PREVENTING READING FAILURE: TEACHING PHONOLOGICAL AWARENESS TO PRESCHOOLERS

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ABSTRACT

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by Katherine Tennant

Previous research has shown a link between phonological awareness and learning to read (Bradley & Bryant, 1983; National Reading Panel, 2000). We examined whether preschool children could make substantial gains in phonological awareness following an intervention that used direct instruction methods. Twenty-eight children ranging in age from 3 years, 6 months to 5 years were assigned to one of two intervention conditions or a control condition. Children in the intervention groups received five hours of instruction in phonological awareness spaced over five weeks. Using Elkonin boxes and manipulatives, children were taught to blend, segment, and delete sounds in spoken words progressing from larger to smaller sound units. Phonological awareness and spoken vocabulary were assessed three times over the course of the study. Individual growth, as measured by gains in phonological awareness after the first test, indicate that the intervention helped children make significant gains in phonological awareness. Children in the intervention group had significantly greater post-intervention phonological awareness scores compared to their pre-intervention scores. No such growth was observed for vocabulary. However, only one of two intervention groups significantly improved their phonological awareness scores compared to children in the control group. Age differences and/or insufficient power may have contributed to the lack of significant growth. These data indicate that preschool children may benefit from direct instruction in phonological awareness. Strengthening phonological awareness before literacy instruction begins in kindergarten could improve outcomes for those at risk for reading failure.

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Introduction

One of the main objectives of early elementary education is teaching students to read, and it is not uncommon for children to struggle in this area. Deficiencies in reading ability are associated with long-term detrimental effects to individuals' socioemotional functioning (Morgan, Farkas, & Wu, 2012), socioeconomic status (Kirsch, Jengeblut, Jenkins, & Kolstad, 2003), and academic performance. Poorly developed reading skills can have carry-over effects, and contribute to difficulties in other subject areas because a great deal of instructional material requires reading. Additionally, most students who receive special education services for a learning disability have problems in reading (Lyon et al., 2001). Reading difficulties are associated with special education placement and grade retention, and these events in turn are correlated with increased likelihood of high school dropout (Reschly, 2010). Clearly, the effects of poor reading skills are widespread.

Putting poor readers at further risk are the cumulative impacts of early reading failure, which can produce "Matthew effects" (Stanovich, 1986). In this poor-get-poorer effect, a reciprocal relationship exists between reading achievement and text exposure. Children who experience reading difficulties cannot identify or decode words as efficiently as strong readers, and therefore read fewer words in the same time. In other words, poor readers typically read less, and the lack of exposure contributes to lower achievement, thus perpetuating the cycle of reading difficulty. This means that poor readers do not improve without intervention.

The first three years of school are critical to the process of learning to read. More than 17.5% of students in the United States struggle with reading during these years (National Reading Panel, 2000). If this trend is not reversed, it leads to a pattern of reading difficulties that extends into more advanced grades. Among fourth and eighth graders in the United States, only

about 34% of students at each grade level perform at or above the proficient level in reading (National Center for Education Statistics, 2011). Because the early years of education are imperative to later success, early intervention is invaluable for a child struggling in reading.

Even more effective than the remediation of reading difficulties in the early grades, however, is the prevention of reading difficulties before the commencement of formal reading instruction. Ideally, prevention activities would take precedence over remediation in order to avoid reading failure altogether. It is estimated that the number of individuals receiving reading remediation services, such as special education, could be decreased by up to 70% through early detection and prevention (Lyon et al., 2001). One of the most fundamental skills for learning to read is phonological awareness, which is the awareness of the sound structure of spoken words, ranging from larger to smaller units. There is evidence of a causal relationship between phonological awareness and skillful reading (Bradley & Bryant, 1983). The present study investigated the effectiveness of an intervention aimed at helping preschoolers improve their phonological awareness skills.

Levels of Phonological Awareness

Phonological awareness is a skill both fundamental and necessary to the development of reading ability. Phonological awareness is a general term for the awareness of the sound structure of spoken words. This skill is demonstrated through the ability to identify and produce rhymes and alliterations, as well as mentally manipulate units of words ranging from syllables, to onset and rime units, and finally to phonemes. Onset refers to the part of a word that comes before the first vowel sound, while rime refers to the remaining part of the word, including the vowel sound and all sounds after it.

The most complex skill subsumed under phonological awareness is phonemic awareness. Phonemes are the smallest units of language that deliver meaning, and as such, they are an abstract concept because they are not heard separately. Instead, phonemes are blended together in the speech stream and are heard as one word among a group of others. Phonemic awareness involves the understanding that words can be separated into individual sounds (Gillon, 2003). Understanding the sound structure of a spoken word at this level helps in decoding its written equivalent (Calfee, Lindamood, & Lindamood, 1973; Rosner & Simon, 1971). It is not surprising, then, that phonemic awareness is the best predictor of individual differences in reading ability among early learners (Liberman, Shankweiler, & Liberman, 1989; Melby-Lervåg, Lyster, & Hulme, 2012).

Manipulation at the syllable, onset-rime, and phoneme levels occurs through blending, segmenting, adding, and deleting (eliding) units, among other skills (Gillon, 2003). For example, at the onset-rime level, blending the sounds */l/* and */amp/* together makes *lamp*, and adding */p/* to */an/* makes *pan*. Additionally, at the phoneme level, the word *tag* can be segmented into the */t/*, */a/*, and */g/*. Finally, at the syllable level, eliding *sun* from *sunflower* leaves *flower*.

Developing Phonological Awareness

Research suggests there is a biological readiness to pick up spoken language through social interaction. As young as infancy, the ability to discriminate between isolated speech sounds has developed (Eimas, Siqueland, Jusczyk, & Vigorito, 1971). Despite this, discriminating phonemes within speech is more challenging, and does not develop spontaneously (Morais, Cary, Alegria, & Bertelson, 1979). However naturally speech may come, the ability to discriminate individual phonemes within the speech stream is difficult because these units are not easily segmented (Liberman, 1971).

Although the proclivity to learn spoken language is a product of evolution, the recognition that individual speech sounds map on to graphemic representations is not natural (Gough & Hillinger, 1980; Liberman, 1971). Thus, we are "biologically destined to speak, not to read or write" (Liberman, 1997, p. 186), and we only learn the latter two abilities through instruction (Gough & Hillinger, 1980). For some individuals there is a breakdown when it comes to matching easily-developed spoken language processes to the more difficult process of reading. These individuals enter kindergarten and have difficulty acquiring reading skills because they lack phonological awareness, which involves the ability to process units of spoken language. Thus, developing phonological awareness aids in learning to read. Indeed, phonological awareness at a young age is linked to skilled reading in later grades (Ashby, Dix, Bontrager, Dey, & Archer, 2013; Bradley & Bryant, 1983; Calfee, Lindamood, & Lindamood, 1973; Lonigan, Burgess, Anthony, & Barker, 1998; Lundberg, Olofsson, & Wall, 1980).

The development of phonological awareness follows a predictable pattern. Children learn to manipulate larger sound units before smaller units (Anthony, Lonigan, Driscoll, Phillips, & Burgess, 2003; Carroll, Snowling, Hulme, & Stevenson, 2003; Gillon, 2003; Liberman, Shankweiler, Fischer, & Carter, 1974; National Reading Panel, 2000). Preschool children are able to manipulate larger units such as syllables, and as they advance in school they become more sensitive to smaller sound units (Liberman, 1973); however, even some children younger than the age of 3 can demonstrate the more advanced skills (Lonigan, Burgess, Anthony, & Barker, 1998). As children age, two mechanisms guide the development of phonological awareness. First, their ability to skillfully perform phonological awareness tasks at the higher ability level is predicted by their ability at the lower level, and second, their phonological awareness skills become more stable (Lonigan, Burgess, Anthony, & Barker, 1998).

Teaching Phonological Awareness

Study after study has suggested that phonological awareness can be explicitly taught to a variety of young learners (Bradley & Bryant, 1983; Liberman, Shankweiler, & Liberman, 1989; Lundberg, Frost, & Petersen, 1988; National Reading Panel, 2000; Olofsson & Lundberg, 1983; Treutlein, Zöller, Roos, & Schöler, 2008), including preschoolers with communication impairments (Laing & Espeland, 2005), and first-graders placed at risk for reading difficulties due to low socioeconomic status and/or a speech-language impairment (Ritter & Saxon, 2011). Despite this, it is typically not an instructional objective in schools (Phillips, Clancy-Menchetti, & Lonigan, 2008). Furthermore, research has suggested that teachers frequently lack adequate phonemic awareness skills themselves as well as the content knowledge to accurately interpret language screenings and implement interventions (Moats, 1994; Moats & Foorman, 2003). Together, these factors limit the degree of phonological awareness included in reading instruction. In addition, the prevalence of reading problems (National Center for Education Statistics, 2011) makes a strong case for ensuring phonological awareness skills are well-developed before attending kindergarten.

Phonological awareness can be taught prior to kindergarten enrollment (Bradley & Bryant, 1983; Maslanka & Joseph, 2002; National Reading Panel, 2000). Universal phonological awareness instruction in preschool has been studied in other countries. For example, a city in Germany mandated the implementation of a program that included instruction in these skills in all public preschools (Treutlein, Zöller, Roos, & Schöler, 2008). Conditions of program implementation varied widely among schools, allowing for an examination of the effects of the instruction in a naturalistic setting. Children who received the phonological awareness training demonstrated increased skills in recoding and decoding compared to peers

who did not. This is remarkable considering the variability with which the program was implemented among schools, and attests to the power of phonological awareness instruction.

In another large-scale longitudinal study, Danish preschoolers received explicit instruction in phonological awareness skills before the commencement of reading instruction (Lundberg, Frost, & Petersen, 1988). Skills practiced included rhyming and segmentation daily over a period of 8 months. Small but significant effects found in this study demonstrated that phonological awareness can be taught to preschoolers despite a lack of a graphemic system. The authors cited the use of explicit instruction as key to the instruction's success.

Pedagogical Approaches to Teaching Phonological Awareness

In their meta-analysis, the National Reading Panel highlighted the most effective approaches to teaching phonological or phonemic awareness (2000). In studies included in the meta-analysis, moderate to large effect sizes were found for improvement in phonemic awareness, spelling, and reading following phonemic awareness instruction. This was true when instruction was delivered to preschoolers more than any other age group, which supports the important role of early prevention and intervention activities in establishing good reading ability. Larger effect sizes were also found when instruction in phonemic awareness skills was focused and explicit, when only one or two skills were taught, and when instruction was delivered in small groups rather than individually.

Another important finding of the panel's analysis is that phonemic awareness can be taught effectively to a variety of learners under a variety of conditions (National Reading Panel, 2000). Instruction can occur in a classroom setting and benefit a wide range of ability levels. This suggests that instruction in early reading skills can be advantageous for all students. Furthermore, instructional time totaling 5 to 18 hours was more effective than instruction for

shorter or longer periods. Results of another meta-analysis supported this finding, and revealed that the duration of most programs is 7 to 12 weeks, for three to five sessions per week lasting 15 to 30 minutes each (Schuele & Boudreau, 2008). This encouraging finding suggests that teachers who wish to implement a program of phonemic or phonological awareness do not have to dedicate a large portion of instructional time to these skills to have an impact.

In teaching phonological awareness, the use of manipulatives to concretely represent sounds has been found effective for children in preschool (Maslanka & Joseph, 2002), and early elementary school (Uhry & Shepherd, 1997). One instructional method is the Elkonin box procedure (Elkonin, 1973). In this procedure, blocks or markers that represent speech sounds (typically phonemes) are placed in boxes beneath a picture of the word that is to be segmented. The child places a block in each box as they simultaneously say the sound represented by the block. Thus, there is a one-to-one correspondence between speech sounds and the manipulatives.

The Elkonin box procedure has been used with preschoolers and found to be effective. Maslanka and Joseph (2002) implemented an instructional program with 19 preschoolers with a mean age of 4 years, 5 months. Two instructional techniques for teaching phonological awareness – sound boxes and sound sort – were implemented. The sound boxes procedure is the same as the Elkonin boxes procedure, in which skills are practiced using concrete representations of speech sound units. In the sound sort technique, participants sorted pictures into categories based on some shared characteristic of their sounds (e.g., words with a common beginning or ending sound). Both techniques resulted in improvement in performance on phonological tasks, however, the sound box group achieved significantly higher scores on isolating medial sounds and segmenting phonemes. These results show that students as young as preschool can learn

these skills using this technique. However, two limitations of this study included the lack of a non-treatment control group and the use of a standardized measure that was not meant for use with preschoolers, the *Test of Phonological Awareness* (TOPA; Torgesen & Bryant, 1994). In using the TOPA, the researchers assessed post-intervention growth with raw scores instead of deriving standard scores. Thus, the degree to which the treatment improved participants' skills beyond the course of normal maturation is unknown.

A general approach to instruction that has been found effective in teaching phonological awareness skills is direct instruction. Research supports the use of these procedures for young children (National Reading Panel, 2000). Direct instruction is teacher-directed, fast-paced instruction in which lessons are carefully scripted and sequenced and then delivered to small groups of children (Lehman et al., 2011). Direct instruction is not a new concept; in fact it has been researched and developed for decades. The assumption of direct instruction is that a great deal of material can be covered in relatively little time. This is accomplished through maximizing instructional time through rapid pacing, and garnering responses from all participants simultaneously, rather than using a turn-taking procedure (Engelmann & Carnine, 1991).

The present study investigated whether direct instruction of phonological awareness skills would benefit preschool children. Children were tested before and after a 5-week intervention that involved phonological awareness instruction modified for preschoolers in two ways. First, direct instruction procedures were used (see Engelmann & Carnine, 1991). This included small group sizes and unison responding from the children. Both of these practices allowed for high rates of responding and increased attention from all students. Furthermore, the pacing of instruction was rapid; phonological awareness skills at the syllable level through the phoneme

level were covered in five weeks. Finally, a "model, lead, test" scaffolding format was used to teach skills on an as-needed basis, another direct instruction practice. For this, the primary investigator modeled a skill, then participants performed the skill in unison with the primary investigator leading, and finally the participants' ability to perform the skill independently was tested. The second modification included the use of Elkonin boxes. Participants performed each phonological task with the aid of pictures and manipulatives to reduce the working memory load required by these tasks.

Other researchers have used one or both of these methods to teach phonological awareness (e.g., Maslanka & Joseph, 2002; Uhry & Shepherd, 1997), but the present study differs in some important ways. For example, participants were all 5-years-old or younger and did not have documented phonological processing deficits. Furthermore, at roughly 6 hours' instructional time, the intervention in the present study was at the short end of most estimates of effective phonological awareness interventions (National Reading Panel, 2000; Schuele & Boudreau, 2008).

Following the intervention, the growth in phonological awareness and vocabulary over five weeks was assessed for children who received the intervention and for those who did not. Skills taught in this intervention included the blending and elision of speech sound units including syllables in compound words, syllables in words (not compound), onset and rime units, and final phoneme. It was predicted that there would be significant growth in phonological awareness following the intervention, but not in vocabulary; it was also predicted that the intervention group would improve phonological awareness skills relative to the control group.

Method

Participants and Settings

Participants included 28 children enrolled in three daycare programs in the Mid-Michigan area (males = 17; females = 11). Participants ranged in age from 3 years, 4 months to 5 years at the start of the study (Median = 48 months, *M* = 49.71 months, *SD* = 6.22 months).

The average age of intervention group participants in Period 1 was 4 years, 6 months (range of 3 years, 11 months to 5 years). The average age of intervention group participants in Period 2 was 4 years, 2 months (range of 3 years, 5 months to 5 years). The average age of both intervention groups was 4 years, 4 months (range of 3 years, 11 months to 5 years). The average age of control group-only participants was 3 years, 11 months (range of 3 years, 5 months to 4 years, 10 months) at the first testing.

Directors of three daycare centers gave permission for the study to be conducted at their respective centers. Following this, the parents of participants gave their permission for the involvement of their children. Permission forms, as well as letters, appear in Appendix A.

Participants were selected based on attainment of parent permission and daycare attendance. Potential participants received parental permission forms if they attended the daycare center for all three days of instruction (i.e., Monday through Wednesday). Those who returned the forms and whose schedules matched were included in the study. Participants were assigned to intervention and control groups that were matched for their performance on the Phonological Awareness subtest of the TOPEL. To achieve this, participants were rank-ordered based on their scores on the Phonological Awareness subtest, and then systematically assigned to one of the three groups in order on an alternating basis. This ensured that all groups had a range of similar ability levels from the start.

Experimental Design

This study consisted of two intervention groups (Groups A and B) and two control groups (Groups B and C; Group B served as a control group then an intervention group). During Period 1, there were nine participants in the intervention group (Group A) and 19 in the control group (Groups B and C). In Period 2, there were 10 participants in the intervention group (Group B) and nine in the control group (Group C). These nine participants in the final control group did not receive the intervention in this study; but received an abbreviated version upon completion of the study. One participant in Group A discontinued enrollment at his daycare center and was not tested during Test 3.

Both intervention groups received 5 weeks of phonological awareness instruction, three times a week for approximately 25 minutes each by the principal investigator. Instruction covered blending and elision of words at the level of the syllable, onset and rime, and phoneme (last phoneme only). A sample weekly lesson plan appears in Appendix B. Instruction progressed from manipulation of larger units to smaller units, and from blending to elision. This decision was made based on research findings indicating that blending abilities develop before elision abilities (Anthony et al., 2003).

Participants were assessed prior to and following the intervention, irrespective of whether they received the intervention. The original testing protocol included both vocabulary and phonological awareness assessment during the first test, and phonological awareness assessment only in the second and third test. This was for the purpose of assigning participants to groups based on vocabulary abilities prior to the commencement of the intervention. This protocol changed from the beginning to the end of the study; during the second test phase, it was decided that vocabulary would be assessed at all test phases. This resulted in unequal sample sizes across

analyses; thus, there are nine participants for whom no vocabulary subtests were administered in Period 2. Table 1 depicts these three groups and the timeline for testing and intervention.

Instrumentation

The pre- and posttest measures used in this study were the *Test of Preschool Early Literacy* (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007), and the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Good & Kaminski, 2002). Assessment using DIBELS included the Phoneme Segmentation probe in its standardized form, as well as three modified versions to assess blending at the onset-rime and phoneme levels, and segmentation at the onset-rime level. The TOPEL was chosen because it is technically adequate and one of the few measures of phonological awareness available for ages 3 through 5 that assesses both blending and elision at the level of syllable, onset-rime, and phoneme.

Test of Preschool Early Literacy (TOPEL)**.** The TOPEL is a norm-referenced measure of early literacy skills for children ages 3 to 5 that contains three subtests: Print Knowledge, Definitional Vocabulary, and Phonological Awareness. The Print Knowledge subtest consists of 36 test items and assesses written language conventions and form as well as alphabet knowledge. The Definitional Vocabulary subtest comprises practice items in addition to 35 test items that measure the ability to identify the name and some feature of an object. The Phonological Awareness subtest consists of 27 test items as well as practice items that measure blending and elision of words and phonemes.

The TOPEL was normed on 842 children and included more than 200 participants per age level. The normative sample's demographic characteristics were similar to the 2001 U.S. Census in terms of geographic distribution, gender, race, ethnicity, socioeconomic status, and disability status; however, there were no data for urban/rural residence.

For 4- and 5-year olds, the TOPEL's internal consistency for the Phonological Awareness subtest was .86 and .88; for the composite it was .96 at both ages. Test-retest reliability was measured using a two-week interval; for the Phonological Awareness subtest it was .83 and for the overall composite, .91.

A logistic regression procedure was used to assess any item bias. Items on the TOPEL were found to be unbiased in terms of gender, race, and ethnicity. To evaluate the TOPEL's concurrent validity, it was compared to the Alphabet subtest and Reading Quotient of the *Test of Early Reading Ability-Third Edition* (TERA-3; Reid, Hresko, & Hammill, 2001), the Elision and Blending Words subtests of the *Comprehensive Test of Phonological Processing* (CTOPP; Wagner, Torgesen, & Rashotte, 1999), the *Expressive One-Word Picture Vocabulary Test – 2000 Edition* (Brownell, 2000), and the *Get Ready to Read! Screening Tool* (Whitehurst & Lonigan, 2001). At all ages, correlations for the composite ranged from .60 (.70 corrected) when compared to the *Get Ready to Read* composite, to .63 (.67 corrected) when compared to the TERA-3 reading quotient. Correlations for the Phonological Awareness subtest ranged from .37 (.37 corrected) when compared to the TERA-3 Reading Quotient, to .55 (.65 corrected) when compared to the CTOPP Blending Words subtest. The raw score means on the TOPEL are correlated with age; thus, performance on this instrument increases with age.

In its Phonological Awareness subtest, the TOPEL uses a multiple-choice format on some items. This consists of pictorial representations of the answer choices. The ability to blend and elide words is demonstrated by the child's ability to correctly choose the pictorial representation of part of the test word. For example, the examiner asks the child to point to the word *sunflower* without *flower*. The child responds correctly by pointing to a picture of a sun. This method has been used in prior studies (Anthony, Lonigan, Driscoll, Phillips, & Burgess,

2002; Carroll, Snowling, Hulme, & Stevenson, 2003; Kantor, Wagner, Torgesen, & Rashotte, 2011; Lundberg, Frost, & Petersen, 1988).

***Dynamic Indicators of Basic Early Literacy Skills* (DIBELS).** The second measure used in this study was the Dynamic Indicators of Basic Early Literacy Skills (DIBELS). This criterion-referenced phonemic awareness and reading assessment is used by schools nationwide in kindergarten through sixth grade to determine which students are on track for future reading success and which are likely to struggle in future grades. DIBELS contains a Phoneme Segmentation Fluency (PSF) task, in which children are presented with a word aloud and instructed to segment it into its smallest sounds. The total score comprises the number of correct sound segments identified in one minute.

The Phoneme Segmentation Fluency subtest is intended for children in kindergarten and the beginning of 1st grade. For the middle of kindergarten, the benchmark is 20 segments per minute. Although this measure was designed for children older than preschool, it was used in this study as a more sensitive measure than the TOPEL, because it is timed and growth can be measured in raw score points rather than standard score points.

Because this assessment was administered to preschoolers, it was made simpler by adding an onset-rime segmentation component, in which the participants were instructed to break a word into its onset-rime units. Previous research suggests that preschoolers generally can manipulate larger, rather than smaller word units (Liberman, 1973). It was also modified to assess onset-rime blending and phoneme blending. In the blending tasks, the examiner stated a word aloud that was segmented into either its onset-rime or phoneme units, and the participant was instructed to blend it into a whole word. Partial credit was also given for any phoneme blends, even if they did not form the whole word. Thus, there were four DIBELS tasks: the

Phoneme Segmentation Fluency probe, and the three modified probes: Onset-Rime Segmentation Fluency, Onset-Rime Blending Fluency, and Phoneme Blending Fluency.

Participants were first administered the Onset-Rime Segmentation Fluency probe. If the participant incorrectly answered the first five items, this probe was discontinued and the Phoneme Segmentation Fluency probe was not administered. Next, participants were administered the Onset-Rime Blending Fluency probe. As before, if the participant incorrectly answered the first five items, testing was discontinued and the Phoneme Blending Fluency probe was not administered.

Inter-examiner agreement was evaluated for 20% of all measures administered to assess the accuracy of scoring. To evaluate agreement, another trained graduate student observed the principal investigator while administering the TOPEL and DIBELS tasks and independently scored a separate answer sheet. The graduate student evaluator had experience with administering standardized tests as well as DIBELS probes in a school setting. For the Vocabulary subtest, agreement was 97.7% for all items administered, and for the Phonological Awareness subtest, it was 99%. For all DIBELS tasks, agreement was 95.1% for all items administered. Thus, inter-examiner agreement was acceptable for this study.

Procedure

Prior to beginning the intervention, the principal investigator assessed each participant using all three subtests of the TOPEL and the modified DIBELS probes. Administration required approximately 30 minutes per child. Assessment with these measures occurred on three occasions during this study.

Prior to the intervention's implementation, the principal investigator taught the direct instruction procedures to the participants. Of primary importance was learning the Model, Lead,

Test sequence, as well as learning how to respond in unison upon presentation of a hand signal. The basic procedure was as follows: to teach the skill, the instructor first modeled how to perform it; then the instructor and participants applied the skill in unison upon the instructor's signal; then, the instructor signaled again so that only the participants replied in unison (Engelmann & Carnine, 1991). In this intervention, the signal was the primary investigator telling the participants "ready, set, go." The Model, Lead, Test sequence was used on an as-needed basis throughout the instruction. While the investigator was providing instruction, the participants were seated in chairs at a table or on the floor in a horseshoe shape.

To aid in skill acquisition, participants were taught using manipulatives (e.g., tokens) in combination with Elkonin boxes. This procedure aided in blending words when participants identified the unit that each marker represented, and aided in elision when participants took away a marker and then said the word while skipping the box with the missing marker. This procedure taught students to associate the number of boxes they saw on the page with the number of units to be manipulated. This procedure also reduced the cognitive load required by mental word manipulation by providing a visual and memory aid for the participants. It minimized the effects that poor short-term or working memory could have on performance (procedure adapted from McCarthy, 2008). See Appendix C for samples of Elkonin boxes; the words below each box were not included in instruction, but illustrate the word units that were blended and/or elided.

The Elkonin boxes were placed in "sound stages" made out of small boxes the size and shape of a shoebox, and decorated by the participants. This configuration was especially useful during the "test" phase, when participants were directed to elide a specific part of a word and could do so by removing the marker that represented the sound, rather than stating the sound

aloud. This procedure made it easier to monitor participants' responses, and kept their responses private from other participants.

Participants who were absent for an instructional session received individual make-up instruction on the next day they were present. Make-up sessions involved reviewing the skills taught during the session that was missed. Therefore, the conditions were different between the normal instructional sessions and the make-up sessions because they were conducted on an individual basis and therefore tended to be of shorter duration.

Results

Standard scores served as the unit of measurement when analyzing performance on the TOPEL, rather than raw scores, to avoid measuring maturation effects because this study extended over several weeks. To assess DIBELS performance, the unit of measurement for segmentation was the number of sound units a participant broke a word into; for blending, the unit of measurement was the number of sound units in a word blended together (e.g., onset-rime units or phonemes). Differences in pre- and post-intervention scores, or growth scores, were calculated for the intervention and control groups at multiple time points: Period 1 (Test 1 compared to Test 2), Period 2 (Test 2 compared to Test 3), and Overall (Test 1 compared to Test 3). It is important to note that the "Overall" time point is not simply the mean of Periods 1 and 2; rather, it is the difference between the participants' scores at Test 1 and Test 3. Therefore, participants will be missing a Period 1, Period 2, or Overall growth score if they were not tested during one of the assessment phases.

The intervention was administered in two consecutive periods and, therefore, each period was analyzed separately. Participants who received the intervention first served as the intervention group in Period 1; those who received it second served as the intervention group in

Period 2; finally, both groups' scores from the first testing (January) and the last testing (May) were combined to assess overall growth for the intervention group. In all analyses of growth in Period 2, participants who received the intervention during Period 1 did not serve as controls. Within-group growth analyses were conducted due to inconsistent sample sizes between groups.

Analyses of TOPEL and DIBELS pre- and post-intervention performance proceeded in the following sequence: phonological awareness growth for the intervention group was examined in each period. These analyses were repeated for phonological awareness growth in the control group. Next, the intervention and control groups' vocabulary growth scores were analyzed separately. Between-group analyses were then conducted between the intervention and control groups' TOPEL and DIBELS scores to compare the intervention groups' phonological awareness growth relative to the control group at each time period.

Baseline descriptive statistics for each dependent measure are presented in Table 2. These data represent the scores achieved by participants at the first testing, before any implementation of the intervention, and thus indicate that groups had similar levels of phonological awareness skills from the beginning.

Within Groups Analyses

Phonological awareness growth in the intervention groups. Descriptive statistics for TOPEL phonological awareness growth in the intervention groups appear in Table 3. On average, participants who received the intervention in Period 1 experienced a 10.4 point mean increase in their phonological awareness subtest scores, t (8) = 3.07, $p < .05$. Participants in Period 2 experienced a 5.2 point mean increase in their phonological awareness subtest scores, t (9) = 2.00, $p = .08$. Overall, examining participants who had scores for both Tests 1 and 3, those

in the intervention groups experienced a 9.5 point mean increase in their phonological awareness subtest scores, t (17) = 4.92, $p < .001$.

The intervention group also improved their phonological awareness according to their performance in some areas of the DIBELS probes; descriptive statistics for these analyses appear in Table 4. In Period 1, participants increased their ability to blend phonemes into larger units (phoneme blending) by an average of 3.4 points, t (7) = 2.9, p = .02; growth was not present in any other area in this period. In Period 2, participants did not increase their phonological awareness in any area assessed by the DIBELS probes. Overall, examining participants who had test scores for both Tests 1 and 3, those in the intervention group increased their ability to segment words into onset-rime units (onset-rime segmentation) by an average of 7.1 points, t (16) = 2.25, p = .04. Also during this time, participants increased their ability to segment words into phonemes (phoneme segmentation) by an average of 6.6 points, t (15) = 2.06, p = .06; their ability to blend onset-rime units into words (onset-rime blending) by an average of 1.9 points, t (16) = 2.03, p = .06; and their ability to blend phonemes into larger units (phoneme blending) by an average of 3.1 points, t (13) = 1.94, p = .08.

Phonological awareness growth in the control groups. The following analyses were conducted on TOPEL growth scores; descriptive statistics for phonological awareness growth in the control groups appear in Table 3. On average, participants who were in the control group in Period 1 experienced a 1.2 point increase in their phonological awareness subtest scores, t (18) = .63, p = .54. Participants in Period 2 experienced a 3.9 point increase in their phonological awareness subtest scores, t (6) = 1.05, p = .34. Overall, examining participants who had test scores for both Tests 1 and 3, those in the control groups experienced a 5.6 point increase in their phonological awareness subtest scores, t (6) = 1.56, p = .17.

Within groups analyses of DIBELS growth were not conducted for the control groups because the DIBELS measures were administered to very few participants during Test 1.

Vocabulary growth. Descriptive statistics for TOPEL vocabulary growth in both the intervention and control groups appear in Table 5. On average, participants who received the intervention in Period 1 experienced a 1.5 point increase in their vocabulary subtest scores, t (5) = .49, p = .65. Intervention group participants in Period 2 experienced a .83 point decrease in their vocabulary subtest scores, t (5) = .39, p = .71. Overall, examining participants who had scores for both Tests 1 and 3, those in the intervention groups experienced a 1.72 point increase in their vocabulary subtest scores, t (17) = 1.38, p = .19. On average, participants who were in the control group in Period 1 experienced a 1.3 point decrease in their vocabulary subtest scores, t (12) = .82, p = .43. Participants in Period 2 experienced a 2.2 point increase in their vocabulary subtest scores, t (4) = .79, p = .48. Overall, examining participants who had test scores for both Tests 1 and 3, those in the control groups experienced a 1.7 point decrease in their vocabulary subtest scores, t (6) = 1.35, p = .23.

Between Groups Analyses

Phonological awareness growth. The TOPEL growth in the intervention group significantly differed from controls in Period 1, t (26) = 2.54, p = .02, d = .99; whereas it did not differ in Period 2, t (15) = .31, p = .76; or overall (examining participants who had scores for both Tests 1 and 3), t (23) = 1.03, p = .31.

Additional analyses of the DIBELS scores of the intervention group compared to the control group did not yield any significant differences in phonological awareness growth between groups at any point measured.

Vocabulary growth. Analyses of the intervention groups' vocabulary growth relative to that of the control groups were not conducted because vocabulary did not increase within groups.

Discussion

Nineteen preschool-aged participants received direct instruction in phonological awareness over five weeks, for about 6 hours total. Elkonin boxes with manipulatives aided in the acquisition of blending and eliding units at the syllable, onset-rime, and phoneme level. Nine participants served as a control group, who did not receive any form of intervention during this study. Measures administered prior to and following the intervention consisted of a standardized measure of vocabulary and phonological awareness, the *Test of Preschool Early Literacy* (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007), as well as modified versions of the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; Good & Kaminski, 2002) as an additional measure of phonological awareness.

Overall, the intervention helped children improve their phonological awareness according to their performance on the dependent measures. The strongest gains were seen when participants were measured against their own performance. Participants' phonological awareness skills were stronger following the intervention, as measured by differences in their pre- and post-intervention scores. However, growth was not as strong when the intervention group was compared to the control group. For example, differences between the intervention and control group only appeared significant in Period 1.

Within the intervention groups, there was no vocabulary improvement, nor was there improvement relative to the control groups. The absence of vocabulary growth suggests that examiner familiarity is unlikely to account for the present findings. Examiner familiarity has been shown to be a factor in improved test scores (Fuchs & Fuchs, 1986). In the case of this

intervention, some participants were re-assessed after five weeks' worth of intervention, while their control group peers were re-assessed at this time after no further interaction with the examiner, which could have made examiner familiarity a confound. Similarly, this pattern also suggests that Hawthorne effects are unlikely to account for the study's findings. Hawthorne effects would have led to growth in vocabulary as well, because participants would have improved their scores simply due to the presence of an intervention, regardless of its effectiveness. It is assumed that these confounds would have affected both phonological awareness and vocabulary performance.

This study was not without limitations. Given that within the intervention groups, participants made significant (or marginally significant) gains, the finding that only one of the intervention groups significantly improved their scores relative to the control group was most likely due to insufficient statistical power due to small sample size. Insufficient power was a problem in the between groups comparisons, but not the within groups comparisons. The overall sample was small, with 28 participants total, and some participants were not tested during each testing period due to attrition and a change in the testing procedures. Additionally, the sample size in Period 2 was further reduced because participants were not included in the control group if they received the intervention in Period 1. There was also a high degree of variability within the growth scores; at times, the standard deviation was greater than the mean for the intervention group's growth scores. A larger sample size would have reduced this variability and increased power.

In addition to insufficient statistical power, the main limitation of this study was the age difference between the intervention groups. Intervention group participants in Period 1 (Group A) were on average 4 months older than intervention group participants in Period 2 (Group B).

Furthermore, a greater amount of Group B (four total) than Group A (two total) participants were younger than 4 years of age. This age difference presents a potential confound to the study. The older participants may have been under better instructional control, and therefore were better prepared to listen to instruction, follow directions, and retain skills learned. The older participants also may have been at a developmental level more appropriate for learning phonological skills. Furthermore, research suggests phonological awareness abilities are more stable in older preschoolers (Lonigan, Burgess, Anthony, & Barker, 1998), so low growth scores in the younger group may have reflected this instability in skill retention. It was observed throughout this study that older preschoolers appeared to acquire the more complex phonological awareness skills with greater ease than the younger preschoolers; this was confirmed in the finding that Group A (the oldest group) made the greatest gains.

This study demonstrates that a short-term intervention can lead to improvement in phonological awareness prior to the commencement of formal literacy instruction. Furthermore, the addition of a non-treatment control group sets this apart from similar studies (e.g., Maslanka & Joseph, 2002). The findings are consistent with previous studies indicating that children as young as preschool can benefit from instruction in phonological awareness (Laing & Espeland, 2005; Lundberg, Frost, & Petersen, 1988; Maslanka & Joseph, 2002; Treutlein, Zöller, Roos, & Schöler, 2008). Many of these studies included participants with documented deficits in phonological processing, those for whom literacy instruction had already commenced, or those who received intervention that spanned the length of the preschool year. Thus, this study provides an initial demonstration that a relatively short intervention (i.e., 5 weeks) confers short-term benefits to typically developing children.

Were this study to be conducted again, there are some areas that could have been improved. Balancing the intervention and control groups for participants' age in addition to their performance on the TOPEL would have been good practice. Furthermore, the skill progression of this instructional format was quite rapid, and would be unsuited for use with all students without modification when necessary. Therefore, a second improvement could involve spending more time on fewer tasks. For instance, an instructor could spend multiple weeks on teaching phonological awareness at the syllable level to younger or less advanced children, and spend the same time teaching this skill at the onset-rime or phoneme level to older or more advanced children. Preschoolers could be organized into small instructional groups depending on their skill level, and could move to more advanced groups as they developed their skills. Another practice that could be effective in a study such as this, and which would aid in the use of groupings based on skill levels, would be the introduction of periodic fluency checks as an alternative means of measuring growth. Fluency checks could provide a more specific way to keep track of progress, and would offer more information than a single score comparing children to their peers in one area. In practice, this would also help a teacher keep track of how quickly students are learning the skill, and then could adjust instruction accordingly.

There are several questions remaining for future research. Given the 4-month age difference between intervention participants in Group A versus Group B, and the greater gains made by participants in Group A, future research could examine whether phonological awareness training leads to larger gains in older preschoolers than younger preschoolers. This appears to have been the case with the present study. Future research could involve implementing the same intervention with a group of 3-year-olds and a separate group of 4-year olds. It has been argued that phonological awareness abilities are unstable in children under 4

years of age (Lonigan, Burgess, Anthony, & Barker, 1998). Based on past research and the results of the present study, it may be that children who are at least 4 years of age and have not yet commenced formal literacy instruction may receive the most benefit from phonological awareness training.

The duration of the intervention's impact on participants' phonological awareness skills presents an additional future area of study. Further research into this area could examine how long the effects of the intervention endure. It would also be beneficial to compare an intervention such as this, in which phonological awareness instruction is delivered over a few weeks, to one in which instruction is delivered in smaller doses over an extended period of time. Initial acquisition of skills could be compared between the two methods, as well as how long the observed effects last.

In conclusion, this study examined the effects of delivering an intervention in phonological awareness via a direct instruction format to preschoolers over 5 weeks. Compared to their initial performance, participants improved their phonological awareness skills as a result of the intervention. However, the study was not sufficiently powered to reveal significant differences between children who received the intervention as compared to those who did not. Children as young as preschool can experience substantial gains in this skill following relatively brief instruction. Effective and efficient instruction can occur in small groups using direct instruction methods. This study's findings have implications for individualized interventions and small group instruction aimed at improving preschoolers' phonological awareness, given that well-developed phonological awareness plays a casual role in learning to read (Bradley & Bryant, 1983; National Reading Panel, 2000). It is up to future research to determine whether

growth following a brief intervention translates into reading gains in the future, thus putting children on track for academic success early in their school career.

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Table 1.

Phonological Awareness Intervention Timeline

	Period 1		Period 2		
	Test 1	Instruction	Test 2	Instruction	Test 3
Group A	Intervention	Intervention	Intervention	None	Intervention
Group B	Control	None	Control/Int	Intervention	Intervention
Group C	Control	None	Control	None	Control

Table 2

Descriptive Statistics for Each Dependent Measure at Test 1

Measure	*N*	*M*	*SD*	*Mdn*
TOPEL				
Phonological Awareness				
Group A	9	95.2	10.9	102
Group B	10	96.7	7.3	98
Group C	9	96.4	10.8	98
Vocabulary				
Group A	9	100.1	9.5	101
Group B	10	106.2	4.3	106.5
Group C	9	105.4	5.8	105.0
DIBELS				
Onset-Rime Segmentation				
Group A	9	6.1	10.0	0.0
Group B	9	2.1	5.0	0.0
Group C	3	0.0	0.0	0.0
Phoneme Segmentation				
Group A	9	4.7	7.4	0.0
Group B	8	2.1	6.0	0.0
Group C	3	0.0	0.0	0.0
Onset-Rime Blending				
Group A	9	3.9	4.8	2.0
Group B	9	0.7	1.3	0.0
Group C	3	4.7	8.1	0.0
Phoneme Blending				
Group A	8	6	8.7	1.5
Group B	7	0.0	0.0	0.0
Group C	3	8.7	15.0	0.0

Table 3

TOPEL Phonological Awareness Growth Scores

Time	*N*	*M*	*SD*	*Mdn*
Intervention Groups				
Period 1	9	10.4	10.2	11
Period 2	10	5.2	8.2	5
Overall	18	9.5	8.2	9
Control Groups				
Period 1	19	1.2	8.4	3
Period 2	7	3.9	9.7	0
Overall	7	5.6	9.5	3

Table 4

DIBELS Growth Scores for the Intervention Group

Time	*N*	*M*	*SD*	*Mdn*
Period 1				
Onset-Rime Segments	9	5.7	14.2	2
Phoneme Segments	9	3.1	5.9	0
Onset-Rime Blends	9	0.9	3.8	0
Phoneme Blends	8	3.4	3.3	3
Period 2				
Onset-Rime Segments	10	5.6	11.6	0
Phoneme Segments	10	5.6	13.7	0
Onset-Rime Blends	10	0.0	3.9	0
Phoneme Blends	10	0.5	2.4	0
Overall				
Onset-Rime Segments	17	7.1	12.9	0
Phoneme Segments	16	6.6	12.9	0
Onset-Rime Blends	17	1.9	3.9	0
Phoneme Blends	14	3.1	6.1	0

Table 5

TOPEL Vocabulary Growth Scores

Time	*N*	*M*	*SD*	*Mdn*
Intervention Groups				
Period 1	6	1.5	7.6	-0.5
Period 2	6	-.83	5.2	1.5
Overall	18	1.7	5.3	2
Control Groups				
Period 1	13	-1.3	5.8	-2
Period 2	5	2.2	6.3	4
Overall	7	1.7	3.6	-2

APPENDICES

APPENDIX A

LETTERS AND PERMISSION FORMS

(Date here)

Dear (program director's name),

My name is Katie Tennant and I am a doctoral student in the school psychology program at Central Michigan University. I am contacting you about conducting a study in one or more of the preschool classrooms at (preschool name) this winter. My study would involve teaching phonological awareness skills to preschoolers in small groups.

Phonological awareness, or the ability to manipulate sounds and words, is an important skill for young learners because it is related to future reading success. My study will involve three 25-minute small-group instructional sessions per week for approximately fifteen weeks in January through May. The targeted skills will include blending and eliminating units of words.

Allowing me to conduct this study would benefit the teachers because it will give them more time for small group activities while I work with part of the class. Additionally, I will be giving the *Test of Early Preschool Literacy* to children both before and after my program. This test measures children's print knowledge, vocabulary, and phonological awareness. I would be willing to share the scores with the teacher so that they know each child's achievement in these areas before they enter kindergarten. Furthermore, if the instruction found to be is effective, teachers may want to include the procedure in their instruction.

With your permission and the permission of the teachers, I wish to answer the research question of whether phonological awareness can be taught to preschoolers to provide them with a foundation for later learning. I hope you will find it worth the time for (preschool's name) to be involved in this project.

I can be contacted via e-mail at tenna1k@cmich.edu or phone at 269-873-9267 if you have any further questions. My supervisor, Jane Ashby, can be contacted via e-mail at ashby1j@cmich.edu.

Thank you for your time and consideration.

Sincerely,
Katherine Tennant
Doctoral Candidate
School Psychology
Central Michigan University

CMU
CENTRAL MICHIGAN UNIVERSITY

(Date here)

Dear parent/guardian,

My name is Katie Tennant and I am a doctoral student in the school psychology program at Central Michigan University. I am contacting you to let you know about a program in your preschooler's classroom this winter that will involve teaching phonological awareness skills. Phonological awareness is the ability to manipulate spoken sounds and words (e.g., recognizing that "sunflower" is made up of the words "sun" and "flower"). It is an important skill for young learners because it is related to future reading success.

All children in __(teacher)_____'s class whose parents give permission will receive the instructional program. Additionally, I will be giving a test of preschool language skills to all children in the class to assess the effectiveness of the program. This test will measure their letter knowledge, vocabulary, and phonological awareness. No personal information will be collected about your preschooler except for his or her name, age, and scores on the test of language skills. This information will be kept confidential and only _____(teacher)____, a research assistant, and I will know your child's scores. __(Teacher/director)___ has given me permission to use findings from my evaluation of the teaching program for a master's thesis research project. In any papers or publications that result from this research project, no personally identifiable information about your preschooler will be reported.

Your preschooler's participation in this program will be for five weeks during the period of January to May, and will take up to 25 minutes, three days per week. All teaching sessions will be in small groups of children and under the supervision of your preschooler's teacher. I look forward to working with your child and hope that the skills I teach can provide them with a foundation for later learning. Please be aware that you may withdraw your preschooler from the research aspect of this teaching program without penalty. I can be contacted via e-mail at tenna1k@cmich.edu if you have any questions. My supervisor, Jane Ashby, can be contacted via e-mail at ashby1j@cmich.edu.

Sincerely,
Katherine Tennant
Doctoral Candidate
School Psychology
Central Michigan University

CMU
CENTRAL MICHIGAN UNIVERSITY

Director Permission Form

Study Title: Preventing Reading Failure: Teaching Phonological Awareness to Preschoolers

Research Investigators' Names and Contact Information:

Katherine Tennant – Doctoral student and investigator; E-mail: tenna1k@cmich.edu; Phone: 269-873-9267
Jane Ashby – Professor of Psychology; E-mail: ashby1j@cmich.edu

Introductory Statement:

I would like to invite you to participate in a study that will investigate the effects of a short instructional program on preschoolers' phonological awareness skills. Phonological awareness is the ability to hear and manipulate sounds and words in speech. It is an important pre-literacy skill, and deficits in this area have been shown to negatively impact later literacy achievement.

What is the purpose of this study? The purpose of the study is to determine whether preschoolers can benefit from instruction in phonological awareness activities.

What will the children do in this study? Students will receive instruction in various phonological awareness skills in a small group setting. They will also be assessed using an early literacy assessment. Students will not lose any instructional time, because instruction will occur during the small group work time.

How long will it take the children to do this? Instruction will occur for 25 minutes each day for three days per week for five weeks.

Are there any risks of participating in the study? There are no risks for participating.

What are the benefits of participating in the study? If this program is successful in boosting the phonological awareness of the participants, students will have gained a skill that is important to future reading success.

Will anyone know what the children do or say in this study (Confidentiality)?
Only the classroom teacher, research assistant, and I will know how individual students performed on the assessment. To avoid this information being viewed by anyone else, each child will have a number associated with their scores and personal information. These two pieces of information will be kept separate and only I will have access to the coding system. If the results of this study are shared with others, individual performance will not be reported.

Will the children receive any compensation for participation? There is no compensation for participating in the study.
Is there a different way for the children to receive this compensation or the benefits of this study? There is no compensation for participating in the study.

Who can I contact for information about this study?
Katherine Tennant – Doctoral student and investigator; E-mail: tenna1k@cmich.edu; Phone: 269-873-9267
Jane Ashby – Professor of Psychology; E-mail: ashby1j@cmich.edu

You are free to refuse to participate in this research project or to withdraw your consent and discontinue participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your relationship with the institution(s) involved in this research project.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

My signature below indicates that all my questions have been answered. I agree to participate in the project as described above.

_____ _____
Signature of Teacher/director Date Signed

A copy of this form has been given to me._____ Initials

_____ _____
Signature of Teacher/director Date Signed

A copy of this form has been given to me._____ Initials

_____ _____
Signature of Responsible Investigator Date Signed

CMU
CENTRAL MICHIGAN UNIVERSITY

Parent/Guardian Permission Form

Study Title: Preventing Reading Failure: Teaching Phonological Awareness to Preschoolers

Research Investigators' Names and Contact Information:

Katherine Tennant – Doctoral student and investigator; E-mail: tenna1k@cmich.edu. Phone: 269-873-9267
Jane Ashby – Professor of Psychology; E-mail: ashby1j@cmich.edu

Introductory Statement: I would like to invite your child to participate in a study I will be conducting in his/her preschool classroom. In this study I will investigate the effects of a short instructional program on preschoolers' phonological awareness skills. Phonological awareness is the ability to hear and manipulate sounds and words in speech. It is an important pre-literacy skill, and deficits in this area have been shown to negatively impact later literacy achievement.

What is the purpose of this study? The purpose of the study is to determine whether preschoolers can benefit from instruction in phonological awareness activities.

What will my child/ward do in this study? Your child will receive instruction in a small group setting. He/she will also be assessed using an early language test both before and after the instruction to determine its outcome on his/her phonological awareness skills.

How long will it take my child/ward to do this? Instruction will occur for 25 minutes each day for three days per week for five weeks.

Are there any risks of participating in the study? There are no risks involved in participating.

What are the benefits of participating in the study? If this program is successful in boosting the phonological awareness of the participants, your child will have gained a skill that is important to future reading success.

Will anyone know what my child/ward does or says in this study (Confidentiality)?
Only the classroom teacher, research assistant, and I will know how individual participants performed on the test. To avoid this information being viewed by anyone else, each child will have a number associated with their scores and personal information. These two pieces of information will be kept separate and only I will have access to the coding system. If the results of this study are shared with others, individual performance will not be reported.

Will my child/ward receive any compensation for participation? There is no compensation for participating in the study.
Is there a different way for my child/ward to receive this compensation or the benefits of this study? There is no compensation for participating in the study.

Who can I contact for information about this study?
Katherine Tennant – Doctoral student and investigator; E-mail: tenna1k@cmich.edu. Phone: 269-873-9267
Jane Ashby – Professor of Psychology; E-mail: ashby1j@cmich.edu

You are free to refuse to allow your child/ward to participate in this research project or to withdraw your permission and discontinue your child/ward's participation in the project at any time without penalty or loss of benefits to which you are otherwise entitled. Your participation will not affect your child/ward's or your relationship with the institution(s) involved in this research project.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the Institutional Review Board by calling 989-774-6777, or addressing a letter to the Institutional Review Board, 251 Foust Hall Central Michigan University, Mt. Pleasant, MI 48859.

My signature below indicates that all my questions have been answered. I agree to allow my child to participate in the project as described above.

_____ _____
Signature of Parent/Guardian Date Signed

_____
Name of Child/Ward

A copy of this form has been given to me. _____Parent/Guardian Initials

I give permission for the researcher to contact me in the future regarding this study.

_____Yes _____No

If yes, please provide your preferred method of contact below (e.g., your mailing address, e-mail address, or phone number):

_____

_____

_____

For the Research Investigator—I have informed this parent/guardian of the procedure(s) described above and the risks involved; I believe he/she understands the contents of the permission document and is competent to give legally effective and informed permission.

_____ _____
Signature of Responsible Investigator Date Signed

APPENDIX B

SAMPLE LESSON PLAN: WEEK 2 (BLENDING AND ELIDING SYLLABLES)

Session 1:	Introduction to blending: compound words.
Materials: - Sound stages - Blocks - E. boxes Notes:	**We are going to play a game with words. This is a game where we add two words together to make a new word. I will be teaching you how to play with words using our sound stages.** Model: **We are going to add two words together to make a new word. Watch what I do closely. I will use our blocks to put "BASE" and "BALL" together and see what new word it makes**. (CLAP) (Say **BASE** while putting block in first box, and **BALL** while putting block in second box). **I'll say it fast.** (CLAP). **BASEBALL.** Lead: **Let's try it together. We will use our blocks to put "BASE" and "BALL" together and see what new word it makes**. (CLAP) (Say **BASE** while putting block in first box, and **BALL** while putting block in second box. Monitor student responses). **Get ready – what word? Say it fast.** (CLAP). **BASEBALL.** **Correction Procedure:** Correct response from all: **Great job putting ___ and ____ together! You got it! Let's try another one.** Incorrect response from any: **You almost got it, good trying. Let's try again. I will put _____ and _____ together. (**CLAP). **____ ____. Get ready, I'm going to say it fast: _____.** Do error correction procedure as needed. Test: **Now you do it altogether. Use your blocks to put "BASE" and "BALL" together.** (CLAP). (Monitor students – they say **BASE** while putting block in first box, and **BALL** while putting block in second box). **Get ready to say it fast.** (CLAP). Monitor responses and use error correction procedure as needed**.** **Let's try some more.** Do model, lead, test procedure with more words to ensure understanding. Use the above words and script when doing model, lead, and test. Use error correction procedure as needed. **Let's try something a little different now. I will tell you two words, and you use your boxes and your blocks to tell me what new word they make when you put them together. The words are _____ and _____. Think about it right now.** Pause. **Get ready to say it fast!** (CLAP). Monitor responses. Use error correction procedure as needed.

Session 2:	Introduction to elision: compound words.
Materials: - Sound stages - Blocks - E. boxes Notes:	**Today we will be playing some more special word games. I will be teaching you how to play with words using our sound stages again.** **Do you remember what we did yesterday? We put two words together to make brand new words. Let's try some now so we remember.** Do a couple words with them for review using their sound stages. **Today we are going to do something. We are going to take a part away from a word to make a brand new word. Yesterday we put two words together** (push two blocks together)**, and today we'll be taking two words apart** (push two blocks apart)**.** Model: **Here we have a picture of a FLASHLIGHT. Watch.** Put block in FLASH and LIGHT. **Now watch what I do closely. I will say FLASHLIGHT then take away LIGHT**. (CLAP) Remove block from second square, "light". **This makes FLASH.** Lead: **Let's try it together. We will say FLASHLIGHT then take away LIGHT. Get ready**. (CLAP) Remove block from second square, "light". **What word does this leave?** (CLAP). Monitor responses and use correction procedure as needed. **Correction Procedure:** Correct response from all: **Great job taking away ___ from ____! You got it! Let's try another one.** Incorrect response from any: **You almost got it, good trying. Let's try again. I will take away _____ from _____. (**CLAP). Remove block from _____**. Get ready: _____.** Do error correction procedure as needed. Test: **Now you do it. Say FLASHLIGHT then take away LIGHT.** (CLAP). **What word does this make?** (CLAP). Monitor responses and use correction procedure as needed. **Let's try some more.** Do model, lead, test procedure with more words to ensure understanding. Use the above words and script when doing model, lead, and test. Use error correction procedure as needed. ALTERNATIVE TESTING 1: **Let's try something a little different now. I will tell you a word, and you use your boxes and your blocks to tell me what new word is made when you take away part of the word. The word is _____. Think about it right now.** Pause. **Get ready!** (CLAP). Monitor responses. Use error correction procedure as needed.

<table>
<tr><td></td><td>ALTERNATIVE TESTING 2:
Now let’s try this. I will tell you a word, and then tell you what part to take away from it. You will take away the block that shows me what the new word is. The word is _____. Think about it right now. Pause. Get ready! (CLAP). Monitor responses. Use error correction procedure as needed.</td></tr>
<tr><td>Session 3:</td><td>Review blending and eliding.</td></tr>
<tr><td>Materials:
- Sound stages
- Blocks
- E. boxes

Notes:</td><td>We have learned two different word games so far, and today we are going to play them both so we’re really good at it.

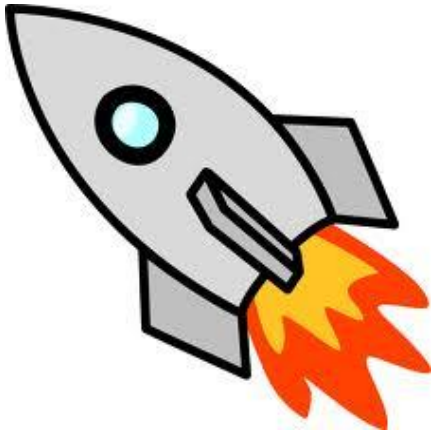
Does anyone remember what the two games are that we play? Raise your hand if you do. Call on individual children and comment on their responses.
In one game we put two words together (push two blocks together), and in the other game we take two words apart (push two blocks apart).
To review, pick random Elkonin boxes from supply. Use each one to both blend AND elide the parts of the word with children. Do model, lead, and test at first, followed by testing practice only.
Monitor responses and use error correction as needed.

BLENDING Correction Procedure:
Correct response from all: Great job putting ___ and ____ together! You got it! Let’s try another one.
Incorrect response from any: You almost got it, good trying. Let’s try again. I will put _____ and _____ together. (CLAP). ____ ____. Get ready, I’m going to say it fast: _____.
Do error correction procedure as needed.

ELISION Correction Procedure:
Correct response from all: Great job taking away ___ from ____! You got it! Let’s try another one.
Incorrect response from any: You almost got it, good trying. Let’s try again. I will take away _____ from _____. (CLAP). Remove block from _____. Get ready: _____.
Do error correction procedure as needed.</td></tr>
</table>

APPENDIX C

SAMPLE OF ELKONIN BOXES



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