An Investigation into Teaching Phonemic Awareness through Shared Reading and Writing

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This study examined teaching phonemic awareness by embedding sound talk within meaningful literacy experiences of shared reading and writing. Small groups of 5 and 6-year-old children were seen three times a week for seven weeks. Four phonemic awareness tasks – first and last sound identification, sound segmentation and deletion – were targeted in each session, with scaffolding fitting task difficulty and individual child ability. Results showed that such naturalistic instruction lead to gains in phonemic awareness compared to a no-treatment control group for both the treatment group as a whole and for a subgroup of children with lower literacy levels. Treatment-specific improvement was evident in three of the four phonemic awareness tasks: first sound identification, last sound identification, and sound segmentation. Additional observations of language and literacy benefits for this emergent literacy approach were also identified.

Phonemic awareness, or the awareness of the sound structure of words, is a metalinguistic skill important to the successful acquisition of reading and writing. Controlled studies have demonstrated the effectiveness of phonemic awareness training in individual and classroom situations for typically developing children and children with language impairments (for example, Ball & Blachman, 1991; Byrne & Fielding-Barnsley, 1991; Fox & Routh, 1975, 1983; Gillon, 2000; van Kleeck, Gillam, & McFadden, 1998). Training procedures have followed developmentally sequenced mastery of skills in contrived activities apart from reading and writing contexts. While there has been strong support for explicit, systematic instruction in phonemic awareness (NICHD, 2000), there has been little investi-

gation of teaching phonemic awareness in a manner more consistent with principles of emergent literacy instruction (McFadden, 1998; McGee & Purcell-Gates, 1997). This study examines the possibility of teaching phonemic awareness in a holistic, scaffolded, responsive approach, using conversations embedded in literacy activities of shared reading and writing.

PHONEMIC AWARENESS TRAINING

Phonemic awareness is a broad metalinguistic area, with achievements occurring over a range of ages. Early forms of awareness, such as those evidenced in rhyming and word play, are learned incidentally in daily life activities, and may be facilitated through preschool contexts such as reciting nursery rhymes or shared storybook reading. The type of phonemic awareness considered critical for reading and writing is awareness of phonemes or speech sounds. Skills such as phonemic segmentation (say the sounds in cat) or phoneme deletion (*cat* without the/k/sound is?) have generally been considered to develop through the reading and writing experiences of the first grade classroom or through explicit instruction in phonemic awareness prior to or alongside reading instruction (Lundberg, Frost, & Peterson, 1988; van Kleeck, 1995).

Phonemic awareness tasks vary in difficulty: first phoneme identification is easier than phoneme deletion, and two-phoneme words (to, see) are easier than four-phoneme words (black, bread). Phonemic awareness training research has typically used shaping approaches, with structured, hierarchical procedures controlling task complexity (McFadden, 1998). Phoneme selection and presentation is strictly controlled, such as using one phoneme in one word position per session. Training typically involve direct instruction using isolated words, starting with identifying first phonemes in words, then last phonemes, and finally segmenting or deleting phonemes. Within each task, there is a hierarchy of two-phoneme, three-phoneme, and consonant blend words. Activities typically include matching phonemes to colored blocks, identifying pictures of words with certain phonemes, or generating words containing certain phonemes. Although letters may be introduced late in the instruction period, form is carefully separated from content with the absence of actual reading or writing tasks.

Making Phonemic Awareness a Part of Emergent Literacy

In a discussion about the state and direction of research in emergent literacy in *Reading Research Quarterly*, McGee and Purcell-Gates (1997) discuss the place of phonemic awareness research. The authors question whether research in phonemic awareness training should be considered part of emergent literacy research. Purcell-Gates suggests that there is little that is emergent about the training: that it is not part of children's daily literacy experiences and it is not responsive to individual differences in knowledge. The NAEYC/IRA (1998) position statement is congruent with this, stating that conventional training in phonemic awareness is not appropriate for young children. The position statement suggests such structured training is most beneficial for children "after they have

learned some letter names, shapes, and sounds and can apply what they learn to real reading in meaningful contexts" (p. 34). It goes further to suggest that, even later, many children will acquire phonemic awareness without specific training as a consequence of learning to read. The position statement concludes that, "in the preschool years sensitizing children to sound similarities does not seem to be strongly dependent on formal training but rather from listening to patterned, predictable texts while enjoying the feel of reading and language" (p. 34).

McGee and Purcell-Gates (1997) are not suggesting that phonemic awareness is not a part of emergent literacy, but that the way it is typically taught does not reflect the principles of emergent literacy acquisition followed in many early childhood education classrooms. They suggest it would be beneficial to understand how phonemic awareness can be taught and learned in the way other aspects of emergent literacy occur.

Richgels, Poremba, and McGee (1996) provide a descriptive study demonstrating how educators can involve young children in meaningful and functional reading and writing while simultaneously teaching the skills and knowledge particular to print, including phonemic awareness: "they can play an active role in guiding children's attention to print during functional and holistic experiences with written language" (p. 632). Richgels and colleagues present an instructional activity called *What Can You Show Us?* Prior to the teacher's reading of the book to the students, volunteers are invited before the class to demonstrate something they know about the displayed text, such as letter identification, word identification, sound-letter correspondences, and text format features: "Eric D. associated individual letters with classmates' names . . . Zack pointed to and read *Dear Kindergarteners* . . . Kaitlynn returned the class's attention to the letter *K*, this time at the beginning of her name" (p. 636). During the reading, the teacher may direct attention to content aspects such as characters or plot, application aspects such as comparisons with the students' lives, or form aspects such as pointing out letters or segmenting phonemes. This study demonstrated a responsive literacy-based context for learning phonemic awareness.

Richgels (1995) investigated the proposal that children who were self-taught invented spellers were involved in "self-directed phonemic awareness training and practice" (p. 99), resulting in better performance in word reading. At the beginning of the kindergarten year, Richgels screened a large number of kindergartners and selected out two groups of kindergartners, better and worse invented spellers. Neither group could read whole words. At the end of the school year, Richgels found that kindergartners who had been better invented spellers were also better word readers, and concluded that implicit phonemic awareness gained through the invented spelling aided later reading performance.

Dahl, Scharer, Lawson, and Grogan (1999) examined and observed the curriculum of whole language first grade classrooms over a one year period to determine whether and how phonics instruction occurred, and whether students showed achievement in phonics areas. Dahl et al. reported that foundation concepts of phonemic awareness and letter-sound relationships were taught across a variety of whole language activities. The investigators reported that the writing program was a key instructional context. Writing activities included shared writing, writing

demonstration, and individual writing instruction. Teachers individualized instruction within the writing context based on learner development and ongoing assessments. Dahl et al. reported substantial evidence of phonics instruction and extensive student achievement in whole word reading in these whole language classrooms.

These three studies provide indirect evidence that phonemic awareness can be learned through literacy activities. However, there was no explicit attention to phonemic awareness in the teaching or the assessment procedures. Whitehurst and Lonigan (1998), in their review of child development and emergent literacy, suggest that phonemic awareness and letter knowledge are "inside-out" skills which are less well understood than "outside-in" skills such as vocabulary and concept development. Whitehurst and Lonigan recommend emergent literacy activities such as shared reading for the outside-in skills, but report smaller and less direct effects from these activities on inside-out skills. Whitehurst and Lonigan base their conclusions on typical shared reading patterns which are described in the next section and which have very little phonemic awareness or letter sound commentary. It is not known how modifying shared reading by embedding explicit comments about phonemic awareness and letter sounds will affect development in these inside-out skill domains.

Shared Bookreading as a Context for Phonemic Awareness

From the Richgels (1995) and Dahl et al. (1999) studies, it was clear that writing activities were clearly contexts for phonemic awareness learning. A context that occurs more frequently than writing and that allows extensive opportunity for phonemic awareness, but that does not appear to be fully exploited, is shared reading. Reading to young children is considered a critical part of developing children's literacy and language skills, and is a recommended practice for parents and teachers of young children (IRA/NAEYC, 1998; NRC, 1999). However, in an analysis of more than 30 years of empirical research, Scarborough and Dobrich (1994) report that, despite the overwhelming support for reading to children, the observed effects are, on the whole, disappointingly small and variable.

The lack of large effects of this seemingly important activity may be due in part to the lack of what is considered quality questioning and commenting during shared reading: comments on vocabulary, story meaning, experiential links, and print concepts. van Kleeck, Gillam, Hamilton, and McGrath (1997) report that mainstream middle class families provide highly variable patterns of interaction in terms of both quantity and quality. More specifically, parents and other adults provide little interpretive commenting on print concepts during shared reading (Ezell & Justice, 1998, 2000; Phillips & McNaughton, 1990).

Scarborough and Dobrich (1994) recognized that some parents do not interact with their children during shared reading. However, they reported that, when quality as well as quantity of shared reading was examined, quality was not a better predictor than quantity. In addition, parent training studies showed relatively small effects on the children's language and literacy despite large changes

in parent behavior. Whitehurst and Lonigan (1998) differed from Scarborough and Dobrich in their conclusion, finding support for interactive styles of reading. Regardless, Scarborough and Dobrich's conclusion is reasonable: if educators and researchers continue to promote the importance of shared reading, "future research should be focused on pinning down the aspects of shared reading that are most beneficial" (p. 297). Shared reading that includes explicit attention to phonemic awareness, a critical element in learning to read, would appear to be a domain that merits investigation.

Children Who Don't "Get It"

A major part of the phonemic awareness instruction research is focused on children who have not demonstrated this skill domain in a timely fashion. Do these children need phonemic awareness taught in structured, decontextualized manner? McGee and Purcell-Gates (1997, p. 314) raise concerns whether training on "sound segments and letters without a purpose or function as part of a larger activity" produces the same kind of understanding of the interrelationship of phonemic awareness with other aspects of literacy as the understanding that is obtained more naturally, in the course of literacy activities. McGee and Purcell-Gates suggest that for children who have not developed a rich, sophisticated phonemic awareness, our instructional methods should be examined to determine whether such learning opportunities are provided. If they are not, we should be determining how to incorporate more explicit attention within the more natural activities.

As McGee and Purcell-Gates (1997) suggest, some children may need more directive support in acquiring phonemic awareness. Can children with lower language and literacy abilities learn from explicit phonemic awareness exchanges embedded in literacy activities? There is little evidence to answer this question to date. However, holistic, contextualized interventions aimed at other aspects of language and literacy have strong support, such as activity-based intervention (Bricker, Pretti-Frontczak, & McComas, 1998; Linder, 1993), whole language intervention (Norris & Hoffman, 1993), or storybook-based intervention (Culatta, 1994; Kirchner, 1991; Owens & Robinson, 1997). Phonological articulation skills have even been targeted in storybook reading contexts along with semantic, syntactic, and discourse goals (Hoffman, 1997).

As Scarborough and Dobrich (1994) suggest, the instructional benefit of shared reading cannot be assumed. Investigators need to carefully analyze the process of activities such as shared reading for how best to maximize learning support. A key element in supporting learning within complex activities is scaffolding. Within a scaffolding approach, teaching occurs, not through task breakdown and hierarchical ordering of task complexity, but through strategic support, decreasing over time (McFadden, 1998; Norris & Damico, 1990; Ukrainetz, 1998). Such scaffolding support fits complex, naturalistic instruction approaches where learning needs to be supported in daily life activities. One example is Kirchner's (1991) reciprocal story reading, where the patterned storybook is used as a predictable routine event. The familiar storybook context and adult scaffolding allow the child

to participate in the language activity and gradually gain competence over the task and the component language skills involved.

Scaffolding phonemic awareness during literacy activities occurs by fitting the degree of support to task difficulty: first sound identification would be expected to need considerably less support than sound segmentation. The scaffolding may take a variety of forms, involving physical or structural support, such as the presence of printed letters to aid in sound segmentation, as well as social support such as modeling and imitation from the teacher and from peers (McFadden, 1998; Ukrainetz, 1998). Scaffolding can be fitted to differing skill levels even within single tasks – one child might need considerable guidance and modeling from adults or peers for last sound identification, while another is able to accomplish the same task with only occasional reminders. Assistance may range from a high degree (e.g., needing to hear stress on the target word in the prompt and hear other children's responses) to a low-level (e.g., needing only repetition of the sentence containing the target word).

The Current Study

Preschoolers ordinarily develop their phonemic awareness skills through literacy activities. However, there has been little attention to explicitly including phonemic awareness in emergent literacy activities. There is a lack of information on how to embed phonemic awareness within activities such as shared reading and writing, and whether children of a range of language and literacy abilities can learn from such an approach. This study examined teaching phonemic awareness through conversations embedded in meaningful text activities with 5 and 6 year old children in mixed ability groupings in a group experimental design. This preliminary investigation was carried out by graduate speech-language pathology students with small groups in childcare settings.

Several key elements characterized the naturalistic approach employed: a) presenting complex items (e.g., sound segmentation) from the beginning of instruction; b) presenting these items in actual situations of use; c) supporting mastery through scaffolding; d) opportunities for use varying with instructor judgment and child interests (e.g., a book on llamas stimulating an impromptu minilesson on llama characteristics); and, e) addressing a variety of other language and literacy goals within the same session (e.g., discussing words such as "aristocrat," the blood-sucking habits of mosquitoes, and the use of exclamation marks). Within this text-based approach, we sought to answer the following research questions, on phonemic awareness and interest in literacy activities.

1. Can five and six year old children learn phonemic awareness in a naturalistic context?
2. Can children with lower literacy abilities learn phonemic awareness in a naturalistic context?
3. Can children learn both easier and more difficult phonemic awareness tasks within the same teaching session?

4. Will children show increased interest in literacy activities as demonstrated through parent report?

METHODS

Participants

Thirty-six children, aged 5;0 to 6;5 years, from four early childhood programs in the area participated in the study. All of the children were at least five years of age at the beginning of the study in October, but five of the children were not yet in kindergarten. All the children were considered nonreaders by achieving a raw score of less than two on the Clay (1979) Quick Screen Test.

Twelve of the children were identified as having lower literacy levels based on a combination of letter-name knowledge, first sound awareness, and teacher concerns. The lower literacy level was defined as a combination pattern based on scoring 26 or less on upper and lower case letter names, scoring 2 or less on first sound awareness, and having childcare center teacher concerns. Children were considered in the "lower" group if they were low on two of the three factors. Letter name knowledge and phonemic awareness are the two best predictors of reading performance (Adams, 1990), and teacher ratings of general academic and language achievement have been shown to be generally accurate (zharvRecords & Tomblin, 1993); Salvesen & Undheim, 1994).

The 12 children with lower levels of literacy and the 24 children with higher levels of literacy were randomly assigned to treatment conditions, resulting in 18 in the treatment condition and 18 in the no-treatment condition. The no-treatment condition received only the pre- and post-testing. All the children, in both treatment and no-treatment conditions, continued to receive their normal childcare and kindergarten activities.

The 4 boys and 2 girls with lower literacy in the treatment condition ranged in age from 5;0 to 5;11, with a mean age of 5;6 years. The 6 boys and 6 girls with higher literacy in the treatment condition ranged in age from 5;0 to 6;0, with a mean age of 5;4 years. The 3 boys and 3 girls with lower literacy in the no-treatment condition ranged in age from 5;0 to 5;10, with a mean age of 5;7 years. The 7 boys and 5 girls with higher literacy in the treatment condition ranged in age from 5;1 to 6;5, with a mean age of 5;7 years.

The children came from families with a range of income levels from lower middle class to upper middle class. The majority of the children were Caucasian with less than 5% from minority groups. Demographics on family make-up were not obtained. The children in the three child-care centers attended public school kindergarten programs during the mornings and were enrolled in child-care in the afternoons. The public kindergarten programs had curriculum programs that taught reading readiness with a focus on sound/symbol relationships and little if any emphasis on phonemic awareness as a skill to be mastered prior to learning sound/symbol relationships. The children in the private school had a morning kindergarten program and afternoon enrichment program that emphasized swim-

ming and other activities. These children were exposed to structured phonemic awareness instruction in their British influenced kindergarten classroom.

Procedure

Instructors and Testers   The instructors (the third and fourth authors) were master's students in speech-language pathology. They were supervised by the first and second authors, professors in speech-language pathology and early childhood education, respectively. Neither instructor was familiar with phonemic awareness or emergent literacy prior to the study. In addition, the naturalistic literacy-based approach did not occur at their graduate practicum sites, so this approach was new to both instructors.

For training, the instructors read McFadden (1998) in which this instructional approach is presented. They viewed videotapes of the first author teaching in this manner. They were supervised and videotaped several times in a pilot study practicing this flexible, responsive interaction style. Two videotapes of each instructor's sessions, from an early and a midpoint session, were viewed and discussed with the instructors by the first and second authors. Frequency counts were not taken at that time, but the sound talk was considered appropriate and of sufficient frequency to allow learning. Posthoc analysis of the results revealed the instructors maintained expected levels of sound talk for all the tasks but sound deletion, which may have accounted for the lower gains for this particular phonemic awareness task.

Measures

Teacher Interview   To identify literacy level, the teachers at each childcare site were interviewed prior to instruction,. The teachers were given a brief questionnaire asking whether the teacher had any concerns about the way the child said words, if he or she was understood easily, and his or her vocabulary and grammar. They were also asked if they had any concerns about learning, readiness for kindergarten, or expectation of the need for special help. Any affirmative answers resulted in the child categorized as having teacher concerns.

Letter-names   Clay's (1979) letter-name survey was used to identify literacy level. Letter names were requested for the 26 letters of the alphabet, in upper and lower case, presented in random order, for a total possible score of 52. The order of presentation was identical for each child.

Phonemic Awareness   Four types of phonemic awareness were tested and taught: first sound identification (sam→/s/); last sound identification (sam→/m/); sound segmentation (sam→s-a-m); and sound deletion (sam without/s/). Performance on the first sound identification test was used to identify literacy level prior to instruction. The items were introduced in the test by talking about a character named Sam and providing two training items (see Appendix A).

The words in the phonemic awareness measures and the nonsense syllable list were composed of increasingly difficult 2-phoneme consonant-vowel (CV) combinations, 3-phoneme CVCs, and 4-phoneme CCVCs. The four 10-item tests were

each scored out of 10 points. In the first sound and last sound tasks, half points were awarded for providing letters rather than sounds (for the word bat, b instead of/b/) and for presence of the vowel as well as the consonant (/ba/for bat). In the segmentation task, half points were awarded for onset-rhyme (/b/-/at/) segmentation and for deleting vowels (/b/-/t/). The sound deletion task did not involve any part credits. The four tests were summed for an overall phonemic awareness score out of 40 points.

Parent Report A parent report was instituted to explore possible added benefits of working in storybook and story writing contexts. A parent phone interview was conducted with each participant's parent (34 mothers and 2 fathers) shortly after the completion of the instruction. We assumed some growth would be expected for all children, so we asked parents to rate change as a little, quite a bit, or a lot on four questions concerning interest and accomplishment in literacy activities (Appendix B). The responses were assigned a value of 1, 2, or 3 respectively. The responses were summed for a total possible score of 12. Parents were also asked for examples of changes made. The parents were not told to which condition their child had been assigned, and comments made indicated most of the parents thought their children were receiving the treatment condition.

Instruction

For the treatment condition, phonemic awareness was taught 30 min three times a week over seven weeks to groups of three children in quiet areas in the childcare centers between October and December. The treatment children were assigned to one of six groups, with each group having one child with lower literacy and two with higher literacy levels. The instructional session alternated between two components: a) twice-weekly activities involving conversations during bookreading; and, b) once-weekly activities involving conversations during writing. Seven sessions were videotaped, approximately once weekly, for one group for each instructor.

In the reading component, the instructor read one storybook each session (Appendix C). The books were selected ahead of time for rhythmic line (some rhyming or alliteration) and interest value. Books the children enjoyed were used more than once. Both instructors selected from the same corpus of books, but specific books and schedules for use were not controlled.

The instructors read a portion of the book, then started a sound talk episode by identifying rhyming or alliterative words, then moved into one or more of the four target skills. They were given following the general pattern below to follow (based on a story in *Terrible Teresa and other very short stories*). Segmentation was taught by having the children put their fists on the table and sticking out a finger for each sound as the instructor or the children slowly said the word. The instructors aimed to provide a sound talk episode at least once every second page of the storybook. They focused the children on identifying the sounds in the words, not identifying which letters represented the sounds (although some incidental letter discussions could occur).

Instructor: {reading} The story of Fred. This is a boy named Fred. He hates to go to bed. He hides out in the shed, and stays awake instead. Do you hear words that rhyme? {reads again, stressing rhyming words}
   Child 1:   Fred-bed.
   Child 2:   *shed*.
Instructor: {segmentation} Yes, all those words rhyme, *Fred-bed-shed*. Let's count the sounds in *Fred*. Put your fingers out for each sound. /F-r-e-d/. 4 sounds! How many in *bed*? /B-e-d/. 3 sounds. Now *shed*. /sh-e-d/. 3 sounds. Which one is longest? Yeah, *Fred* has 4 sounds.

    In the writing activities, the children and the instructor drew pictures about the story or some idea relating to the book read the prior day. The instructor wrote to dictation from the children about the instructor's picture and then the children each wrote (using scribble, letter strings, or invented spelling) about their own drawings with commentary from the instructor. The talk focused on identification of sounds and aligning the number of letters written with the number of sounds in the words. The instructors had the children identify the sounds, count the number of sounds, provide a matching number of letters, and use their best guess for the specific letter involved. If a child did not know how to form a letter and was concerned about it, the instructor or another child could show them how to write the letter.

    The complexity of the words identified and discussed, as well as the number of sound comments, were not formally controlled. The words used for sound talk arose from the story books, the writing, and the children's names. They varied considerably in length and structure, from short words such as *boy* and *log*, to longer words such as *mountains*, *outside*, and *goodnight*. The instructors followed the children's interests and freely discussed comments and questions made by the children. Topics included interesting vocabulary, personally relevant topics, arithmetic opportunities, and print concepts.

    The naturalistic, responsive method of instruction meant that the frequency of sound talk could not be strictly controlled. The instructors aimed to discuss each of the phonemic awareness tasks at least once with each child in each session. The less than intended actual frequency of sound talk during the sessions was estimated by the videotaped records. Counts per child could not be made because all the children attended to a question and cooperative responding (unison or each contributing to arriving at a correct answer) often occurred. First sound and sound segmentation were most frequently discussed across the sessions, ranging from 2 to 11 times per session, with a mean of 4 and 6 occurrences, respectively. Last sound identification occurred only 1 to 3 times per session in the first four weeks, then jumped to 5 to 7 occurrences in the final two weeks. Sound deletion talk occurred infrequently, with 0 occurrences in 11 of the 15 sessions, and 1 to 3 occurrences in 5 of the sessions, spread throughout the treatment period. Rhyming occurred frequently in all the sessions. It was typically used as a starter, to identify pairs of words to be discussed. In one session, the instructor also had the children identify medial sounds 3 times, which was not a preplanned phonemic awareness task.

    With the reciprocal relations between phonemic awareness and word decoding,

Table 1. Mean Phonemic Awareness Performance for the Full Group, Site, and Literacy Subgroup Comparisons

	Treatment			No-treatment		
Sample	**n**	**Pretest**	**Posttest**	**n**	**Pretest**	**Posttest**
Full*	18	5.9 (4.3)	23.5 (7.8)	18	7.3 (6.6)	11.7 (9.5)
Low**	6	6.5 (2.8)	19.5 (4.1)	6	2.3 (4.0)	5.5 (7.0)

Note   ( ), standard deviation; Low, lower literacy subsample, Full, full sample; *p* < .0001, **p* < .001.

sound-letter talk is another avenue into greater phonemic awareness. As Richgels (1995) suggests, practice in invented spelling and discussing sound-letter correspondence are indirect ways of teaching phonemic awareness. In the current study, this source of phonemic awareness learning was present in addition to the explicit phonemic awareness talk. Most of the incidents of sound-letter talk were child-initiated, but the instructors also instigated some discussions. The videotaped records showed 0 instructor-led occurrences in 7 sessions and 1 to 3 occurrences in 8 sessions, with for one reading session in the fifth week that had a high of 10 occurrences.

Because phonemic awareness complexity level was not controlled, and a mix of literacy levels were present in each group, the instructors provided differing degrees of scaffolding based on individual needs. Scaffolding techniques included stressing the target word or sound, stretching the word, repeating the target word or sound, asking a more able student to respond first, and confirming student responses. As the children responded successfully to particular types of questions, scaffolding was reduced.

RESULTS

This study examined whether phonemic awareness instruction, centered in interactions around meaningful text, with mixed ability groups, resulted in gains in four types of phonemic awareness compared to a no-treatment condition for the sample as a whole and for a lower literacy subsample. In addition, increased interest in literacy activities was assessed. Statistical analyses were performed using Statview (SAS Institute, 1998), with significance levels set at *p* < .05. Effect sizes were hand calculated, following Meline and Schmitt (1997).

Phonemic Awareness Performance

The first question was whether phonemic awareness showed greater gains from pretest to posttest for the treatment versus no-treatment conditions for the full sample. Both conditions showed improvement in performance over the seven weeks, but the treatment condition showed considerably greater change, 17.6 versus 4.4 points (Table 1). The greater improvement demonstrated by the full sample and low subsample is illustrated in Fig. 1, with the steeper improvement lines for the treatment conditions compared to the no-treatment conditions. A
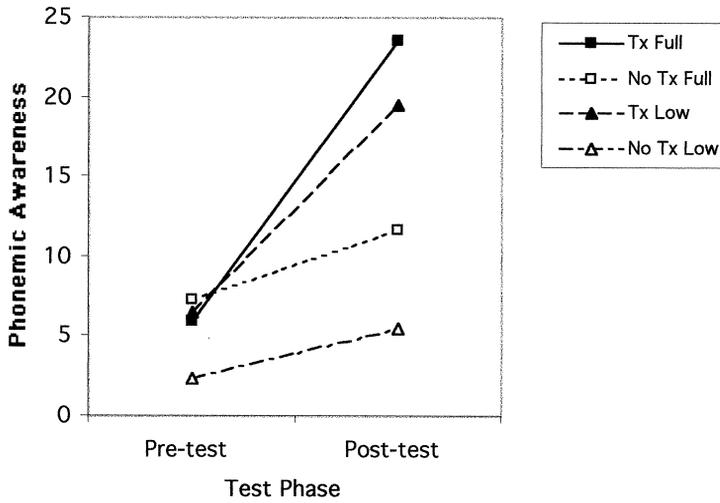
Figure 1. Phonemic awareness performance from pretest to posttest for the full sample and the lower literacy subsample across treatment and no-treatment conditions.

repeated measures ANOVA revealed a significant interaction between condition and test, $F(1,34) = 42.0$, $p < .0001$, indicating a greater change for the treatment condition than for the no-treatment condition from pretest to posttest. In addition, a large effect size eta of 0.74 was obtained.

The second question concerned the performance of the lower literacy sub-sample (Low on Table 1 and Fig. 1). Despite random assignment, the mean performance of children in the treatment condition was significantly higher than that of the no-treatment condition at pretesting, $F(1,10) = 12.9$, $p = .0049$. However, the treatment condition made greater gains from pretest to posttest than the no-treatment condition (13.0 as compared to 2.2 points). A repeated measures ANOVA showed a significant interaction for condition and test, $F(1,10) = 21.7$, $p = .001$. A large effect size of 0.91 was obtained for the lower literacy treatment condition compared to the no-treatment condition.

Performance across Task Types

The third question was whether improvement due to treatment could be obtained across all four phonemic awareness tasks. Some developmental change occurred for all four tasks, as evidenced by the small improvements in the no-treatment condition performance. However, treatment-specific learning showed large improvement e at posttesting for three of the four tasks (Table 2). First sound identification was the easiest task, with half the items correct on average at pretesting for both conditions. At posttesting, children in the treatment condition showed greater improvement with almost all items correct. Last sound identification and sound segmentation were low at pretesting for both conditions.

Table 2.   Mean Performance on Four Phonemic Awareness Tasks

Task	Treatment		No-treatment	
	Pretest	**Posttest**	**Pretest**	**Posttest**
First Sound**	5.1 (3.6)	9.0 (1.3)	5.5 (4.2)	6.6 (3.4)
Last Sound*	0.3 (1.0)	5.9 (3.6)	1.1 (2.5)	1.9 (2.7)
Segmentation*	0.4 (0.9)	5.7 (2.5)	1.1 (1.5)	2.0 (3.0)
Deletion	0.1 (0.2)	2.9 (3.2)	0.1 (0.2)	1.6 (2.7)

Note   ( ), standard deviation; $*p < .0001$, $**p < .01$.

These two tasks showed the greatest gains for the children in the treatment condition, moving from performance close to zero to more than half the items correct. Sound deletion was low initially and showed the least improvement. Children in the treatment condition performed only slightly better than those in the comparison condition at posttesting on this task. Fig. 2 demonstrates the learning slopes across the four tasks for the treatment condition. The ease of learning first sound awareness and the difficulty of sound deletion are clearly apparent.

A repeated measures ANOVAs showed a significant interaction effect for condition and test for first sound, $F(1,33) = 7.2$, $p < .01$, last sound, $F(1,33) = 25.0$, $p < .0001$, and sound segmentation, $F(1,33) = 26.2$, $p < .0001$. Effect size etas were medium to large (0.43, 0.66, and 0.67 respectively). The slight advan-
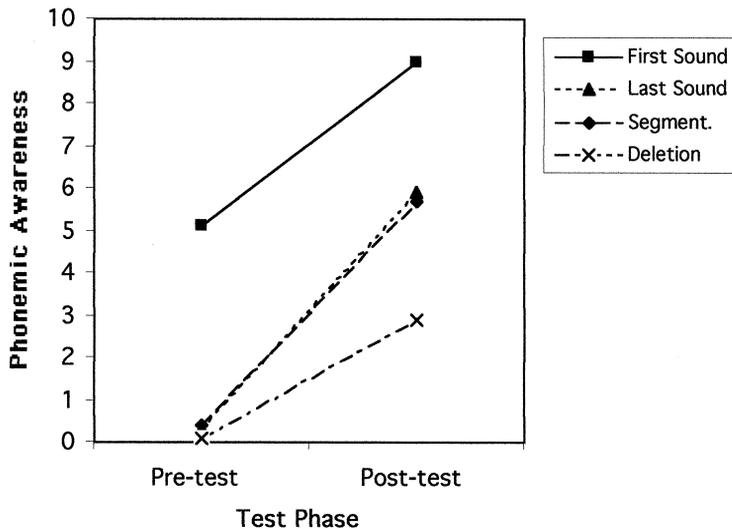

Figure 2.   Phonemic awareness performance for the full sample treatment condition from pretest to posttest for first sound identification, last sound identification, sound segmentation, and sound deletion.

Table 3.   Mean Performance on Posttest Parent Interview

Sample	Treatment	No-treatment
Low Subsample**	9.8 (1.0)	6.7 (0.6)
Full Sample*	9.4 (2.0)	6.6 (1.8)

Note   ( ), standard deviation; $*p < .001$, $**p < .05$.

tage for posttest sound deletion performance for the treatment condition failed to reach significance.

Interest in Literacy Activities

Finally, interest and achievement in literacy activities was examined through parent report (Table 3). Parents were asked to rate four questions concerning interest and accomplishment in literacy activities. The participants in the treatment condition achieved a mean total score of 9.4, out of a total possible score of 12, while those in the no-treatment condition achieved a mean total score of 6.6. On the item scale of 3 (a little change, quite a bit of change, a lot of change), parents of the treatment children were reporting a mean rating of 2.3, between *quite a bit* and *a lot*. Parents of the no-treatment children reported a mean rating of 1.65, between *a little* and *quite a bit*. For the lower literacy subsample, the treatment condition was 9.8 and the no-treatment condition was 6.7, almost identical to the full sample results. A Mann-Whitney U test for ordinal data showed significantly different performance for both the full sample and the lower literacy subsample; $U(29) = 35.5$, $p < .001$; $U(5) = 0.00$, $p < .05$.

DISCUSSION

Phonemic Awareness as a Product of Instruction

In this study, phonemic awareness was taught in a naturalistic approach, with sound talk embedded in shared reading and writing activities for small groups of mixed ability 5 and 6 year old children. This study was a first attempt to teach phonemic awareness in a way more consistent with principles of emergent literacy instruction: phonemic awareness was embedded in situations of actual use; instruction was matched to individual child knowledge; and opportunities for self-directed learning were present. Results showed this method was successful in increasing phonemic awareness. Children in the treatment condition made significantly greater gains on phonemic awareness than children in the no-treatment condition. The effect was seen for children of lower literacy levels as well as for higher achieving children. We expect that these positive results were due to both the explicit sound talk and the implicit opportunities for developing phonemic awareness because of exposure to and discussion of print concepts.

None of the children in the lower literacy group had a diagnosed language learning impairment, but all of them had teacher concerns, lack of first sound

awareness, or knowledge of less than half the alphabet. These children were able to learn phonemic awareness within complex, meaningful text interactions. Although their gains were less than those of the higher achieving children, they tripled their pretest performance in seven weeks – a very satisfactory accomplishment.

Two unexpected findings were obtained with the lower literacy subsample. The children had been randomly assigned to treatment or no-treatment conditions, but the pretest performance was significantly different for the two conditions. This difference was due mainly to first sound performance: performance on this task tended to be bimodal, with children scoring either 0 or 7 or more out of 10 possible points. Four of the 6 treatment participants, but only 1 of the 6 no-treatment participants scored 6 or better. Testing the interaction between pre-/post-test and condition compensated for this difference, but it would have been better for the children in the two conditions to have been similar from the outset.

In identifying the lower literacy children, we used three sources of information. Some children were not low on all three sources, so a standard of two out of three was used. The lower literacy children who provided the higher average phonemic awareness performance described above had qualified as lower literacy through teacher report and letter name knowledge. This divergence between letter name knowledge and phonemic awareness was unexpected. Observations during instruction supported our initial estimates of these children as having greater learning difficulties than the other children despite some strengths. As a result, we were confident in the literacy level categorizations. However it would have been preferable to have a norm-referenced measure and participants in the lower literacy level category with more consistency across the three measures.

Another limitation of the study was the lack of information on the curriculum and activities occurring in each participant's school classroom. The study was carried out in childcare centers and specific classroom information was not obtained.

Three of the four phonemic awareness tasks showed treatment-specific improvement. First sound identification was the easiest task both initially and at the end of the study. The children in both conditions could not do the other three tasks at the outset of the study. Two of these conditions, last sound identification and sound segmentation, showed the greatest gains. Children showed progress in understanding the complex task of segmentation, moving from being unable to segment at all (e.g., providing only a first sound), to segmenting words into sounds or onset-rime (e.g., cat =/k-at/). Errors typically included the onset-rime pattern, deleting the final consonant, or subdividing a continuant into two parts (e.g., no =/n-o-o/). No-treatment children made little gain on these two tasks. Sound deletion did not show improvement resulting from the treatment. This was a reasonable finding based on the videotaped records showing it was rarely discussed. The instructors reported that sound deletion was the hardest task to explain and provide learning support. Unlike the other three tasks, "drop the/k/from/cat/and what do you get?" seemed more like a guessing game than a natural and logical part of the reading and writing process. Blending (e.g.,/c-a-t/= *cat*), more closely linked

to the act of reading, might be a more appropriate fourth task to teach in this naturalistic context.

Informal Observations of Learning

The children's interest in phonemic awareness went beyond the instructor-led sound talk. Two children, in different treatment groups, began taking an interest in the instructor's nametag, requesting her to read it and count the sounds in it each session. The children often were competitive in determining who had the most sounds in their first, middle, or last names.

Interest and progress in other aspects of language and literacy were also observed. The children became excited over new storybooks and took great interest in the discussions around them. The children discussed such vocabulary as *aristocrat* (in *Terrible Teresa and other very short stories*), and *private*, *corporal*, and *general* (in *Drummer Hoff*), and physically demonstrated the concept of *upside-down* (in *Silly Sally*). The storybook *Is Your Mama a Llama?* sparked a lively conversation about llamas, leading the instructor to providing photos of her family's pet llamas in a subsequent session.

There were many opportunities for the children to comment and discuss print concepts. For example, during a reading of *Drummer Hoff*, one girl suggested that she knew this was a "long part in the story" because there were so many words on that page. This led into a discussion about the length of words as well as the length of extended discourse. During another book reading, a boy commented that he knew that a certain part of the story needed to be read loudly because there was an "explanation point" (i.e., exclamation point) in the writing. This introduced the topic of punctuation and the various functions of each.

Progress in emergent literacy was also evident in the writing component. Initially, the children were hesitant to write. They protested that they did not know how to write and they repeatedly asked for correct word spellings. Gradually, the children began to believe they could write, and became comfortable guessing and helping each other with spelling. The children became familiar with concepts such as writing from left to right, leaving a space between words, putting a period at the end of a sentence, and starting a sentence with a capital. One girl brought a letter to an instructional session that one of her classmates had written her. She requested the help of the group to write a letter in reply. The session was spent constructing a letter to her friend, engaging all children in the group in sound talk and writing.

The parents noticed positive changes concerning literacy. The higher scores reported by the treatment condition parents provided strong evidence that the storybook and story writing instruction contexts stimulated interest in literacy activities. One girl began attempting to read cereal boxes at home and, to her mother's surprise, was able to sound out some of the words.

Another mother indicated that she purchased her son his own set of stationery and envelopes because he had become enthralled with writing letters each night. The mother of a third child commented that her child's teacher was pleased at the child's visible growth in literacy over the treatment period.

These informal observations concerning progress in emergent literacy provide evidence that gains extended beyond phonemic awareness. The reading and writing sessions were engaging, rich contexts for many aspects of literacy learning. Naturalistic, responsive instruction appeared to allow benefits not obtainable in a systematic, decontextualized phonemic awareness training approach.

The Process of Instruction

Scaffolded learning has several essential components: an activity that can be accomplished with the help of a more competent other, repeated opportunities for learning, and gradual withdrawal of support by the more competent other. This instruction provided all these components. The videotaped sessions provided some examples of the instructional process.

The sound talk in the bookreading session was fairly routine, opening with identifying rhyming words, then proceeding to one or more of the sound tasks. Initially, the tasks were too difficult for the children and required considerable prompting and support. The repeated, routinized presentations allowed the instructors to gradually reduce support as the children became more independent in their performance. The examples below show early and later performance on first sound tasks (slashes indicate the sound; italics indicate the letter; all names are pseudonyms).

Early Session

Instructor: Okay Amanda, here's another one for you. What's the first sound, Amanda, look at me. What's the first sound in *dare*?
Amanda: *Don't you dare!*
Instructor: What's the first sound? *Dare.*
Amanda: */t-t-t-t/*
Instructor: /day-d/
Amanda: */day/*
Instructor: Good job!

Later session

Instructor: Okay, here's a question for Henry. What's the first sound in *rest*?
Henry: */r-r/*
Instructor: /r-r-r/, good job!
Rachel: *It starts with the letter r.*
Instructor: It starts with an r!

Segmentation and last sound identification required considerable support initially, but the children made considerable progress in these tasks. An example from earlier and two from later in the instruction period for segmentation are presented. By the later sessions, the children with higher literacy were often able to segment syllabically simple words. Syllabically complex words required a lot of support throughout the instruction period, but the children were still able to gain greater independence for parts of these words. The complex word example

shows partial independence, with the child able to segment *titanic* into four phonemes and one syllable.

Early Session

Instructor:	I need to write the word *drummer*. How many sounds are in *drummer*? (Instructor and children all get their fingers ready to count)
Instructor:	/day-r-u-mm-er/ (the children say the sounds and count with the instructor).
Amanda:	*Five!*
Instructor:	Five sounds! So how many letters do I need?
Henry:	*Five.*

Later Session–Simple Word

Instructor:	How many sounds are in the word *the*?
Jordan:	*Two.*
Instructor:	Show me the sounds. There are two sounds. Tap my fingers and show me.
Jordan:	*/th-e/*
Instructor:	Yes! /th-e/, /th-e/. Good job!

Later Session–Complex Word

Instructor:	What's the next word?
Jordan:	*Titanic.*
Instructor:	Titanic! That has a lot of sounds in it. What do you think the first sound is?
Jordan:	*/T-i-tan-i-c/ (sticks out five fingers as he says sounds).*
Instructor:	Good!
Jordan:	*There's five sounds.*
SLP:	Okay, good.

Children with lower literacy levels had difficulty with segmentation throughout the intervention, needing the teacher to slow down and elongate the sounds. These children showed improvement by the end of the instruction to the point where they understood the idea of segmentation, but still often missed or added sounds even in simple words.

Segmentation–Lower Literacy Level

Instructor:	Okay, Rachel, you count the sounds in *toes*.
Rachel:	*/T-oe-oe-s/ (while sticking out four fingers).*
Instructor:	Okay, you're making the sounds a little too long. (Instructor sticks out their fingers and tells Rachel to point to each one for the sounds)
Rachel:	*/t-oe-s/ (while pointing to instructor's fingers).*
Instructor:	Right! /T-oe-s/, /t-oe-s/ (while pointing to each finger).
Rachel:	*Three!*
Instructor:	Three sounds! Good job!

An added benefit of this style of instruction was that the children who had difficulty answering phonemic awareness questions could participate through the

conversations about vocabulary, ideas, and print concepts. By the end of the instruction, some of the children were able to "be the teacher" for parts of familiar stories. They "read" the story and led the sound talk, prompting peers and the instructor to identify sounds and segment words.

Scaffolding occurred through child-to-child support in addition to the adult support. Children with less competence were able to learn from the models of more competent members, such as in the example below from a midpoint session. At times, the more competent children in the group had to be restrained to allow time for the less competent child to respond. The children were encouraged to be patient, take their turns, and help one another, thus working on social interaction and cooperation.

Peer-Peer Scaffolding

Instructor: Elaine, what's the first sound in *hush*?
  Rachel: */sh/*
Instructor: That's the last sound. What's the first sound?
    Toby: */h-h-h/*
  Rachel: */h/*
   Chris: *h*
Instructor: Right, it's an *h*.

Challenges to Achieving Change

In this study, the effect size was large for almost all the comparisons, which is unusual for such a complex, naturalistic instruction context, "in new areas of research inquiry, effect sizes are likely to be small . . . because the phenomena under study are typically not under good experimental or measurement control or both" (Cohen, 1977, p. 25). This naturalistic approach certainly would fit Cohen's caution, particularly with some of the following challenges.

One challenge was the brevity of instruction. The instruction occurred only 3 times a week for 30 min for seven weeks. This is less than most structured research studies (e.g., Ball & Blachman, 1991; Lundberg et al., 1988; Sawyer, 1988; van Kleeck et al., 1998) or curriculum guide recommendations (e.g., Adams, Foorman, & Beeler, 1998). Intervention taking place in whole, complex situations frequently afford fewer opportunities for practice than structured approaches, but is intended to be balanced by incidental instruction throughout the day (Bricker et al., 1998), which we were not able to provide in this study.

Another concern was with the in-situ instruction. The instruction took place in childcare centers with limited space and a multitude of other competing activities. At times, the instructors had to conduct their sessions amid the play and visits by nontreatment children. At other times, they had to bring the children to the session from outside or from free choice activities, causing some initial resentment.

Other sources of learning could not be controlled. All the children received regular preschool and kindergarten curricular instruction. Progress in phonemic awareness will occur from daily reading and writing activities in addition to the

study's specific phonemic awareness instruction. Despite this, large and significant treatment effects were demonstrated.

Finally, the instruction format was very different from the testing format, which made positive results more difficult to obtain. The instruction sessions involved brief teachable moments embedded in complex, meaningful activities. This was in contrast to the drill-like nature of the pre- and posttesting: many 10-item tests to be accomplished contiguously and under instructor direction. In addition, a large number of words with various syllable structures were used in teaching, while only a few, syllabically simple words were tested, with only two items overlapping, *boy* and *time*. This issue is of particular concern in activity-based and naturalistic approaches (Hills, 1992). Real content learning occurs, but this learning is not always reflected in standardized test performance.

Future Possibilities

Phonemic awareness is a challenging domain for kindergartners, particularly tasks such as sound segmentation and deletion. This is the first attempt to demonstrate that phonemic awareness can be taught in naturalistic contexts more consistent with the principles of emergent literacy. The minimal materials required, the possibility of group instruction, and the additional language and literacy benefits, are all further reasons to employ such an approach. The method can easily be modified to fit child interests and teacher curriculum: science and nature materials could be used, and writing could be more varied, involving composing letters, grocery lists, or address books. The instruction in this study was provided by graduate students in speech-language pathology. The teachers in the child-care centers informally observed the instruction and expressed interest in it, but did not participate. The focus for this investigation was determining whether such an approach to teaching phonemic awareness was possible. Future studies will examine application with teachers and speech-language pathologists within school settings, in inclusive and pull-out formats.

We (the first and second authors) are very interested in teacher and speech-language pathologist collaboration. While early childhood teachers are not as familiar with phonemic awareness as speech-language pathologists, they are more familiar with teaching through emergent literacy experiences. By adding explicit sound talk to the teachers' ongoing instructional interactions in reading and writing, we believe this can provide a valuable missing element to early literacy instruction. Speech-language pathologists can then support teachers by providing supplementary instruction in phonemic awareness to children with language impairments, either in this naturalistic manner or through structured approaches separate from reading and writing. Even with the second approach, we believe children will learn better in the structured situations if they are already familiar with sound talk embedded in literacy activities within the classroom.

SUMMARY AND CONCLUSIONS

Phonemic awareness is a critical component of reading and writing. This study demonstrates that small groups of mixed ability children can learn phonemic awareness in a naturalistic approach consistent with the principles of emergent literacy instruction. Sounds in words can be discussed within conversations embedded in storybook reading and story writing. Even children with lower levels of literacy can learn phonemic awareness in this complex, meaningful text situation. Several phonemic awareness tasks can be targeted within a single instruction session, with levels of scaffolding tailored to task difficulty and individual child performance. This approach provides a fertile learning environment within which other aspects of language and literacy, and individual child interests can be pursued.

APPENDIX A: PHONEMIC AWARENESS TEST

Indicate whether the child said the letter name or the sound by writing / / around sounds and the letter alone for letter names. If several letters are provided, separate by dashes (-) to indicate they are not representing a word. Ceiling - Stop testing if five incorrect in a row.

First Sound Identification (sam →/s/)

I want you to say the first sound in some words. I have a friend named Sam. *Sss*am starts with an – (wait for child to attempt). . . /s/. *Sss*am starts with /s/. (If child says letter, agree but say to listen for the sound and not worry about the letter.) Sam's favorite food is cheese. *Chch*eese starts with? (Wait for child to attempt). . . /ch/. *Chch*eese starts with the /ch/ sound. (If child incorrect, say the following) You say the first sound, cheese starts with? (Wait for child to attempt). . . /ch/. Cheese starts with the /ch/ sound. Now you do some by yourself. You say the first sound in these words. Say the *first* sound in _____. (say each time)

  1. shoe   2. boy   3. sun   4. wish   5. mat
  6. cheap   7. dog   8. bad   9. please 10. climb

Last Sound Identification (sam →/m/)

Now, I want you to say the *last* sound in some words, the sound at the *end* of the word. My friend Sa*mm* ends with an – (Wait for child to attempt). . . /m/. Sa*m* ends with /m/. Sam's favorite food is cheese. Chee*sss*e ends with? (wait for child to attempt). . . /z/. Chee*ss*e ends with /z/. (If child incorrect) You say the first sound, cheese ends with? (Wait for child to attempt). . . /z/. Cheese ends with the /z/ sound. Now you do some by yourself. You say the last sound in these words. Say the *last* sound in _____. (say each time)

1. ice	2. egg	3. sun	4. wish	5. time
6. peach	7. dog	8. bad	9. please	10. climb

First Sound Deletion (sam -/s/=/am/)

I'm going to mess up Sam's name now. I'm taking the /s/ sound off Sam. Sam without /s/ is? (Wait for child to attempt). . . -/am/. *S*-am without /s/ is -/am/. How about cheese? Cheese without /ch/ is? (Wait for child to attempt). . . -/iz/. Cheese without /ch/ is /iz/. You say that, cheese without /ch/ is (wait for child to attempt). . . -/iz/. (If child incorrect) You say that, cheese without /ch/ is? (Wait for child to attempt). . . /iz/. Cheese without /ch/ is /iz/. Now you do some. Shoe without /sh/ is _____ (say each time.) [Same word list as First Sound Identification.]

Segmentation (sam → s-a-m)

Now I want you to break words into pieces. We can break up the name Sam into three sounds, ss-aa-mm. See, we can stick out our fingers for each sound in the word s-a-m. (Show fist on table). Stick out your finger for each sound, /s/-(index)/ a/-(middle)/m/-(ring). Three sounds. /S/-/a/-/m/ (Put finger out for each). You do it. /s/- (Wait for child to attempt rest) /a/-/m/. One finger for each sound, /s/-/a/-/m/ (Finger out for each). We can stick out our fingers for the sounds in cheese. Get your fingers ready (Show fist on table). /ch/(index)-/ee/(middle)-/z/(ring). You try it. Count the sounds in cheese. (Wait for child to attempt, if nothing start with first sound & finger). /ch/- (Wait for child attempt). /ee/-/z/. Three sounds again. Do it with me, /ch/-/i/-/z/. Now you do some by yourself. Get ready with your fingers (Show fist on table). Say the sounds in _____. (Say each time, with optional reminder - use your fingers.) [Same word list as First Sound Identification.]

APPENDIX B: POST-TREATMENT PARENT INTERVIEW

Hi, this is _____. I am involved in the storybook reading study that your child was a part of this fall at his daycare. I just called to thank you for allowing your child to participate and ask you a few follow-up questions about your child. Do you have a few minutes?

1) Since September, how do you feel your child's knowledge of letters has progressed? Would you say a little bit, quite a bit, or a lot? Do you have any examples?
2) Has your child shown an increased or decreased interest in books or reading in general? (if increased) Would you say it increased a little, quite a bit, or a lot? Can you think of any examples?
3) What about his/her interest in writing, for example wanting to learn to write or pretending to write letters? Would you say there was an increase or a decrease since September? A little, quite a bit, or a lot? Do any examples come to mind?

4) Have you noticed your child is trying to sound out or read words more often since September? A little, quite a bit, or a lot? Can you give me any examples?

APPENDIX C: BOOKS USED FOR INSTRUCTION

Brown, M.W. (1982). *Goodnight moon,* New York, NY: Harper Trophy.

Carlstrom, N.W. (1986). *Jesse Bear, what will you wear?* New York, NY: Aladdin.

Cuetara, M. (1997). *Terrible Teresa and other very short stories,* New York, NY: Dutton Children's Books.

Emberly, B. (1967). *Drummer Hoff,* New York, NY: Aladdin.

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