

**Abstract Title Page**  
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**Title: The Efficacy of Supplemental Early Literacy Instruction by  
Community-Based Tutors for Preschoolers Enrolled in Head Start**

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## **Abstract Body**

*Limit 5 pages single spaced.*

### **Background/context:**

*Description of prior research, its intellectual context and its policy context.*

A large body of evidence documents the presence of a cluster of phonological processing abilities (PPA) in preschool that are remarkably stable from the late preschool period onward and predictive of beginning reading (Lonigan, 2006). These abilities are uniquely related to—and play a special role in—preschool children’s emergent literacy even after controlling for other cognitive abilities (Anthony, Williams, McDonald, & Francis, 2007). It is now well established that deficits in PPA are a prominent feature of numerous reading problems (Smith, Simmons, & Kame’enui, 1998), and in the absence of intervention becomes more difficult to remediate overtime beginning in kindergarten (Lonigan et al., 2009). Among PPA, the most extensively researched has been phonological awareness (PA). Children who show facility in recognizing and manipulating the sound structures in spoken words learn to read earlier and better than less able peers, even after other variables such as receptive and expressive vocabulary, working memory, and socioeconomic status variables were controlled for (Lonigan, 2006). Investigations in the primary grades suggest that at-risk children can benefit from developmentally appropriate instruction designed to teach PA through the use of meta-linguistic games and activities (e.g., rhyming words in songs, identifying or locating objects using letter-sound clues, clapping to mark syllables, sound segmenting; Craig, 2006). Ball and Blachman (1988) conducted one of the first randomized experiments on PA effects with kindergarten “pre-readers” (performance of less than three words on a standardized word reading test) and found that, after 7 weeks, kindergarteners in the PA group were significantly higher on PA and word reading than peers who received no training or language training (vocabulary building, story listening, letter-sound training). More relevant to the present investigation are studies of preschool children with phonologically-based speech impairments treated in language, speech and hearing settings. Although primarily single-subject or small-n designs, and researchers-as-interventionists, this group of studies show impressive gains for phonological sensitivity, rhyme ability, initial sound and phoneme awareness (Laing & Espeland, 2005; Ziolkowski & Goldstein, 2008). Finally, in one of the few studies of PA training with preschool children, Byrne and Fielding-Barnsley (1991) assigned preschoolers to a treatment (i.e., recognition of phoneme identification activities) or control (i.e., semantic activities). The results showed that preschool children in the treatment condition showed improvements in PA and alphabetic knowledge relative to those in the control condition. Despite the empirical support for the efficacy of PA instruction, recent observations of preschool classroom environments reveal a paucity of such instruction occurring in practice (Phillips et al., 2008). It appears that effective early literacy instruction that includes a focus on PA instruction is often not a part of preschool instruction. This finding has important educational implications and suggests that it may be beneficial to provide preschool intervention that bolsters PA in children at-risk for reading problems.

### **Purpose / objective / research question / focus of study:**

*Description of what the research focused on and why.*

Broadly, the current study contributes to the growing body of evidence supporting the positive effects of PA interventions for preschoolers, demonstrating that PA instruction need not be

postponed until kindergarten (Phillips et al., 2008). Specifically, the current study addresses the paucity of research on PA training in preschool by testing the efficacy of a supplemental cohesive and explicit PA focused intervention (*Stepping Stones to Literacy*; Nelson, Cooper, & Gonzalez, 2004) that has been shown in previous studies to improve PA and alphabetic knowledge of at-risk kindergarteners (Nelson, Benner, & Gonzalez, 2005; Nelson, Stage, Epstein, & Pierce, 2005). Second, the current study employs community-based paraeducator tutors as interventionists, and in so doing, extends other early K-1 reading research showing that paraeducators can deliver supplemental early reading interventions with a high degree of fidelity, particularly if the interventions are well scripted for non-certificated teachers' use (Gunn, Smolkowski, Biglan, & Black, 2002; Vadasy & Sanders, 2008a,b; Vadasy, Sanders, & Peyton, 2006). Finally, we chose to use a modified form of Interactive Book Reading (Wasik, Bond, & Hindman, 2006) as our comparison (control) condition to (a) control for supplemental instruction time and consistency, and (b) provide an alternative intervention approach appropriate for preschoolers. Indeed, studies support the benefit of interactive storybook reading for building emergent literacy skills (Dickinson & Smith, 1994; Justice, Meier, & Walpole, 2005); however, supplemental instruction that focuses on vocabulary acquisition has not, to date, been tested against explicit supplemental instruction in PA focused instruction with diverse (i.e., low socioeconomic, limited English proficiency) preschool children. Thus, this study also provides information regarding the relative impact of two approaches on preschoolers' PA and alphabetic and vocabulary knowledge. The primary research questions for the current study were: (a) does a supplemental PA focused intervention implemented by paraeducators have a direct, positive impact on at-risk preschool children's literacy outcomes?, and (b) does the intervention have a unique impact on children's outcomes, after controlling for pretest skill, classroom and home literacy environments, and treatment fidelity?

### **Setting:**

*Description of where the research took place.*

Eight Head Start classrooms from rural Midwest communities agreed to participate in the study. All children were recruited to participate who teachers believed the interventions were appropriate. Within classrooms, participating children were randomly assigned to small groups (there were 2 to 4 small groups per classroom), and then small groups comprising 2 to 6 children each (with an average of 3 preschoolers per small group) were then randomly assigned to receive supplemental small-group instruction in either the treatment or the control program. After attrition of 11 children (5 treatment and 6 controls due to moving out of the program), there were  $n=41$  treatment children (across 13 small groups) and  $n=47$  controls (across 14 small groups).

### **Population / Participants / Subjects:**

*Description of participants in the study: who (or what) how many, key features (or characteristics).*

Children averaged  $M = 57.08$  months old ( $SD = 4.28$ ) at pretest, and comprised 46 (52%) males, 67 (76%) children of color, and 44 (50%) children whose parents spoke a language other than English at home (ELL). Intervention conditions did not significantly differ on any of these demographic characteristics (all  $\chi^2$  test  $p$ -values  $> .10$ ).

## **Intervention / Program / Practice:**

*Description of the intervention, program or practice, including details of administration and duration.*

Tutor instruction was provided to children 20 min per day, 5 days per week, over 10 weeks, Feb-Apr. *Training.* We used the same professional development procedures to train tutors to implement the instructional components of the treatment and control conditions correctly. *Treatment (PA focused intervention) condition.* On average, 29.39 ( $SD=6.10$ ) instructional sessions were required to complete the 25 treatment lessons. The treatment program is a cohesive and intensive supplementary early literacy intervention for young children who are at risk for developing reading difficulties. It consists of one lesson book and a separate section within the lesson book on serial rapid automatic naming (activities that provide children practice making quick visual-verbal associations of known sets of colors and numbers in a left-to-right format). During daily sessions of 20 min in length, small groups of children were guided by a paraeducator through a set of instructional activities designed to promote children's PA and alphabet knowledge. *Control (vocabulary focused intervention) condition.* On average, children participated in 31.06 ( $SD=4.89$ ) instructional sessions in the modified Interactive Book Reading (control) condition (the two treatments did not differ in the number of sessions completed,  $t$ -test  $p$ -value  $> .10$ ). This program was based in part on Interactive Book Reading (Wasik & Bond, 2001; Wasik et al., 2006). During daily sessions of 20 min in length, instructional was organized around an identified target and two conceptually connected words drawn from a storybook related to a classroom teacher-identified theme. *Intervention Fidelity.* Each tutor ( $n=8$  per condition) was observed by research staff during an intervention session on three equidistant occasions (once per week). To record intervention fidelity, tutors in both conditions were rated on a 5-point behavior frequency scale ranging from 0=never to 4=proficient, on each relevant instructional practice. *Classroom Literacy Environment* To describe and quantify the classroom literacy environment of children participating in the study, we briefly surveyed all participating classroom teachers ( $n=8$ ) on their teaching qualifications and their perceived classroom literacy practices at the beginning of the intervention in Feb. Over half ( $n=5$ , 63%) reported having obtained a Bachelor's degree (others reported having earned Associate's degrees in Early Childhood Education). Four of those who had obtained a Bachelor's degree were also state certificated ( $n=3$  were certified K-8 Regular Education and  $n=1$  was certified Special Education). Teaching experience averaged  $M=3.25$  years ( $SD=2.38$ ). *Home Literacy Environment* A parent questionnaire was used to assess family home literacy environment (Griffin & Morrison, 1997). *Child Assessments* Abilities hypothesized to contribute to or correlate with the early reading skills were assessed at pretest (Feb) and posttest (late Apr) and included measures of print awareness, alphabetic knowledge, phonological awareness, and definitional vocabulary. Tests were individually administered by testers who were unaware of student group assignment. At pretest only (for the purpose of describing the sample) we measured *receptive language* using the *Peabody Picture Vocabulary Test-III*A (PPVT; Dunn & Dunn, 2006). *Print awareness* was assessed using the total number of correct items on Section A from *Test of Preschool Early Literacy* (TOPEL; Lonigan, Wagner, & Torgesen, 2007) *Alphabetic knowledge* was assessed using the number of correct responses on Sections B and C from the TOPEL Print Knowledge subtest. *Phonological awareness* was measured using the TOPEL Phonological Awareness subtest. Vocabulary was measured with the TOPEL Definitional Vocabulary subtest.

## **Research Design:**

*Description of research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).*

A cluster randomized trial research design was used to assess the efficacy of a PA focused early literacy intervention program, *Stepping Stones to Literacy* (Nelson et al., 2004; treatment), compared to an alternative supplemental vocabulary focused intervention (modified Interactive Book Reading; control).

## **Data Collection and Analysis:**

*Description of the methods for collecting and analyzing data.*

Children were individually assessed prior to intervention (pretest) and just after intervention (posttest) on measures of print awareness, alphabetic knowledge, phonological awareness, and definitional vocabulary by trained research staff blind to experimental conditions. In addition to assessing children on literacy outcomes, we collected information on home and classroom literacy environments as well as treatment dosage and fidelity. Due to the complex nature of the child outcome data, we used multilevel modeling to analyze intervention condition differences. Because children received intervention in small groups within classrooms, two inherent nesting structures were present: children within a given small group are likely to have more similar instructional experiences than children in other small groups, and small groups were more likely to be more similar to one another if they were drawn from the same classroom compared to other classrooms. Consequently, scores from children and small groups were not treated as independent (as assumed in classic *t*- and *F*-tests): to ignore this non-independence would yield potentially biased parameter estimates as well as degrees of freedom that are too large, resulting in Type I error inflation (c.f., Hox, 2002, pp. 5-6). We thus used multilevel modeling to analyze child outcomes. Specifically, we used two models. First, we tested for direct effects using a simple three-level model in which children's scores (Level 1) are nested in small groups (Level 2), which are in turn nested in classrooms (Level 3). Intervention condition was dummy coded (1=treatment, 0=control) as a small-group level predictor. The general three-level model for testing the direct treatment effects (our first research question) is as follows:  $Y_{ijk} = \gamma_{000} + \gamma_{010} * \text{Condition}_{jk} + u_{0jk} + u_{00k} + e_{ijk}$ , where  $Y$  = test score of the  $i$ th child in the  $j$ th small group in the  $k$ th classroom;  $\gamma_{000}$  = conditional grand mean test score,  $\gamma_{010}$  = *Treatment* effect,  $u_{0jk}$  = residual between the child's small group mean and the mean across small groups within classrooms,  $u_{00k}$  = residual between the child's classroom mean and the mean across classrooms, and  $e_{ijk}$  = unexplained residual. In our second set of models (to test for unique treatment effects), we added four covariates, all grand-mean centered, including: respective child pretest, child's home literacy environment (mean across 12 items on home literacy survey), small-group treatment fidelity, and classroom literacy environment (teacher report of total daily minutes afforded to literacy instruction). All multilevel analyses were conducted using *HLM 6* (Raudenbush, Bryk, & Congdon, 2004); all classic analyses were conducted using *SPSS 13* (SPSS Inc., 1989-2004).

## **Findings / Results:**

*Description of main findings with specific details.*

Observed pretest and posttest means and standard deviations are reported in Table 1. (please insert Table 1 here). The results of our multilevel models showed, first, positive direct treatment effects on alphabetic knowledge, and moreover, positive unique treatment effects on PA and

alphabetic knowledge once classroom literacy instruction, treatment fidelity, and child pretest skill and home literacy practices were controlled for. Table 2 Further, the impacts were not small: in our unique effects models, we found that children who received the PA focused intervention were 3.06 points higher on alphabetic knowledge and 2.25 points higher on PA compared to children in the control condition who received a vocabulary focused storybook intervention. These results, in our view, are impressive on several levels, namely: (a) the PA and alphabetic knowledge based supplemental instruction was delivered by community-based paraeducator tutors instead of highly trained researchers or classroom teachers which is promising for preschool programs that have far fewer funds than regular schools; (b) the intervention was conducted in small groups and was relatively brief, lasting only 10 weeks, which again lends well to real-world applications; (c) the treatment, although supplemental, was compared with another literacy oriented intervention rather than business-as-usual, and as such, cannot be simply thought of as “added” instruction); and (d) the intervention took place prior to kindergarten, a developmental period that is often overlooked as a time for academic growth. The effect of the home literacy environment also merits discussion. The home literacy environment can be thought of as interrelated resources and opportunities provided to children, combined with the parental skills, abilities, and dispositions that govern the provision of these opportunities (Burgess, Hecht, & Lonigan, 2002). The present finding is not surprising given that the home literacy environment’s importance rests on the fact that the home is the setting where children first encounter language and literacy (Weigel, Martin, & Bennett, 2006).

### **Conclusions:**

*Description of conclusions and recommendations based on findings and overall study.*

Despite these limitations, the current study contributes broadly to the idea that teaching early literacy skills need not wait for kindergarten, let alone first grade. On a more practical level, this study demonstrates that supplemental PA focused instruction can be provided with high fidelity by paraeducators, an often underutilized community resource. Indeed, for young at-risk young children coming from impoverished communities (i.e., receiving Head Start services), a PA and alphabetic knowledge intervention may indeed help prevent future reading failure.

## Appendices

Not included in page count.

### Appendix A. References

References are to be in APA version 6 format.

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## Appendix B. Tables and Figures

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Table 1 Means and Standard Deviations for Child Measures

Measure	Treatment				Control			
	<i>n</i> = 41				<i>n</i> = 47			
	Pretest		Posttest		Pretest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Recept Lang	42.02	18.46			36.15	21.06		
Print Aware	5.30	3.56	5.40	4.18	4.10	3.35	5.60	3.92
Alphabetics	5.90	6.86	12.40	8.81	6.80	7.93	9.90	9.26
Phono Aware	11.46	5.31	15.00	6.28	10.60	6.30	13.38	6.23
Vocabulary	30.00	14.55	38.85	13.60	27.55	16.13	33.30	17.14

*Note.* Raw scores used for all measures. Recept Lang = receptive language measured using the raw score from the Peabody Picture Vocabulary Test IIIA; Print Aware = print awareness items from Section A of the Test of Preschool Early Literacy (TOPEL) Print Awareness subtest; Alphabetics = alphabetic knowledge items from Sections B and C of the TOPEL Print Awareness subtest; Phono Aware = TOPEL Phonological Awareness subtest; Vocabulary = TOPEL Definitional Vocabulary subtest.

