices, young children gain oral language skills and vocabulary (Fodor, 1966, as cited in Glazer & Burke, 1994) and learn all sorts of things about literacy. They acquire knowledge about print and the alphabet (Hiebert, 1988; Mason & Allen, 1986), and an understanding that print differs from speech (Morrow et al., 1990; Smith, 1989). In addition, children gain knowledge about the rhythm and cadences of written language, leading them to literate oral language (or “talking like a book”) (Snow, Tabors, Nicholson, & Kurland, 1995).

McGee and Purcell-Gates (1997) have suggested that phonological awareness interventions be incorporated into shared book reading and an entire emergent literacy
curriculum. Ukrainetz (2006) argued that phonological awareness skills are best addressed through shared book reading experiences. Further, she suggested that joint book reading routines allow multiple emergent literacy and phonological awareness skills to be addressed at one time.

Richgels, Poremba, and Mcgee (1996) qualitatively investigated a program like the one described by McGee and Purcell-Gates and Ukrainetz. This program utilized a naturalistic approach to phonological awareness training that was situated in an emergent literacy curriculum. In this study, the researchers found that phonological awareness skills can be targeted within the context of storybooks and children’s play activities. For example, in reading books, teachers can point to phonemes and ask children to detect rhyme and isolate sounds.

Ukrainetz et al. (2000) examined the effects of a naturalistic phonological awareness program that was also centered on meaningful joint book reading activities. The researchers used authentic literacy materials (books and manipulatives) in their phonological awareness intervention, which ran three times a week for seven weeks (~20 minute sessions). After analyzing the results, the investigators discovered that the naturalistic treatment was effective, as all children (including those with lower language skills) showed significant improvements in their phonological awareness abilities compared to a non-treatment control group.

(2) Optimal learning environments scaffold children’s knowledge and skills-- Vygotsky (1978) suggested that educators consider a child’s zone of proximal development when constructing learning environments. The zone of proximal development “is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). Inherent in the idea of working within a child’s zone of proximal development is the notion of scaffolding. Scaffolding occurs when
adults or more capable peers are responsive to the ability level of a learner. Through scaffolding, the more capable learning partner makes his/her responses contingent upon the ability level of the novice learner, so that the novice gradually increases his/her understanding of the problem (Wood, Bruner, & Ross, 1976).

Optimal learning environments should meet children at their developmental level, scaffolding their knowledge through meaningful interactions. Naturalistic, or contextualized instruction that utilizes scaffolding has been well developed for other areas of language interventions (Ukrainetz, 2006), and has been the predominant language intervention approach for toddlers and preschoolers (Cole, 1995; Pretti-Frontczak & Bricker, 2004). Manolson (1983) found that a child directed naturalistic interventions provides a rich language environment with supportive adult interactions scaffolding language development. Also, there is a large body of research demonstrating that the acquisition of morphsyntactic forms can be accelerated through adult modeling, prompting, and expanding (Camarata, Nelson, & Camarata, 1994; Rey, Cleave, Long, & Hughes, 1993; Girolametto, Pearace, & Weitzman, 1996).

Richgels, Poremba, and McGee (1996) utilized scaffolding in their naturalistic phonological awareness activities. The teachers involved in that project individualized group instruction by allowing other children to provide scaffolds to less competent peers in learning about the sounds of language. Ukrainetz (2006) also described creating preplanned structural scaffolds in phonological awareness training where materials, tools, and environmental conditions are carefully selected. The researchers suggested opening language intervention sessions, that target skills like phonological awareness, with sharing of a piece of literature followed by focused skills activities scaffolded around a classroom topic or thematic unit. For example, Ukrainetz et al. (2000) used scaffolding in their phonological awareness program.
These researchers made scaffolding a key element of their program, and were able to demonstrate success in increasing children’s mastery of phonological awareness skills in natural contexts.

(3) Learning is a social experience-- In a discussion of biological and cultural evolution, Donald (1991) proposed that joint activity lays the foundation for learning in an individual’s development. Likewise, Lave and Wenger (1991) have suggested that learning is an integral aspect of participation in a community. Following these theories, Gordon Wells (2000) has argued that best practice classrooms encourage a collaborative community of learners. In collaborative classrooms, children are not seen as only a collection of individuals, but instead are viewed as a community working towards shared goals. Therefore, early literacy activities should be placed in a social context.

In studies investigating best practices in storybook reading, researchers have demonstrated that children learn best from the experience when meaning is negotiated between the learners and teacher (Mandel-Morrow & Gambrell, 2002). In naturalistic phonological awareness training studies, social interactions are encouraged as more competent peers may scaffold novice participants’ knowledge of sounds (Ukrainetz et al, 2000). Social interactions cultivate students’ learning of knowledge and skills in literacy (Wells, 2000).

In summary, the conceptual framework for this study is rooted in cognitive and learning theories. Although the traditional drill approach to training phonological awareness skills is based upon early behaviorist theories of learning, naturalistic approaches in early literacy interventions are grounded in socio-cultural/constructivist theories of cognition and learning. While the research into naturalistic interventions described above is promising, systematic research comparing the effectiveness of this approach to the traditional sequenced and structured
method is lacking. Therefore, the purpose of this project was to compare the effectiveness of two types of phonological awareness programs (a structured drill approach and a naturalistic approach) in increasing the early literacy skills of preschool children at-risk for reading failure. Specifically, this study sought to answer the following research question: **Is there a significant difference among the early phonological awareness/early literacy skills of children in two intervention groups (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?**
Chapter III

Method

Participants

Research Site. This research took place at an inner city Head Start located in a large Midwestern city. The Head Start center serves approximately 150 children in six full-day and two half-day classrooms.

By virtue of the requirements for enrollment in Head Start, enrolled children and families present many of the risk factors associated with difficulties in learning to read. Additional risk factors such as specific language impairment, sensory impairment, and other developmental impairments place some children at an even greater-risk for literacy learning problems (Snow, Burns, & Griffin, 1998).

Children. Forty-five preschool children (four-year-olds) were recruited for participation in the intervention portion of the study. Thirty-four children completed the intervention. Six full-day classrooms at Creative participated during the winter/spring of 2004. There were three classrooms assigned to each treatment condition (17 assigned to drill and 17 assigned to naturalistic). Ten children from two full-day classrooms were recruited for participation in the control group portion of the study that was completed in the winter/spring of 2006. Current enrollment policies at the Head Start center states that children are randomly assigned to classrooms upon enrollment into the all-day Head Start program (thus, children were already randomly assigned to classrooms before this project begins in the winter of 2004). Although all children (ages three- and four-year-olds) participated in the intervention, only the four-year-olds were tested (and thus, paid for their participation).
Graduate Students. Eight Speech-Language Pathology master’s students from the Department of Communication Sciences and Disorders at the University of Cincinnati held the primary responsibility of testing the participants and providing the interventions. Master’s level students were chosen due to the fact that we wanted to reduce the researcher biases associated with the treatment conditions. Additionally, the use of graduate students over teachers offered better control over the proper implementation of the programs. The preparation and supervision of the participating graduate students was an important aspect of this project and will be detailed in the procedures section of the proposal.

Assessment Tools/Outcome Measures

The following assessment instruments were used to measure children’s early literacy and phonological awareness skills. The selected assessments have support from early literacy targeting the appropriate literacy skills in the pilot project of this research in the summer of 2002. The assessments were administered three times: upon enrollment into the project, following the initial four weeks of the project, and after the second four weeks of the project.

(1). Portions of The Phonological Awareness Test (Robertson & Salter, 1997): Because there is no standardized test of phonological awareness for use with children under five (see review in Justice, Invernizzi, & Meier, 2002), portions of The Phonological Awareness Test were administered informally. The portions that were used were: rhyme discrimination/production, word and syllable segmentation, and initial sound isolation. Although the administration of all testing items was considered in designing the test protocol for this project, data collected from the pilot-project (summer of 2002) revealed that including the other phonological awareness stimuli did not add anything significant to our understanding of the preschool children’s phonological awareness abilities. The four-year-old children participating
in the summer study were unable to perform the more advanced phonological awareness tasks both before and after the intervention (due to the developmental course of phonological awareness in preschoolers).

(2). The Test of Early Reading Abilities—3 (TERA-3): This is a standardized test normed on children ages 3-10 years (Reid, Hresko, Hammill, 2001). It has three subtests: alphabet knowledge, conventions (measuring children’s understanding of print concepts), and meaning (measuring children’s ability to comprehend the meaning of printed material). The TERA-3 reports standard scores (average 85-115) and percentile ranks and has two testing forms (to decrease children’s learning of the test items given multiple testing events). The test was chosen to document children’s abilities in other aspects of emergent literacy. Both tests (Phonological Awareness Test and TERA-3) report satisfactory test-retest reliability (r>.80), and each test was created with multiple testing events in mind.

Procedures

Graduate Student Training:

Graduate students were recruited from the current and incoming class of Master’s Speech-Language Pathology students. Following recruitment, graduate students were required to attend a two week-long project orientation/training. This training involved three aspects: (1) the administration of the testing protocols; (2) the implementation of the drill-approach to phonological awareness training; and (3) the implementation of the naturalistic approach to phonological awareness training. The training sessions was conducted by the student-investigator and included opportunities for supervised practice with test administration and the phonological awareness interventions.

Phonological Awareness Intervention:
Upon enrollment at the Head Start Center, parents were asked to participate in the research study. After receipt of informed consent, testing began. At this point, the graduate students employed under this project had completed the in-service concerning testing administration and procedures. Graduate students administered the Test of Early Reading Abilities—3 (TERA-3) and developmentally appropriate portions of the Phonological Awareness Test (PAT) (rhyme discrimination and production, word and syllable segmentation, and initial sound isolation).

Following the administration of the tests, intervention began. Classrooms were randomly assigned to receive the drill-approach or the naturalistic treatment. There were three classrooms in each condition. Each group received the same amount of intervention (two 20 minute sessions per week for 4 weeks).

In the winter/spring of 2006, parents of children in two randomly selected full-day classrooms at Creative Head Start were asked to participate as a control group. This control group aided the investigator in exploring the natural progression of phonological awareness skills in at-risk preschoolers.

Each intervention is detailed below.

*Drill-Based Approach.* The drill-based approach to phonological awareness treatment utilized procedures from other well-known phonological awareness studies (Lundberg, Frost, & Peterson, 1988; van Kleeck, 1995). The traditional drill-approach to phonological awareness training has typically used shaping procedures, with structured hierarchies controlling task complexity (McFadden, 1998; Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000; Gillon, 2004). Our drill-based intervention followed similar procedures. See Appendix A
A target skill was selected for a one-week period (i.e. 1st week - rhyme discrimination and production; 2nd week - word segmentation; 3rd week - syllable segmentation; 4th week - initial sound isolation). See Table 1. The graduate student targeted the skill in group instruction. For example, if the target skill for the week was rhyme discrimination, the graduate student would spend roughly five minutes giving examples and explaining the concept of rhyme. She/he then presented several pairs of words and ask children if they rhyme. Each child had at least two stimuli to which he/she would respond. For example, a child may have been asked to respond to this question, “Do man and tan rhyme?” Other skills were targeted in a similar manner.

Naturalistic Approach. The naturalistic approach to phonological awareness training was modeled after other naturalistic approaches to early literacy training reported in the literature (Richgels, Poremba, & McGee, 1996; Ukrainetz et al., 2000). As discussed in Ukrainetz (2006), a naturalistic phonological awareness intervention should include some contrived activities that are different from drill-based activities in that they incorporate scaffolding to support varying skill difficulty and support individual student responses to more than one type of phonological awareness at a time. Further, Ukrainetz (2006) suggested that these phonological awareness activities situated in a joint book reading activity allow for a variety of other language and literacy topics to be explored. Lesson plans for the naturalistic approach were those that were used for the pilot-project of this research (performed in the summer of 2002). These lesson plans were created by the student investigator after careful review of relevant literature (McGee & Purcell-Gates, 1997; Richgels, 1995; and Ukrainetz, 2000). The naturalistic intervention lesson plans are detailed in Appendix B.

A storybook was included in every session. Every session began with readiness interactions, modeled from Cochran-Smith’s (1984) research. Cochran-Smith found that one
successful preschool prepared children for storybook reading by engaging in ritualistic reading patterns. The readiness interactions were the same at each session, and included behavior cues for storybook reading (see appendix A). Each lesson plan targeted a specific skill, however, other phonological awareness skills were also addressed in each session. That is, although a lesson plan may have used a rhyming storybook and targeted children’s rhyme discrimination, other phonological awareness skills (such as initial sound isolation and word segmentation) may have been incidentally explored by the graduate student and children. See Table 1. For instance, when rhyme discrimination was the target of a particular lesson, the graduate student may have also drawn children’s attention to alliteration in the text or to syllable segmentation. As an example, during the reading of a children’s book like Buzz Said the Bee, the children were asked to fill in the story with the rhyming word (“So the hen danced a jig and sat on a _____”). Further, after the graduate student had finished reading that particular book, she/he asked children to isolate the initial sound of words in a follow-up activity that was meaning-based. For example, after reading Buzz Said the Bee (a story with farm animals), the graduate students asked children to isolate the initial sounds of food items to place with each animal (all of the food that begins with /k/ goes with the cow, and all of the food that begins with /p/ goes with the pig). There were four storybooks used in the intervention (each book and activity was performed twice).
Table 1. Schedule of Treatment for Drill and Naturalistic Groups

<table>
<thead>
<tr>
<th></th>
<th>1st week</th>
<th>2nd week</th>
<th>3rd week</th>
<th>4th week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>Rhyme Discrimination/Production</td>
<td>Sentence Segmentation</td>
<td>Syllable Segmentation</td>
<td>Initial Sound Isolation</td>
</tr>
<tr>
<td>Naturalistic</td>
<td>There Was An Old Lady-Rhyme Activity</td>
<td>Jump Frog, Jump-Sentence Segmentation</td>
<td>Mrs. McNosh Hangs Up Her Wash—Syllable Segmentation</td>
<td>Buzz Said the Bee—Initial Sound Isolation</td>
</tr>
</tbody>
</table>

Following the first four weeks of intervention, the graduate students employed under the project re-administered the testing protocol (using alternate testing forms when appropriate). As mentioned earlier, in the winter/spring of 2006, a control group was recruited from the same Head Start site. Unlike the intervention groups, the children did not receive any type of specific phonological awareness intervention between testing events other than what happened naturally in the Head Start classroom.

Anonymity/Confidentiality/Risks-Benefits. Confidentiality was preserved with the use of a tracking number. Each child was assigned a tracking number. This number was used as the identifier on all tests throughout the study. The child’s name was not included on test forms. There were not any audio/video recordings made.

Data Collection/Analysis. A repeated-measures ANOVA was used to analyze results (using SPSS software), with group assignment (one of two intervention strategies or control group) a between subjects factor and time a within subjects factor for the following measures:
Rhyme discrimination, rhyme production, sentence segmentation, syllable segmentation, initial sound segmentation, alphabet knowledge, print concepts, and meaning.
Chapter IV

Results

SPSS software was used to analyze the data collected. The means and standard deviations for all measures at pre-test and post-test for the naturalistic, drill, and control group are reported in Table 2. One-way ANOVA’s were computed for each intervention group at pre-test to ensure that intervention groups were not significantly different at pre-test. The only measure that exhibited a significant difference between intervention groups at pre-test was syllable segmentation \(p < .05\), with the naturalistic intervention group mean significantly higher than the drill or control groups.

Repeated measures ANOVA’s were computed with group assignment (naturalistic, drill, or control group) as a between-subjects factor and with time as a within-subjects factor for each measure (rhyme discrimination, rhyme production, sentence segmentation, initial sound isolation, total phonological awareness, alphabet knowledge, print concepts, and meaning). Results are presented in response to each of the research questions posed in this investigation.

Research Question 1: **Is there a significant difference among the rhyme discrimination skills of the two intervention groups (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?**

Figure 1 displays the means for Rhyme Discrimination for each intervention group with respect to testing time. A repeated measures ANOVA was computed with group assignment as a between-subjects factor and testing time a within-subjects factor for the measure of Rhyme Discrimination. The ANOVA revealed that there was not a significant intervention group effect \(F, (1, 41) = 1.0, p > .05\); however, there was a main effect for time \(F (1, 41) = 4.0, p < .05\). There was also a time/intervention group interaction effect \(F (1, 41) = 5.6, p < .05\). That is, at
pre-test there was not a difference between group means, yet, at post-test both intervention
groups’ means improved, but the control group’s mean actually declined.

Table 2. Means and Standard Deviations for Pre-test Measures of Phonological Awareness
Subtests for Naturalistic and Drill Intervention Groups and Control Group.

<table>
<thead>
<tr>
<th>Subtests</th>
<th>NAT</th>
<th>DRILL</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
<td>Pre-test</td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>AK</td>
<td>6.7 (5.7)</td>
<td>6.6 (6.1)</td>
<td>5.5 (4.8)</td>
</tr>
<tr>
<td>PC</td>
<td>3.5 (2.1)</td>
<td>4.4 (3.5)</td>
<td>3.0 (2.4)</td>
</tr>
<tr>
<td>MN</td>
<td>7.3 (2.3)</td>
<td>7.4 (1.9)</td>
<td>7.0 (1.9)</td>
</tr>
<tr>
<td>RD</td>
<td>5.7 (1.9)</td>
<td>7.2 (1.8)</td>
<td>5.5 (1.9)</td>
</tr>
<tr>
<td>RP</td>
<td>2.4 (3.3)</td>
<td>3.9 (4.4)</td>
<td>1.4 (2.3)</td>
</tr>
<tr>
<td>SNS</td>
<td>4.3 (2.7)</td>
<td>6.2 (2.1)</td>
<td>3.8 (2.9)</td>
</tr>
<tr>
<td>SYS</td>
<td>5.4 (2.8)</td>
<td>6.2 (1.5)</td>
<td>3.4 (1.8)</td>
</tr>
<tr>
<td>ISI</td>
<td>1.4 (2.6)</td>
<td>3.8 (4.4)</td>
<td>2.4 (3.6)</td>
</tr>
<tr>
<td>TPA</td>
<td>19.1 (7.5)</td>
<td>27.3 (10.6)</td>
<td>15.6 (8.5)</td>
</tr>
</tbody>
</table>

Note. AK (alphabet knowledge); PC (print concepts); MN (meaning); RD (rhyme
discrimination); RP (rhyme production); SNS (sentence segmentation); SYS (syllable
segmentation); ISI (initial sound isolation); TPA (total phonological awareness); NAT
(naturalistic group).
Figure 1. Mean Scores for Rhyme Discrimination Subtest of drill and naturalistic intervention groups and control group before and after intervention.

Research Question #2: *Is there a significant difference among the early rhyme production skills of two intervention groups (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?*

Figure 2 displays the means for Rhyme Production for each intervention group with respect to testing time. There was not a significant intervention group effect \([F (1, 41) = .4, p > .05]\). There was a significant time effect for Rhyme Production \([F (1, 41) = 5.4, p < .05]\). There was not a significant intervention/time interaction effect for this measure \([F (1, 41) = 1.9, p > .05]\). All children made gains in rhyme production over the four week period regardless of group assignment.
Research Question #3: **Is there a significant difference among the early sentence segmentation skills of two intervention groups (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?**

Figure 3 displays the means for Sentence Segmentation for each intervention group with respect to testing time. For the measure of Sentence Segmentation, there was a significant intervention main effect \( [F (1, 41) = 4.5, p < .05] \) and a significant time main effect \( [F (1, 41) = 5.3, p < .05] \). There was also an intervention/time interaction effect \( [F (1, 41) = 3.7, p < .05] \). A post hoc comparison, Tukey HSD, was used to understand the differences between the three groups (interventions and control) because there was a significant intervention effect. Tukey’s HSD revealed a significant difference between scores of naturalistic and control groups at the
time of post-test. The mean score of the children in the naturalistic group was higher than the control group ($p < .05$). There was also a significant difference between the drill and control groups. The scores of the drill-group were higher than the control group ($p < .05$). There was not a significant difference between the drill-group and naturalistic group.

Figure 3. Mean Scores for Sentence Segmentation Subtest of Drill and Naturalistic Intervention Groups and Control Group Before and After Intervention.

Research Question #4: **Is there a significant difference among the early syllable segmentation skills of two intervention groups (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?**

Figure 4 displays the means for Syllable Segmentation for each intervention group with respect to testing time. There was a significant intervention effect for Syllable Segmentation [$F (1, 41) = 7.8, p< .05$]. However, the ANOVA revealed a significant main effect for intervention group on syllable segmentation at pre-test. The naturalistic group was significantly different
than the drill and control groups at pre-test ($p < .05$). A post-hoc comparison, Tukey HSD, revealed a significant difference between scores of naturalistic and control at post-test ($p < .05$). The naturalistic mean was higher than the control mean. There was not a significant difference between the drill and control groups and the drill and naturalistic groups at post test. There was not a significant time effect [$F (1, 41) = 2.2, p > .05$] or time/intervention interaction effect [$F (1, 41) = 1.3, p > .05$].

Figure 4. Mean Scores for Syllable Segmentation Subtest of Drill and Naturalistic Intervention Groups and Control Group Before and After Intervention.

Research Question #5: Is there a significant difference among the early *initial sound* isolation skills of two intervention groups (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?
Figure 5 displays the means for Initial Sound Isolation for each intervention group with respect to testing time. For the measure of Initial Sound Isolation, there was a significant time effect \([F (1, 41) = 5.6, p< .05]\). However, there was not a significant intervention main effect \([F (1, 41) = .8, p > .05]\). Also, there was not a significant interaction effect between time and intervention group \([F (1, 41) = 1.5, p > .05]\).

Research Question #6: Is there a significant difference in the total phonological awareness skills among intervention group (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?

Figure 6 displays the means for Total Phonological Awareness for each intervention group with respect to testing time. For the measure of Total Phonological Awareness, there was
a significant intervention main effect \([F (1, 41) = 3.14, p \leq .05]\). There was also a significant time effect \([F (1, 41) = 14.5, p < .05]\). Additionally, there was an intervention/time interaction effect \([F (1, 41) = 6.3, p \leq .05]\), as there were no significant differences between the groups at pre-test, but at post-test the intervention groups’ means increased while the control group’s mean decreased. A post hoc comparison, Tukey HSD, was used to understand the differences between the three groups (interventions and control) because there was a significant intervention effect. Tukey HSD revealed that there was a significant difference between the naturalistic group and control group (naturalistic mean was higher than the control group) \((p < .05)\). There was not a significant difference between the drill and control group, nor was there a significant difference between the drill and naturalistic groups.

Figure 6. Mean Scores for Total Phonological Awareness Subtest of Drill and Naturalistic Intervention Groups and Control Group Before and After Intervention.
Research Question #7: Is there a significant difference in the alphabet knowledge skills among intervention group (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?

Figure 7 displays the means for Alphabet Knowledge for each intervention group with respect to testing time. For this measure, there was a significant interaction effect between time and intervention \[F (1, 41) = 6.3, p < .05\]. The drill group’s mean increased over time, while the naturalistic and control groups’ means declined slightly. There were no group assignment main effects \[F (1, 41) = .2, p > .05\]. Also, there was not a significant main effect for time \[F (1, 41) = 1.9, p > .05\].

Figure 7. Mean Scores for Alphabet Knowledge Subtest of Drill and Naturalistic Intervention Groups and Control Group Before and After Intervention.
Research Question #8: **Is there a significant difference in the print concepts skills among intervention group (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?**

Figure 8 displays the means for Print Concepts for each intervention group with respect to testing time. There was a significant intervention group effect for this measure \(F (1, 41) = 3.5, p < .05\). A post-hoc comparison, Tukey HSD, revealed a significant difference between the naturalistic and both the drill and control groups. The naturalistic group mean was higher than the drill group and the control group mean \((p < .05)\). There was not a significant main effect for time \(F (1, 41) = .06, p > .05\). There was not a significant time/intervention effect \(F (1, 41) = .91, p > .05\).

Figure 8. Mean Scores for Print Concepts Subtest of Drill and Naturalistic Intervention Groups and Control Group Before and After Intervention.
Research Question #9: **Is there a significant difference in the meaning skills among intervention group (drill and naturalistic) and a control group as result of a four-week phonological awareness intervention?**

Figure 9 displays the means for Meaning scores for each intervention group with respect to testing time. There was not a significant intervention main effect \[F (1, 41) = .91, p > .05\], nor was there a main effect for time \[F (1, 41) = .49, p > .05\]. Additionally, there was not an interaction effects for this measure \[F (1, 41) = .28, p > .05\].

Figure 9. Mean Scores for Meaning Subtest of Drill and Naturalistic Intervention Groups and Control Group Before and After Intervention.
Chapter V
Discussion

The purpose of the present study was to compare two phonological awareness intervention approaches for increasing the phonological awareness and early literacy skills of at-risk preschool children. Forty-four preschool children enrolled in an inner-city Head Start participated in the study and were assigned to one of three groups: naturalistic intervention, drill-based intervention, or control group. The intervention groups received four weeks of phonological awareness intervention (twice a week for twenty minute sessions). The sessions were conducted by graduate students in speech-language pathology. The control group did not receive any type of intervention, but received normal Head Start early language and literacy curriculum. The phonological awareness (rhyme discrimination, rhyme production, sentence segmentation, syllable segmentation, and initial sound isolation) and early literacy skills (alphabet knowledge, print concepts, and meaning) were assessed before and after intervention. Repeated measures ANOVA’s were computed with group assignment (naturalistic, drill, or control group) as a between-subjects factor and with time as a within-subjects factor for each measure (rhyme discrimination, rhyme production, sentence segmentation, initial sound isolation, total phonological awareness, alphabet knowledge, print concepts, and meaning). Results indicate that both the naturalistic and drill-based interventions were successful in increasing children’s rhyme discrimination, sentence segmentation, and total phonological awareness skills as interaction effects demonstrated that both interventions made gains whereas the control group either declined or remained stable over time. Additionally, in reference to print concepts, children assigned to the naturalistic group made significantly larger gains than children assigned to the drill group or the control group.
Efficacy of Naturalistic and Drill-Based Phonological Awareness Interventions

The results of this study indicate that both the naturalistic approach and drill-based strategy to phonological awareness training were effective in increasing preschool children’s rhyme discrimination, sentence segmentation, and total phonological awareness abilities compared to a non-treatment control group. These results are consistent with results of other studies regarding the efficacy of traditional drill-based phonological awareness training (Ball & Blackman 1991; Bradley & Bryant, 1983; Herrera, 1993; Lundberg et al. 1988; Schneider et al., 1997) and contextualized intervention programs (Richgels, Poremba, & McGee, 1996; Ukrainetz et al., 2000).

For example, Ball and Blachman (1991) studied the effects of a traditional drill-based classroom-based phonological awareness intervention that involved a total of only 15 hours of direct intervention. Kindergarteners (placed in groups of four or five) were taught to use tiles to represent phonemes in words. The results of the research revealed large gains in not only phoneme segmentation ability, but also in reading and spelling (Ball & Blachman, 1991). In the present study, preschoolers assigned to the drill-based intervention participated in a phonological awareness intervention that involved a total of only a little more than two and-a-half hours of direct intervention. Like children in the Ball and Blachman (1991) study, children in this study made gains in phonological awareness skills compared to a non-treatment control group.

Like Ball and Blachman, Lundberg, Frost, and Peterson (1988) studied drill-based phonological awareness in non-readers. The researchers provided 235 kindergarten children who were non-readers with training in metalinguistic awareness. The intervention group outperformed a control group on word, syllable, and phoneme segmentation and synthesis tasks. In this study, preschoolers (who were also non-readers) assigned to the drill-based phonological
awareness intervention demonstrated gains in rhyme discrimination, word segmentation, and total phonological awareness tasks.

Richgels, Poremba, and Mcgee (1996) investigated a naturalistic, or contextualized phonological awareness program that differs qualitatively from the two above described studies. This program utilized a naturalistic approach to phonological awareness training that was situated in an emergent literacy curriculum. In this study, the researchers found that phonological awareness skills can be targeted within the context of storybooks and children’s play activities. The present study utilized the methods of Richgels, Poremba and McGee and found that naturalistic phonological awareness approach can be successful in increasing children’s phonological awareness and print concepts compared to a non-treatment control group.

Ukrainetz et al. (2000) examined the effects of a naturalistic phonological awareness program that was also centered on meaningful joint book reading activities. The researchers used authentic literacy materials (books and manipulatives) in their phonological awareness intervention, which ran three times a week for seven weeks (~20 minute sessions). They discovered that the naturalistic treatment was effective, as all children (including those with lower language skills) showed significant improvements in their phonological awareness abilities compared to a non-treatment control group. We found results similar to Ukrainetz and colleagues (2000) with less intervention time, as our intervention ran for only four weeks (two times a week with 20 minute sessions). We used comparable intervention strategies as our phonological awareness interventions centered upon storybooks and meaningful interactions with literacy materials. Like Ukrainetz et al. (2000), our naturalistic intervention group made gains in phonological awareness skills compared to a control group.
It appears that both approaches (drill-based and naturalistic) can be successful for increasing the phonological awareness skills of preschoolers. Gillon (2004) suggested that both approaches to phonological awareness training (skill mastery approach, i.e. drill, and integrated multiple skill approach, i.e. naturalistic) may be useful as she set forth guiding principles to phonological awareness intervention programs.

In the following sections of this discussion, the results of the study in relation to each phonological awareness and early literacy skill targeted in the present intervention (rhyme discrimination/production, sentence/syllable segmentation, initial sound isolation, total phonological awareness, alphabet knowledge, print concepts, and meaning) will be discussed.

**Rhyme Discrimination/Production**

Both intervention groups made gains on the rhyme discrimination task, whereas the control group’s scores actually declined. Bradley & Bryant (1983) found that children made significant gains when they targeted rhyme discrimination in a traditional, drill-based way. Richgels, Poremba, and McGee (1996) found that children also made significant gains when they targeted rhyme discrimination in naturalistic way.

With respect to rhyme production, children in both groups did not make significantly larger gains than the control group. These results are similar to those of van Kleeck et al. (1998). In van Kleeck and colleagues’ study, children made gains in other phonological awareness skills, yet did not make progress in rhyme production following intervention a contextualized approach. This may be due to the metalinguistic demands made by the production task.

In the current study, it appears that many children made errors because of a semantic retrieval bias. That is, children often produced words that were semantically related to the word presented to them. For example, when asked to produce a word that rhymed with “chair,” many
times a child might respond with a word that was semantically related, like “sit.” It appears that many children in the study were not metalinguistically ready to view words outside of their semantic purpose.

Others have suggested that rhyme production may require higher cognitive processes than other measures of rhyming skills (discrimination, categorization, and oddity tasks). Perhaps the tax on phonological working memory (memory that involves temporarily holding the speech sound features of a word, so it can be analyzed or manipulated) was too much for the preschool children (Troia, 2004).

Sentence/Syllable Segmentation

In reference to the measure of sentence segmentation, significant differences were found between both intervention groups and the control group. Lundberg, Frost, and Peterson (1988) found that a drill-based intervention was successful in increasing children’s sentence segmentation abilities. Also, Ukrainetz et al. (2000) discovered that a naturalistic phonological awareness strategy increased the sentence segmentation skills of preschool children. Although many may consider sentence segmentation a part of a child’s developing metalinguistic awareness, some researchers consider it an earlier developing skill and not a part of phonological awareness. Gillam and van Kleek (1998) divided phonological awareness curricula into auditory and semantic. Auditory awareness curricula promotes listening and attention to sound. Semantic awareness involves dividing compound words into root words and segmenting sentences into words. These researchers went on to argue that awareness of words in print and how they match up to spoken words is an important aspect of learning to read, and that semantic awareness promotes treating language as an object of analysis and leads to a deeper vocabulary knowledge. However, this type of awareness is actually separate from phonological awareness.
and may not contribute to a child’s early letter-sound decoding skills. Many researchers contend that this is an earlier developing skill. This may explain why the sentence segmentation intervention was so successful in increasing the skills of the preschool children (Ukrainetz, 2006).

In looking at the measure of syllable segmentation, scores among groups were significantly different at pre-test. This result makes it difficult to make assumptions regarding growth among and between groups. However, other studies have demonstrated that syllable segmentation skills can grow as a result of drill-based and naturalistic interventions (Ball & Blackman 1991; Bradley & Bryant, 1983; Herrera, 1993; Lundberg et al. 1988; Schneider et al., 1997; Richgels, Poremba, & McGee, 1996; Ukrainetz et al., 2000).

**Initial Sound Isolation**

In regard to the measure of initial sound isolation, there was not a significant difference between groups, nor was there an interaction effect. Liberman (1974) discovered similar results as children who were less than 5 years old had difficulty with tasks that involved phoneme level awareness. Gillon (2004) argues that preschool children may have difficulty with initial sound isolation as phonemic level awareness has generally been considered to develop in kindergarten and beyond. Likewise, Ukrainetz (2006) suggests that kindergarten is when major changes can be observed in phoneme-level skills. Despite these arguments, other researchers disagree, claiming that phonemic level skills can develop during the preschool years and should be targeted in phonological awareness interventions (Bradley & Bryant, 1985; Lundberg, Frost, & Peterson, 1988; Lundber et al.,1990)

**Total Scores on the Phonological Awareness Test**
The total scores on the Phonological Awareness Test of the preschoolers in both intervention groups increased as a result of intervention, and the non-treatment control group’s phonological awareness skills actually declined slightly. The total phonological awareness scores were the combined scores of each of the phonological awareness subtests. When the subtests of the Phonological Awareness Test (Rhyme Discrimination/Production, Sentence/Syllable Segmentation, and Initial Sound Isolation) were combined, an interaction between group assignment (drill, naturalistic, and control) and testing time (pre- and post-test) existed, even though this interaction did not exist independently for the measures of rhyme production and initial sound isolation. Collapsing all subtests together created more power, thus enlarged the probability of detecting a real effect regarding the drill and naturalistic intervention strategies.

**Alphabet Knowledge**

On the alphabet knowledge subtest, there was an interaction effect between which group children were assigned (drill, naturalistic, or control group) and testing time (pre- and post-test). Yet, there was not a main effect for intervention. Children in the drill group made gains in alphabet knowledge over time. However, children in the naturalistic group and the control group did not make any progress. This result is somewhat difficult to explain, in that the drill-based intervention did not receive any instruction in alphabet knowledge, nor letter-sound correspondence. Despite the fact that teachers did not report any differences in alphabet instruction to the researcher, there was no control for in-class instruction of the alphabet or letter-sound correspondence. So, the classroom assigned to the drill-based intervention may have had a teacher that may have spent more time in alphabet instruction.

**Print Concepts**
Concerning the measure of print concepts, there was significant growth in the naturalistic intervention group that was not evident in the drill-based intervention group or the non-treatment control group. Children in the naturalistic group experienced exposure to print in the storybooks during the naturalistic intervention whereas children in the drill group and non-treatment control group lacked exposure to books or printed material in general. In their naturalistic phonological awareness intervention, Ukrainetz and colleagues (2000) encouraged SLP’s to identify the book title, author, and illustrator, although they did not measure growth in print concepts following the intervention. Like Ukrainetz et al., in the present study, graduate students performing the naturalistic intervention were encouraged to identify the author and title of the storybook, as well as reference print while reading the target story. This print referencing and general print focus may explain the growth in print concepts for the naturalistic group that the drill and control group did not experience.

Ezell, Justice, and Parsons (2000) investigated the efficacy of a shared-book reading intervention designed to foster parent’s strategies for stimulating preschooler’s learning of print concepts. The intervention was effective in stimulating children’s concepts of print, as children made gains in a print knowledge after only a five-week period. Like Ezell, Justice, and Parsons, the present study, utilized a shared-book reading experience and found that a child’s print concepts could be stimulated while simultaneously working on another literacy skill (phonological awareness).

Meaning

Regarding the measure of children’s ability to comprehend the meaning of printed material, children in all three groups failed to make significant gains following intervention (in the case of intervention assignment). Although this may seem perplexing considering the
naturalistic group’s exposure to a meaning-based intervention, this subtest might not accurately measure a child’s ability to make meaning from print sources. Many of the test items were intermixed with items related to alphabet knowledge. It is not known if the children who were assigned to the naturalistic intervention group may have performed better on this measure if the test items would have been related more to vocabulary or inferencing. Ukrainetz (2006) argued that vocabulary and other language skills can be easily addressed through naturalistic, or contextualized, phonological awareness interventions. Thus, it would be interesting to question whether the naturalistic intervention group may have outperformed the other groups if language items had been measured on the meaning subtest.

*Selecting Intervention Approach*

With regard to the outcomes of this study, one could conclude that choosing either intervention approach would yield positive results in increasing preschooler’s phonological awareness skills. However, some researchers have argued that when two approaches to increasing a child’s language skills are successful, the clinician should choose the more naturalistic activity since it will presumably be more helpful to the child in transitioning the skill to natural contexts (in this case, early decoding) (Paul, 1995; Fey, 1986). Pretti-Frontczak and Bricker (2004) argued that naturalistic phonological awareness activities, situated in book reading experiences, provide meaningful print situations aimed at internalizing an application of phonological awareness in situations of use.

Naturalistic activities may also be preferred when working with younger children due to their developmentally appropriate place in the preschool classroom. Following this notion, Ukrainetz (2006) suggested that naturalistic instruction is successful because it follows the principles of independent exploration, guided interactions, and minimal direct instruction set
forth by the International Reading Association and National Association for the Education of Young Children (1998). Further, naturalistic interventions that use authentic children’s literature allow for more than just phonological awareness to be addressed (Ukrainetz, 2006). Ukrainetz et al. (2000) addressed vocabulary, personal narratives, arithmetic, and print concepts incidentally in their study of a naturalistic phonological awareness training program.

Naturalistic phonological awareness interventions using authentic children’s literature in shared book reading experiences stand to increase children’s general language and literacy learning by engaging children in dialogic book reading. The importance of shared book reading (between preschoolers and their caregivers) for oral and written language development has been well-documented (Wells, 1985; Senechel, LeFevre, Thomas, & Daley, 1998; Whithurst et al., 1988). In fact, Wells (1986) found that of several literacy-developing activities, listening to stories was the most important to later literacy development. Likewise, Whitehurst and Lonigan (1998) demonstrated that shared book reading interventions, that require children to take an active role in reading (often termed dialogic reading), produced large effects on the oral language skills of preschoolers. The present study used dialogic book reading sessions that required children to remain active in the phonological awareness intervention. This study also used multiple readings of the same story. This strategy is also supported in the literature as an avenue to increase children’s oral language and literacy behaviors. For example, Mandel-Morrow (1988) investigated a shared-reading intervention using repeated reading of the same story books. She found that the repeated reading resulted in more interpretive responses and more responses focusing on print and story structure than novel books in each session.

Although there is sufficient evidence to support the use of contextualized, naturalistic phonological awareness intervention procedures, there may also be benefits to single-skill
contrived activities used in the drill approach. Specifically, Ukrainetz (2006) argued that drill-based activities provide mass opportunities to practice a given skill and may teach children how to do well on tests of phonological awareness. In the present study, the drill-based approach ensured that each child had an opportunity to respond to two target phonological awareness stimuli. Children were asked to respond to the targets in ways similar to the testing situation. Therefore, children in the drill group “practiced” taking phonological awareness tests at each training session. This practice with testing-like stimuli may explain some of the gains made by the children in the drill-group, suggesting that the naturalistic group may have demonstrated even larger gains in phonological awareness if they had been assessed in ways similar to how they were taught.

Areas of Future Research

Although traditional phonological awareness strategies have been heavily researched over the past thirty years, there has been comparably little research on more naturalistic methods of training phonological awareness in preschool children. Areas of future research remain wide open for investigating contextualized interventions. For example, this study could be expanded by extending the intervention cycle and measuring those subtests that did not demonstrate significance following intervention (i.e. rhyme production and initial sound isolation). Also, other researchers have demonstrated that preschoolers have been able to demonstrate phonemic-level tasks (phoneme isolation, blending, and segmentation) (Byrne & Fielding-Barnsley, 1991; Gillon, 2000) through the use of intense scaffolding. Thus, it would be interesting to engage preschoolers in these tasks over a longer intervention cycle (over 8 weeks) and measure their phonological awareness growth.
Also, in this study, children’s phonological awareness and early literacy skills were measured, however, the language skills were not assessed. In a future investigation, it would be worthwhile to follow the language skills of the children participating in the study to see if language abilities were affected by a naturalistic or drill-based phonological awareness intervention.

One limitation of this study pertains to the fact that eight different classrooms were used in the study. Classroom activities outside of the interventions were not controlled for, therefore, children may have received instruction in phonological awareness, early literacy, and language skills that may have contributed to their performance on the assessment tools/measurements used in the study. Future research, could address these differences by using only one classroom for all three group assignments (naturalistic, drill, and control).

Many studies of traditional drill-based phonological awareness interventions have demonstrated that training these skills can have a positive effect on later literacy achievement (Ball & Blackman 1991; Bradley & Bryant, 1983; Herrera, 1993; Lundberg et al. 1988; Schneider et al., 1997). However, research supporting naturalistic interventions’ effect on later reading success is lacking. Thus, studies following children longitudinally after they participate in a naturalistic phonological awareness intervention are necessary.

Finally, alternative assessments should be explored. As mentioned previously, children assigned to the drill-based group had practice with the testing items by merely participating in the drill-based intervention (Ukrainetz, 2006). More authentic assessments that allow clinicians to note how children respond to scaffolds and online notes of children’s responses to storybooks may allow one to assess phonological awareness in an authentic way that could demonstrate growth in phonological awareness in children participating in a naturalistic intervention.
Conclusion

In summary, naturalistic and drill-based phonological awareness interventions were successful in increasing children’s rhyme discrimination, sentence segmentation, and total phonological awareness compared to a non-treatment control group. Additionally, the naturalistic intervention group made the largest gains in print concepts compared to the drill and control groups. In making decisions regarding the selection of phonological awareness intervention strategies, one should carefully review the added benefits associated with both methodologies. This study reveals that it may be more beneficial to select the naturalistic intervention due to the benefit associated with the gains in print concepts that may come with a naturalistic training model.
References


Reading Research Quarterly, 10, 9-61.

Ehri, L. (1991). Development of the ability to read words. In R. Barr, M.


in Schools, 33, 84-101.


Evidence that dyslexia may represent the lower tail of the normal distribution of reading ability. *New England Journal of Medicine, 326,* 145-150.


phonological training for preschoolers with speech and /or language disorders. *American Journal of Speech-Language Pathology*, 7, 65-76.


Appendix A

Week 1

Rhyme Discrimination/Production. Introduce the concept of rhyme to the children.

Rhyme means that words sound alike at the end, like *fan* and *man*, or *fish* and *dish*

These words rhyme. Now we are going to practice deciding if words rhyme.

Do you think that *hat* and *bat* rhyme?

Do you think that *box* and *fox* rhyme?

What about less and bat, do they rhyme?

  shoe/flew?
  man/tan?
  car/bar?
  was/book?
  took/look?
  rat/cat?
  spoon/rug?
  coke/smoke?
  step/bike?
  flower/tower?
  light/bite?

Now we are going to come up with rhyming words. You can come up with real words or pretend words. Can anyone tell me a word that rhymes with *sat*?

  spoon?
  weight?
**Week 2**

*Sentence Segmentation.*

We are going to clap for each word we hear today. I am going to say a sentence, and I want you to clap for each word you hear.

I love my mom.

Turn on the television.

My cat is big.

Let’s read a book.

I want to play.

The dog has a large nose.

My computer is not working.

The clown likes balloons.
The candle is hot.
The boy has a spoon.
The refrigerator is cold.
My pillow is big and soft.
The spring flowers are so pretty.
Daddy said “no.”
The remote control is under the couch.

Week 3

**Syllable Segmentation.** The last two times we met, we clapped for each word we heard in a sentence. This time we are going to clap for each word part, or syllable, we hear in a word. Listen, tel-e-scope (clapping for each syllable). I want you to clap now.

- scissors.
- spoon
- lemonade
- backpack
- pillow
- video
- necklace
- violet
- couch
- basket
- television
magazine
movie
pencil
paper
picture
match
wonderful
smell
eating

Week 4

Initial Sound Isolation. We are going to talk about the first sound we hear in words.

What is the first sound you hear in the word book? The first sound is /b/. Let’s practice some more.

What’s the first sound in….

scissors.
spoon
lemonade
backpack
pillow
video
necklace
violet
couch
basket
television
magazine
movie
pencil
paper
picture
match
wonderful
smell
eating
Appendix B

Readiness Interactions

- Have all children sit on the floor
- Introduce yourself and tell the children that you are going to be coming into their room to help them learn about sounds for the next few weeks
- Go over the reading rules
  
  #1. sit on your bottom
  
  #2. have a quiet mouth
  
  #3. have listening ears
  
  #4. hands in your laps (sing the open/shut them song: Open/shut them, open/shut them, give your hands a clap, clap, clap. Open/shut them, open/shut them, put them in your lap, lap, lap)

Books Used in the Study

Buzz Said the Bee—Lewison, W. C. -059044185X

Mrs. McNosh Hangs Up Her Wash—Weeks, S. -0060004797

There Was An Old Lady Who Swallowed A Fly—Taback, S. -0670869392

Jump, Frog, Jump—Kalan, R. -0688092411

1st Week Farm Theme

Materials Needed. Buzz Said the Bee

Farm animal manipulatives (cow, pig, sheep, duck, hen)

3 small brown paper bags

Photocopy of sheep, cow, and hen
Foods (plastic or real): pepper, popcorn, peanuts, pickle, peanut butter, cookies, corn, carrot, Kool-aid package, sugar,

Shell

*Joint Book Reading. Buzz Said the Bee*

Book Reading Suggestions:

Allow the children to look at the book cover and predict the characters of the story

Imitate farm animals and ask children to guess which farm animal you are imitating before you read the story

Point out the author and illustrator of the book to the children

Bring farm animal manipulatives and act out the story as you read (make sure you have read the story prior, so that you are able to move fast with the manipulatives…children may become distracted if too much time is spent with the manipulatives

On rhyming words, pause to allow children to fill in the word if the word if easily guessed (i.e. The hen danced a jig and sat on a ____). In subsequent readings of the same story, children may be able to fill in all rhyming words and portions of the text that are repetitive.

*Extension Initial Sound Isolation Activity: “What do the farm animals like to eat?”*

Explain to children that the farm animal manipulatives are picky eaters. They only like to eat things that start with the first sound in their names. (i.e. the pig only likes to eat things that start with /p/).
Have three paper bags that have a photocopy of a cow, pig, and sheep attached with the sound labeled on the bag. Set the respective manipulatives next to the bags.

Have the children pull food items from one large bag and decide who would like to eat the item. Initially, you may find that you need to provide a lot of assistance. Gradually, though, fade your assistance and allow other children who appear to understand the task be the helpers.

*Language Activity: What doesn’t belong? And Quantity Concepts*

Count the number of food items each animal has in its bag. Decide who has the most and who has the least.

Have students decide which item is not a food item (shell for the sheep). You could also have children find the vegetables, snacks, etc.

2nd Week Wash Theme

*Materials Needed. -Mrs. McNosh Hangs Up Her Wash*

Three “clothes-lines” made by tying yarn to two chairs in the classroom
clothespins
Copy of McNosh’s wash items (photocopied from book or downloaded from Boardmaker)

*Book Reading Suggestions.* Have children find title/author.

Have children point to where you should start reading.

Remember to point to print as you read.
This book is really funny/silly. The children will find the items McNosh hangs funny. Ask them why it is funny. (i.e. What is wrong with Ms. McNosh hanging up the dog?)

*Extension Syllable Segmentation Activity.* Set up the clotheslines and pin the numbers 1, 2, 3 on the clotheslines (each clothesline get only one number)

Explain to the children that we are going to hang up Mrs. McNosh’s items by the number of word parts (this is a very abstract concept—you may need to offer several examples). If a word has one part, hang it on the “1” line. If it has two part, hang it on the “2” line. etc.

Have children pick an item to hang on the lines. The other children may clap the word that the selected child picks to give clues to the number of parts.

*Rhyme.* Allow children to fill in rhyming words as you read the story. (i.e. “She hung up the dog, and his dish, and his bone. She got the wrong number and hung up the _____.”

*Initial Sound Isolation.* -Have children vote on their favorite wash item from a selection of three (*Nightgown*, *Turkey*, *Bats*). Record their vote on a large poster board displaying three columns (one for each item). Have the initial sound of the three items as the heading of their respective columns. Children can vote if they liked the item that started with /n/, /t/, or /b/. Have children help you count the votes for each item and determine which one had the most/least votes.

*3rd Week Frog Theme*

*Materials Needed.* *Jump, Frog, Jump*
Laminated characters of the story (frog, fly, snake, etc.) glued to craft sticks (make three for each character).

12-15 multi-colored lily pads with 4-5 different letters repeated 3 times (laminated)

Upbeat music

CD player

**Joint Book Reading Suggestions.** Have the children look at the cover of the book and guess who will be the characters in the story.

Assign each child a character in the story and give them the respective character on a craft stick (some characters will need to be repeated among the children).

Instruct the children to hold up their character each time it is mentioned.

This book contains a great deal of rhythm. Read the story with a lot of inflection.

You may have children clap as you read (only if you are not asking them to hold up the characters).

**Extension Alphabet Knowledge Activity.** Lay out the lily pads (clear enough space in the classroom)

Instruct the children to jump from lily pad to lily pad as you play music

When the music stops instruct the children to FREEZE on their pad.

Call out a letter (from the letters used in creating the lily pads) and tell the children who are on a lily pad with that letter to “Jump, Frog, Jump on their lily pad (demonstrate jumping up and down).

All other children must remain frozen.
Restart the music and repeat activity until each letter has been called and/or all children have been given an opportunity to jump.

*Extension Sentence Segmentation Activity.* Have children jump (from lily pad to lily pad) for each word they hear in a simple sentence from the book) (NOTE: You will have to simplify the sentences…some of the sentences from the book are very complex).

You may play the same game above with music (having the children freeze on a lily pad when the music stops_, and then ask them to jump in place on their lily pad for each word in a simple sentence.

NOTE: Sometimes these gross motor activities are over-stimulating for some children or classrooms. Use your judgment. You may want to create small lily pads for the animal manipulatives to jump on and give each student a turn to have the manipulatives jump for sentence segmentation.

*4th Week Old Lady Theme*

*Materials Needed.* *There Was An Old Lady Who Swallowed a Fly* by Simms Taback

- Laminated fly, spider, bird, cat, dog, cow, and horse
- Old Lady drawn on poster board with a circle cut out at her mouth. Tape a plastic bag on the back of the poster board so that they Old Lady can swallow the items.

*Joint Book Reading Suggestions.* Many children have had some experience with this book. Ask the children if they have ever read the story. Ask them what happens in the story (if they can remember).

Clap the title of the story. One clap for each word.
Point out author of the story. The author’s name begins with the /s/ sound. Ask the children who else’s name begins with the /s/ sound.

The illustrations are predictive in this story. You can know what the Old Lady is getting ready to swallow by paying attention to the pictures on the previous page. Point this out the children.

Point out that the Old Lady is getting bigger. Why?

On the repetitive portion, “Perhaps she’ll die,” make a sleeping hand motion. Towards the end of the story, watch the children start to make the motion along with you.

Read the story with a lot of inflection. Make it like a song.

*Extension Rhyming Activity.* Clap on the rhyming words as you read.

Read the story a second time, have the children clap on the rhyming words during the second time around.

*Extension Syllable Segmentation Activity.* Clap for the number of syllables for each character in the story. All have “1” except for the spider.

Clap each of the children’s names.