Emergent Literacy Intervention for Vulnerable Preschoolers: Relative Effects of Two Approaches

Laura M. Justice
Sy-Miin Chow
Cara Capellini
Kevin Flanigan
Sarah Colton
University of Virginia, Charlottesville

This study determined the relative efficacy of an experimental explicit emergent literacy intervention program for preschoolers experiencing multiple risk factors. Using an alternating treatment research design, children completed two 6-week waves of intervention in small groups; one wave featured the experimental explicit intervention program, whereas the other featured a comparison program. Emergent literacy assessment was conducted at pretest and at the end of each wave. Results indicated significant widespread gains in emergent literacy knowledge over the entire 12-week intervention program; growth was significantly greater during the experimental explicit intervention program compared to the comparison program. An examination of individual differences and intervention outcome showed oral language skills and literacy orientation to predict emergent literacy performance at the end of the program.

Key Words: emergent literacy, language disorders in children, intervention, at-risk, preschool

Emergent literacy refers to the foundation upon which children’s conventional reading and writing abilities are built. More specifically, this term is used to describe the behaviors, skills, and concepts of young children that develop into and precede conventional literacy (Kaderavek & Sulzby, 1998b; Sulzby, 1985). For most children, the emergent literacy foundation is acquired within the period preceding formal literacy instruction, transcending birth to about 6 years of age.

Generally speaking, this foundation comprises two distinct but highly interrelated areas of development: written language awareness and phonological awareness (Justice & Ezell, 2001b; van Kleeck, 1998). These domains refer, respectively, to children’s acquisition of knowledge about the orthography and the phonology of one’s own language. Written language awareness describes the implicit and explicit knowledge children acquire concerning the fundamental properties of print, such as the relationship between print and speech and the functions and forms of particular written language units (e.g., letters, words, punctuation marks; Hiebert, 1981; Justice & Ezell, 2000, 2002; Lomax & McGee, 1987; Whitehurst & Lonigan, 1998). Phonological awareness, in contrast, describes children’s ability to implicitly and explicitly represent spoken language as comprising discrete and recurrent sound elements (e.g., phonemes, syllables, words; Bradley & Bryant, 1985; Torgesen & Davis, 1996; Whitehurst & Lonigan, 1998; Wise, Ring, & Olson, 1999). Knowledge across both domains is acquired gradually and, for many children, incidentally during the course of early childhood.

Prediction studies following children from preschool or kindergarten into elementary school have consistently shown that performance on an array of emergent literacy tasks reliably predicts children’s later literacy achievement (e.g., Badian, 1982; Catts, Fey, Zhang, & Tomblin, 1999, 2001; Stuart, 1995; for review, see Scarborough, 1998). Children performing well on emergent literacy tasks generally have superior conventional literacy outcomes relative to children demonstrating lower levels of performance. Prediction studies have also shown indices of both written language and phonological awareness to contribute uniquely to conventional literacy outcomes (Badian, 1982, 1986; Stuart, 1995; for review, see Scarborough, 1998). Taken together, the importance of young children’s written language and phonological awareness for later literacy
Children Vulnerable for Literacy Difficulties

The majority of children, by virtue of being immersed in a literate society, acquire emergent literacy concepts and skills relatively effortlessly during the course of early childhood. Nevertheless, some children appear particularly vulnerable for experiencing difficulties achieving an adequate emergent literacy foundation (for an overview of key risk factors, see Snow et al., 1998; also see Catts et al., 2001). Of relevance to the research reported here are two circumstances associated with a significant increase in risk status for emergent literacy difficulties: oral language impairment (LI) and poverty.

Oral LI

There is a reciprocal and robust association between young children’s oral language proficiency and emergent literacy development (Boudreau & Hedberg, 1999; Chaney, 1992; Dickinson & Tabors, 1991; Lonigan, Burgess, & Anthony, 2000). Prediction studies have shown that an array of discrete oral language proficiency indices, including measures of vocabulary and grammar, consistently serve as moderate to robust predictors of conventional literacy outcome (for review, see Scarborough, 1998, 2000). Moreover, the prediction strength becomes increasingly powerful when several measures of language are combined into a composite index of language proficiency (Lonigan et al., 2000; Scarborough, 1998).

It is thus not particularly surprising that young children exhibiting significant difficulties with oral language proficiency are at increased risk for delayed attainment of emergent literacy knowledge and also are relatively more likely than their typically developing peers to experience poor conventional literacy outcomes (Bird, Bishop, & Freeman, 1995; Bishop & Adams, 1990; Boudreau & Hedberg, 1999; Catts, 1993; Magnusson & Nauclet, 1990, 1993). Preschool children with LI consistently show depressed performance relative to their peers on an array of emergent literacy tasks addressing both written language and phonological awareness (e.g., Boudreau & Hedberg, 1999; Gillam & Johnston, 1985; Magnusson & Nauclet, 1993). Likewise, studies of school-age children with reading difficulties have revealed a notably high frequency of earlier deficits in diverse areas of oral language. One prospective study of second graders with reading problems found that many of these children as toddlers had exhibited significant difficulties with oral language development (Scarborough, 1990). A more recent study found 57% of 183 children characterized as poor readers in second grade to have exhibited difficulties in receptive language ability in kindergarten, encompassing such diverse areas as vocabulary knowledge, grammatical understanding, and narrative comprehension (Catts et al., 1999). Preschool and kindergarten children experiencing more severe and/or widespread language difficulties appear to be at relatively greater risk for poor literacy outcomes (Bishop & Adams, 1990). Findings such as these unequivocally argue the need for increased emphasis on a preventive model of literacy intervention for children with LI.

Poverty

As important as oral language proficiency is to emergent literacy development, the latter also appears to be strongly mediated by the frequency with which children are formally and informally exposed to language and literacy in the home, school, and community (Frijters, Barron, & Brunello, 2000; Leseman & de Jong, 1998; McCormick & Mason, 1986; Neuman, 1999; Ninio, 1980; Purcell-Gates, 1996). Children who seldom interact with written language (e.g., through parent–child shared storybook reading experiences) have more difficulty acquiring emergent literacy knowledge compared to peers with more frequent literacy opportunities (e.g., Raz & Bryant, 1990; Wells, 1985). Limited exposure to oral and written language is a circumstance encountered relatively often by young children reared in low-socioeconomic status (SES) households, and it is a situation that may contribute to the relatively low levels of emergent literacy skill observed in low-SES children (e.g., Feitelson & Goldstein, 1986; McCormick & Mason, 1986; Ninio, 1980; Teale, 1986; Whitehurst et al., 1994).

Indeed, converging evidence has provided considerable documentation that both emergent and conventional literacy skills of children from low-SES households differ in comparison to those of their peers from middle- and upper-SES households (e.g., Bowey, 1995; Chaney, 1994; Dickinson & Snow, 1987; Fernandez-Fein & Baker, 1997; Justice & Ezell, 2001b; Lonigan et al., 1999; Warren-Leubecker & Carter, 1988; White, 1982). Dickinson and Snow (1987) contrasted the performance of young children from low- and middle-SES households on a series of written language awareness tasks, finding that middle-SES children performed significantly better than low-SES children on measures of print production, book reading concepts, and environmental print decoding. Lonigan and colleagues (1999) more recently reported similar findings when comparing the emergent literacy performance of low-SES children in Head Start to that of children in a childcare serving middle-SES families. Children in Head Start demonstrated relatively low levels of skill on measures of alphabet knowledge, letter-sound knowledge, book reading concepts, and environmental print decoding.

These same patterns of comparatively poor performance when comparing low-SES children to their more advantaged peers have also been observed when looking at phonological awareness performance; children’s performance on measures of phonological awareness has consistently been shown to be influenced by SES (e.g., Chaney, 1994; Fernandez-Fein & Baker, 1997; Nittrouer,
Emergent Literacy Intervention: Current Perspectives

Emergent literacy interventions for young at-risk children are generally framed within the theoretical perspective that emergent literacy knowledge is best acquired through frequent, informal, naturalistic, and meaningful interactions with literacy-related artifacts (e.g., books, writing instruments; Watkins & Bunce, 1996; Watson, Layton, Pierce, & Abraham, 1994). Mediated interaction with such artifacts under the guidance of more capable and knowledgeable individuals (e.g., parents, teachers, siblings, friends) is a primary vehicle through which children acquire increasingly sophisticated levels of emergent literacy knowledge (Justice & Ezell, 1999).

There are indeed numerous naturally occurring contexts in which young children acquire emergent literacy knowledge, including informal interactions with print contextualized within the community or household environment (see Neuman & Celano, 2001). Adult–child shared storybook reading, for instance, is viewed by many theorists as a particularly potent means for development (e.g., Bus, 2001; Bus, Van Ijzendoorn, & Pellegrini, 1995; Clay, 1998; Crawford, 1995; Dickinson & Smith, 1994; Neuman, 1999; Teale, 1986; Whitehurst et al., 1988), given that it is a context that is familiar, meaningful, interesting, and motivating to the preschool child (Watkins & Bunce, 1996). Hypothetically, children’s emergent literacy knowledge is advanced within shared reading and other such literacy-based interactions both through adult mediation and scaffolding, as well as the child’s own active interest and engagement as an increasingly literate partner (Justice & Ezell, 1999).

Emergent literacy interventions for at-risk preschoolers guided by the parameters of such theoretical principles emphasize the need to increase children’s naturalistic exposure to literacy concepts as well as their participation in meaningful literacy events. Increased exposure and participation in literacy events enhances children’s emergent literacy knowledge in an implicit manner, that is, without direct instruction. Interventions designed to increase children’s participation in adult–child storybook reading would be consistent with such an approach (e.g., Ezell, Justice, & Parsons, 2000; Justice & Ezell, 2000, 2002; Whitehurst et al., 1994, 1999), as are interventions that increase children’s interactions with print during play and other dramatic activities, or promote children’s exposure to print within the classroom (e.g., Christie & Enz, 1992; Harris, 1986; Katims, 1991; Neuman, 1999; Neuman & Roskos, 1993; Vukelich, 1994).

Nevertheless, for young children experiencing multiple risk factors adversely affecting the timely attainment of emergent literacy knowledge, a more explicit approach to intervention may be required. The perspective is such that at-risk children, particularly those experiencing significant developmental difficulties, attain the most benefit from participating in carefully constructed activities designed explicitly to promote emergent literacy performance in key areas (e.g., see Fey, Catts, & Larrivee, 1995; Lundberg, Frost, & Petersen, 1988; O’Connor, Jenkins, Leicester, & Slocum, 1993; van Kleeck, Gillam, & McFadden, 1998). Skills in key areas, such as letter naming or rhyme, are directly targeted through structured tasks. Often, explicit approaches use a specific developmentally derived curriculum in which children participate in a set series of activities for a particular amount of time each day or week. One example of such is the Sound Foundations Program (Byrne & Fielding-Barnsley, 1991), used effectively by Whitehurst et al. (1994) to increase the emergent literacy skills of Head Start children.

The argument for a more explicit approach to intervention is twofold, derived primarily from the language intervention literature (e.g., Fey et al., 1995; Paul, 2001). The first argument is, quite simply, that time is of the essence, thus making a case for efficiency and expediency of intervention efforts. The perspective is thus that engagement in explicit instructional activities is the most efficient route to skill development; activities can be designed to target those areas in which children have particular difficulties or areas that are most highly associated with later literacy outcomes (see Lundberg et al., 1988). The need for efficiency is bolstered by evidence showing that literacy problems are more difficult to remediate than they are to prevent (Juel, 1988; Stanovich, 1986). The second
argument is that children experiencing difficulties with emergent literacy development require more formalized or structured opportunities to develop key skills. These children, for whatever reasons, are not developing skills in the same manner or rate as their typically achieving peers. To this end, the argument is such that a more direct approach is required to encourage skill development in critical areas. This approach has been shown to be effective for children exhibiting a range of adverse developmental circumstances (e.g., Layton, Deeny, Upton, & Tall, 1998; Majsterek, Shorr, & Erion, 2000; O’Connor et al., 1993; van Kleeck et al., 1998).

The Present Study

There is a notable corpus of work providing supportive evidence for various approaches to address the emergent literacy needs of typical and at-risk preschool children (e.g., Bradley & Bryant, 1985; Harris, 1986; Justice & Ezell, 2000, 2002; Katims, 1991; Lundberg et al., 1988; Neuman & Roskos, 1993; O’Connor et al., 1993; van Kleeck et al., 1998; Vukelich, 1994; Whitehurst et al., 1994). Nevertheless, few studies have involved preschool children experiencing multiple risk factors, such as children reared in poverty while simultaneously experiencing oral language difficulties. Given these children’s particular vulnerability for later literacy difficulties, there is a real need to determine the extent to which various approaches to emergent literacy intervention effectively and efficiently influences widespread literacy growth.

In the study reported here, the relative efficacy of two approaches to emergent literacy intervention was examined for a small cohort of 4-year-old children experiencing multiple risk factors. The majority of participants exhibited significant difficulty with oral language development, and all of the children were residing in a low-SES community and attending an “at-risk” preschool. The primary goal was to determine the relative efficacy of an experimental explicit approach to emergent literacy intervention, in which children participated in structured activities designed to promote their skills in targeted areas transcending both written language and phonological awareness. It was hypothesized that an explicit approach to intervention would result in rapid and widespread gains in emergent literacy, relative to a less structured approach.

Three specific aims were addressed. The first aim was to determine the extent to which 12 weeks of emergent literacy intervention influenced the emergent literacy skills of at-risk preschool children. The second aim was to characterize the efficacy of an experimental explicit intervention program relative to a comparison program for promoting the preschoolers’ skills, whereas the third goal was to identify child characteristics most predictive of emergent literacy outcome following intervention.

Method

Participants

Recruitment. The children were recruited from a single urban preschool center serving primarily African-American children located in mid-central Virginia. Participation in this center was based on a family’s demonstration of low-income household status or other social service need and/or presence of a developmental disability by a child. School administrators referred children to participate in the present study based on results of speech-language screening conducted at the start of the academic year. Any child failing one or more portions of the Fluhraty Preschool Speech and Language Screening Test (Fluharty, 1978) was referred to the first author; 23 referrals were made. After these children’s parents were provided the opportunity to enroll their children in the study (15 were so enrolled), program participation was made available to other children in the preschool, until 18 available program slots were filled. Only 1 participant was currently receiving speech-language intervention at the time of the study.

Participant Description. Eighteen children (5 girls, 13 boys) attending eight different preschool classrooms participated. The children ranged in age from 48 to 60 months, with a mean age of 53 months (SD = 3.5 months). All children were native English speakers and resided in homes in which English was the primary language spoken. In terms of ethnicity, 16 children were African-American and two were Caucasian; this demographic ratio approximated that of the school’s student population. All children resided in households with incomes at or below the U.S. Department of Health and Human Services’ federal poverty guidelines. Screening of nonverbal cognition using the Bead Memory subtest of the Stanford-Binet Intelligence Scale—Fourth Edition (Thorndike, Hagen, & Sattler, 1991) by school administrators showed all children performing within the low–to-average-range; none of the children were believed to exhibit significant intellectual difficulties.

Upon enrollment in the study, children’s hearing, speech, and language skills were evaluated for descriptive purposes. Testing was conducted by supervised graduate speech-language pathology students. All children passed a pure-tone bilateral hearing screening at 30 dB across the frequencies of 1000, 2000, and 4000 Hz. Children’s speech production was evaluated using the Goldman-Fristoe Test of Articulation (GFTA; Goldman & Fristoe, 1985); 1 child was not evaluated because he refused testing, although naturalistic observations by the first author suggested significantly impaired speech production skills and poor intelligibility. Receptive and expressive language skills for all children were evaluated using the Preschool Language Scale–3 (PLS-3; Zimmerman, Stein & Pond, 1992).

Table 1 provides a general overview of child characteristics. Data in Table 2 provide additional detail about the children, including individual child profiles for language and speech production performance. Designation of LI was based on a standard score of 81 or below (–1.25 SD) on the Receptive and/or Expressive Language subtests of the PLS-3, whereas designation of speech production impairment was based on a percentile rank of 25 or below (bottom quartile) on the GFTA. As seen from Table 2, 5 children demonstrated typically developing language and speech production skills, 1 showed typically developing language skills in the presence of speech production

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impairment, 6 showed receptive and/or expressive LI with speech production impairment, and 6 showed receptive and/or expressive LI without speech production difficulty.

**General Procedures**

A within-subjects alternating treatment research design involving two intervention programs (experimental explicit, comparison) served as the framework for this investigation. At the start of the study, children were administered an emergent literacy pretest and then were randomly assigned to one of two groups: Group A (n = 6) or B (n = 12). The uneven group composition resulted from scheduling and design constraints, in which the 18-child sample needed to receive two interventions in a 1.5 hr scheduling block (allowing for only three 30-min sessions) during the typical school day.

Following group assignment, children then completed a 12-week emergent literacy intervention conducted in two consecutive 6-week waves, with the order of waves counterbalanced across the two groups. Children completed the intervention waves in small groups of 6 children each; Group A (6 children) was a single group, whereas Group B (12 children) was randomly subdivided further into two groups of 6 children.

Equivalency for the two groups was examined post hoc across the following variables: chronological age, speech production (percentile rank from the GFTA), and language proficiency (Total Language score from the PLS-3). Determination of group equivalency was conducted via a series of independent samples $t$ tests with an alpha level of

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronological age (in months)</td>
<td>53</td>
<td>3.5</td>
<td>48–60</td>
</tr>
<tr>
<td>Speech production (percentile)</td>
<td>49</td>
<td>28.4</td>
<td>3–99</td>
</tr>
<tr>
<td>Receptive language (standard score)</td>
<td>81</td>
<td>13.7</td>
<td>65–103</td>
</tr>
<tr>
<td>Expressive language (standard score)</td>
<td>81</td>
<td>15.3</td>
<td>62–107</td>
</tr>
<tr>
<td>Total language (standard score)</td>
<td>79</td>
<td>15.4</td>
<td>59–104</td>
</tr>
</tbody>
</table>

Note. Speech production = percentile rank from the Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1985). Receptive language and expressive language = standard scores from the Auditory Comprehension and Expressive Communication subtests, respectively, of the Preschool Language Scale–Third Edition (PLS-3; Zimmerman et al., 1992); total language = Total Language score from the PLS-3. Normative references for the PLS-3 are $M = 100$, $SD = 15$.  

<table>
<thead>
<tr>
<th>Child (Group)</th>
<th>Receptive Language</th>
<th>Expressive Language</th>
<th>Speech Production</th>
<th>General Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (A)</td>
<td>103</td>
<td>104</td>
<td>68</td>
<td>Typically developing language and speech production skills</td>
</tr>
<tr>
<td>2 (A)</td>
<td>82</td>
<td>90</td>
<td>79</td>
<td>Typically developing language and speech production skills</td>
</tr>
<tr>
<td>3 (A)</td>
<td>87</td>
<td>97</td>
<td>63</td>
<td>Typically developing language and speech production skills</td>
</tr>
<tr>
<td>4 (A)</td>
<td>65</td>
<td>62</td>
<td>55</td>
<td>Receptive/expressive language impairment; typical speech production skills</td>
</tr>
<tr>
<td>5 (A)</td>
<td>94</td>
<td>81</td>
<td>19</td>
<td>Expressive language impairment; speech production impairment</td>
</tr>
<tr>
<td>6 (A)</td>
<td>67</td>
<td>68</td>
<td>3</td>
<td>Receptive/expressive language impairment; speech production impairment</td>
</tr>
<tr>
<td>7 (B)</td>
<td>71</td>
<td>84</td>
<td>19</td>
<td>Receptive language impairment; speech production impairment</td>
</tr>
<tr>
<td>8 (B)</td>
<td>80</td>
<td>62</td>
<td>3</td>
<td>Receptive/expressive language impairment; speech production impairment</td>
</tr>
<tr>
<td>9 (B)</td>
<td>65</td>
<td>64</td>
<td>60</td>
<td>Receptive/expressive language impairment; typical speech production skills</td>
</tr>
<tr>
<td>10 (B)</td>
<td>70</td>
<td>73</td>
<td>44</td>
<td>Receptive/expressive language impairment; typical speech production skills</td>
</tr>
<tr>
<td>11 (B)</td>
<td>73</td>
<td>64</td>
<td>NA</td>
<td>Receptive/expressive language impairment; speech production impairment suggested</td>
</tr>
<tr>
<td>12 (B)</td>
<td>74</td>
<td>75</td>
<td>68</td>
<td>Receptive/expressive language impairment; typical speech production skills</td>
</tr>
<tr>
<td>13 (B)</td>
<td>66</td>
<td>81</td>
<td>67</td>
<td>Receptive/expressive language impairment; typical speech production skills</td>
</tr>
<tr>
<td>14 (B)</td>
<td>84</td>
<td>81</td>
<td>15</td>
<td>Expressive language impairment; speech production impairment</td>
</tr>
<tr>
<td>15 (B)</td>
<td>103</td>
<td>95</td>
<td>15</td>
<td>Typically developing language skills; speech production impairment</td>
</tr>
<tr>
<td>16 (B)</td>
<td>98</td>
<td>107</td>
<td>99</td>
<td>Typically developing language and speech production skills</td>
</tr>
<tr>
<td>17 (B)</td>
<td>98</td>
<td>105</td>
<td>44</td>
<td>Typically developing language and speech production skills</td>
</tr>
<tr>
<td>18 (B)</td>
<td>69</td>
<td>72</td>
<td>43</td>
<td>Receptive/expressive language impairment; typical speech production skills</td>
</tr>
</tbody>
</table>

.05. Results indicated that the two groups did not significantly differ in chronological age, \( t(16) = 0.46, p = .651 \); speech production, \( t(16) = 0.08, p = .934 \); or oral language, \( t(16) = 0.487, p = .633 \).

**Intervention Waves.** One intervention wave featured the experimental explicit emergent literacy program, whereas the other wave featured a comparison program. Regardless of program, each wave consisted of 12 sessions; sessions were held twice weekly, each lasting approximately 30 min. All sessions were conducted in a small private room at the children’s preschool center, and were conducted by two professionals working collaboratively, one a speech-language pathologist and the other a reading specialist. Both professionals had graduate-level training in intervention principles for working with children with LI. For the duration of the 12-week intervention, children’s teachers and school administrators were blind to the design, content, and sequence of the intervention. Likewise, the two interventionists were blind to the types of emergent literacy measures being administered over the course of the study, as well as to children’s performance on these assessments.

**Experimental explicit intervention program.** Each child completed a 6-week wave encompassing twelve 30-min small-group sessions featuring an explicit approach to emergent literacy intervention. These sessions were designed to directly engage children in activities that promote their attention to the orthographic features of written language and the phonological features of oral language. Although individual sessions varied somewhat in specific activities featured, each session included three components: (a) name writing, (b) alphabet recitation, and (c) phonological awareness games.

Each session began with a name writing activity, in which children were asked to “sign in” by tracing the letters in their names using paper and crayons. Children were provided assistance as they worked to name and identify the letters in their own names. Subsequently, individual features of children’s names were discussed by the group (e.g., children were asked to find “whose name starts with a B”). Next, children were provided laminated cards depicting the alphabet letters and corresponding pictures, and were lead through two to three alphabet recitations. Recitations involved singing the alphabet song with children pointing to the letters on their cards. This was followed by several alphabet games, such as having the children use their cards to find the letters in their names. Lastly, children completed one or more phonological awareness games, focusing on rhyme detection, rhyme production, sentence or syllable segmentation, or initial sound identification. For instance, in one game, children were each provided a picture card depicting a common object (e.g., hat, bat, car), and were then asked to indicate whether their cards rhymed with a target picture shown by an interventionist (e.g., cat). For each session, a lesson plan (available from the first author) was used to sequence and structure the activities.

**Comparison intervention program.** All children also completed a 6-week wave comprising twelve 30-min small-group sessions featuring adult–child shared storybook reading. These sessions were designed to actively engage children in literature-based activities featuring an implicit focus on oral and written language. Each session included two components: (a) adult–child shared storybook reading, and (b) story retelling activity.

At the start of each session, children were read a storybook by one of the two interventionists. A variety of storybooks was used, including several different genres (e.g., rhyming, narrative) and formats (e.g., lift-the-flap, big books). The interventionists used several strategies in the shared reading sessions to promote children’s active involvement and verbal involvement. First, prediction strategies were used in all shared readings to encourage children’s engagement with the storyline. When the book was introduced, children were asked to predict what might happen in the story; during the reading, the adult reader stopped three or more times to provide children with opportunities to predict or discuss narrative events. Second, dialogic strategies (Whitehurst et al., 1988) were used to promote children’s verbal involvement; these strategies included asking open-ended questions, responding to children’s interests, and giving praise and feedback. Following the reading of each storybook, the interventionists lead the children through a retelling activity, such as reenacting the story or drawing and discussing pictures representing key story events. A lesson plan was used to sequence and structure the activities of the 12 sessions. Lesson plans are available from the first author.

**Measures**

**Emergent Literacy Assessment.** Children’s emergent literacy knowledge was evaluated three times during the course of this study: at pretest, at interim, and at posttest. Pre- and posttesting was conducted prior to and immediately following the 12-week intervention period, whereas interim testing was conducted in a 1-week period between the two intervention waves.

Five criterion-referenced measures, all of which were derived from the extant literature, were used to examine children’s emergent literacy knowledge. The test protocol was designed to reflect both written language awareness (alphabet knowledge, print awareness, name writing) and phonological awareness (phonological segmentation, rhyme production). All measures commenced with simple instructions followed by demonstration and practice items whenever appropriate. No praise, reinforcement, or corrective feedback was given during testing, with the exception of praise for on- and off-task behavior as needed (e.g., “Nice sitting” or “I like how hard you’re working”). Measures were administered by supervised, trained speech-language pathology graduate students. The examiners were blind to children’s previous performance levels as well as to their group assignment. The instruments are available from the first author.

**Alphabet knowledge.** Children’s knowledge of the names of the 26 upper-case alphabet letters was tested using the Alphabet Knowledge subtest of the Phonological Awareness Literacy Screening–PreKindergarten (PALS-PreK; Invernizzi, Sullivan & Meier, 2001). Children were shown an 8 in. × 11 in. test sheet depicting the alphabet...
letters in randomized order; the examiner pointed to each letter and asked the child to name it. Responses were scored as 0 (incorrect) or 1 (correct). The total possible number of points was 26.

**Print awareness.** This test, described in Justice and Ezell (2001a), examined children’s knowledge of print and book reading conventions, such as book orientation and print directionality. The test represented a modified version of Clay’s (1979) Concepts About Print test; modification occurred primarily to make the test more appropriate for younger children, such that more difficult items (such as sight word recognition) were eliminated. The test involves 14 tasks administered during an adult–child shared book reading of a commercially available children’s storybook, *Nine Ducks Nine* (Hayes, 1990). This 30-page book contains large print and multiple instances of embedded, contextualized print within the illustrations. Following Justice and Ezell’s (2001a) protocol, the examiner read the target book with the child, during which a series of tasks were presented (e.g., “Show me the front of the book” and “Show me the name of this book”). Correct responses typically received one point, although for several items the correct response received two points and an alternative response received one point. Incorrect responses (including no response) received 0 points; 18 points were possible.

**Name writing.** Children’s ability to write their own names (and more generally, their familiarity with writing) was tested using the Writing subtest of the PALS-PreK. Children were provided an 8 in. × 11 in. piece of paper and were asked to draw their portrait and write their name. Name writing was scored using a 7-point scale (see Invernizzi et al., 2001), in which a scribble or picture representing both picture and written name received 0 points, and a name written correctly received 7 points. The highest possible score was 7.

**Phonological segmentation.** Children’s ability to segment spoken language units (i.e., sentences into words, words into syllables) was tested using the Segmentation subtest of the Phonological Awareness Test (PAT; Robertson & Salter, 1997). In the first 10 tasks, which examined sentence segmentation, children were presented with a series of three- to five-word sentences (e.g., *He can swim*) and were asked to repeat each sentence back while clapping for each word. In the second 10 tasks, which examined syllable segmentation, children were presented with a series of one- to four-syllable words (e.g., *pizza, calendar*) and were asked to repeat the word back while clapping for each part (i.e., syllable) of the word. Responses were scored as 0 (incorrect) or 1 (correct). The total number of possible points was 20.

**Rhyme production.** Children’s ability to generate rhymes was examined using the Rhyme Production items of the Rhyming subtest of the PAT (Robertson & Salter, 1997). Children were given a series of 10 words (e.g., *can, pot, wrinkle, brother*) and were asked to produce a word rhyming with each target. Responses were scored as 0 (incorrect) or 1 (correct). The total possible number of points was 10.

**Additional measures.** Two additional measures were administered during the course of this study. First, measures of children’s orientation to literacy (i.e., literacy interest) were collected at the end of the first and second wave of intervention. Specifically, each interventionist independently collected the Kaderavek–Sulzby Rating of Orientation to Book Reading (KS-ROB; Kaderavek & Sulzby, 2001). Each child was individually rated on this 4-point scale, which provides a global rating of children’s responsiveness and motivation toward participating in literacy events. The lowest score of 1 represents refusal to participate or complete lack of engagement, whereas the highest score of 4 represents eager participation and high interest. Given the high correlation between the two interventionists’ ratings of individual children (*r* = .69, *p* = .002), the two ratings for each child were combined and averaged. Likewise, children’s orientation scores for each intervention wave were highly correlated (*r* = .81, *p* = .000), suggesting that literacy orientation did not vary for the two approaches (i.e., explicit vs. embedded). A composite orientation score, consisting of orientation scores averaged across both intervention waves, was used in all subsequent analyses. The average composite orientation score was 2.6 (*SD* = 0.89, range = 1–4).

Second, a measure of children’s behavior during intervention activities was collected at the end of the 12-week intervention period. The two interventionists were asked to describe children’s behavior by independently completing a 25-item behavioral observation checklist for each child, adapted from Achenbach (1991). The checklist described a series of behaviors (e.g., fidgets, demands a lot of attention, disturbs other pupils) and the frequency with which each behavior was observed during intervention (never, sometimes, often) was scored for individual children. The highest possible score (50 points) indicated a significant level of behavioral problems during intervention, whereas the lowest possible score (0 points) indicated rare occurrences of behavioral problems. Correlational analysis showed a high correlation between the two interventionists’ scores for individual children (*r* = .67, *p* = .003); thus, a behavior score was calculated for each child using the average of the two scores. The mean behavior score for children in this study was 13.9 (*SD* = 15.3, range = 0–44).

**Results**

**General Effects of the 12-Week Intervention Program**

Data were first analyzed to determine the influence of the emergent literacy intervention as a whole, that is, to characterize children’s growth over the 12-week program encompassing both the experimental and comparison intervention programs. A repeated-measures multivariate analysis of variance was conducted, with time (pretest, posttest) as the within-subjects factor and program (experimental vs. control) as the between-subjects factor. With respect to this research aim, we were particularly interested in determining the extent to which time emerged as a significant main effect. Children’s raw scores on the five emergent literacy measures served as the dependent variables.
Table 3 depicts changes in children’s scores from pre- to posttest on the five emergent literacy measures. Visual inspection of these data suggests growth over time for all areas examined. Statistical analyses supported this observation, with the test statistic showing a significant main effect for time based on Wilks’s criterion, $F(5, 25) = 11.84, p = .000$. In contrast, there was no significant finding for program, $F(5, 25) = 0.708, p = .623$, nor was there a Time × Program interaction, $F(5, 25) = 2.153, p = .092$.

These findings indicate that children made substantial gains in collective consideration of the emergent literacy measures over the 12-week intervention period. Univariate tests for the main effect for time showed significant growth for each of the five measures: alphabet knowledge, $F(1, 29) = 25.37, p = .000$; print awareness, $F(1, 29) = 10.54, p = .003$; name writing, $F(1, 29) = 4.385, p = .045$; phonological segmentation, $F(1, 29) = 25.868, p = .000$; and rhyme production, $F(1, 29) = 12.454, p = .001$.

**Effectiveness of the Experimental Explicit Approach to Intervention**

Data were also analyzed to compare the magnitude of growth in emergent literacy for the two intervention waves, contrasting the experimental explicit program and the comparison program. The question of whether the experimental explicit approach exerted an advantage was partially addressed by the multivariate test described previously, in which program served as a between-subjects factor. At the multivariate level, the test statistic indicated no significant main effect for program. However, in this particular analysis, children’s gains across each wave were collapsed across the entire 12-week period, without regard to children’s performance levels at the start of each wave. This is a particularly important consideration in the present study given the alternating treatment design, in which children’s experiences prior to a particular wave may have influenced their growth within that wave. For instance, Group A children began the comparison program following 6 weeks of the experimental explicit program, whereas Group B children experienced the opposite schedule.

A second set of analyses, using a series of paired-samples $t$ tests, was thus conducted to determine the extent of change for the five dependent measures during each intervention wave. We took children’s preexisting differences in performance levels at the start of each wave as a baseline level against which performance at the end of the intervention wave was compared. These analyses controlled for variability in performance levels at the start of each wave within and across individual children. Table 4 depicts children’s scores on each dependent measure at the beginning and end of the two 6-week intervention waves.

**Results** showed that children’s scores on each emergent literacy measure significantly improved from the beginning to the end of the 6-week experimental explicit intervention program: alphabet knowledge, $t(14) = 7.025, p = .000$; print awareness, $t(17) = 3.302, p = .004$; name writing, $t(17) = 2.662, p = .02$; phonological segmentation, $t(16) = 4.735, p = .000$; and rhyme production, $t(16) = 3.469, p = .003$. The same set of comparisons was done to characterize the extent of growth during the 6-week comparison program. During this wave, children showed significant growth only for phonological segmentation, $t(13) = 2.662, p = .02$. Pre- to postwave changes for the

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pretest</th>
<th>Posttest</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Points Possible)</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Alphabet knowledge (26)</td>
<td>5.3</td>
<td>6.8</td>
<td>12.7</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Print awareness (18)</td>
<td>5.0</td>
<td>3.2</td>
<td>7.6</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Name writing (7)</td>
<td>2.3</td>
<td>2.0</td>
<td>3.7</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Phonological segmentation (20)</td>
<td>3.5</td>
<td>2.4</td>
<td>10.3</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Rhyme production (10)</td>
<td>0.7</td>
<td>2.3</td>
<td>3.9</td>
<td>4.1</td>
<td></td>
</tr>
</tbody>
</table>

**Table 4. Within-subject comparison of growth during comparison and experimental explicit programs.**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Comparison</th>
<th>Experimental Explicit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prewave</td>
<td>Postwave</td>
</tr>
<tr>
<td>(SD)</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Alphabet knowledge</td>
<td>7.3</td>
<td>9.8</td>
</tr>
<tr>
<td>Print awareness</td>
<td>6.4</td>
<td>7.1</td>
</tr>
<tr>
<td>Name writing</td>
<td>3.5</td>
<td>3.8</td>
</tr>
<tr>
<td>Phonological segmentation</td>
<td>5.1</td>
<td>8.3</td>
</tr>
<tr>
<td>Rhyme production</td>
<td>0.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

*Justice et al.: Emergent Literacy Intervention*
other four emergent literacy measures were not significant: alphabet knowledge, $t(14) = 1.814, p = .091$; print awareness, $t(15) = 0.848, p = .41$; name writing, $t(14) = 1$, $p = .334$; and rhyme production, $t(13) = 1.508, p = .155$.

**Predicting Emergent Literacy Outcome: Influence of Individual Differences**

The third aim of this study was to identify those child characteristics most predictive of outcome following 12 weeks of emergent literacy intervention. As can be seen in Table 3, there was considerable variability in children’s emergent literacy performance at the end of intervention. We explored four indices as possible predictors of emergent literacy outcome: literacy orientation (composite orientation score from the KS-ROB), oral language (total language standard score from the PLS-3), speech production (percentile rank from the GFTA), and behavior (raw score from the behavioral checklist). Selection of predictors was derived from the extant literature suggesting their unique and substantial associations with emergent literacy development (e.g., Bishop & Adams, 1990; Boudreau & Hedberg, 1999; Frijters et al., 2000; Kaderavek & Sulzby, 1998a; for review, see Scarborough, 1998; also see Whitehurst & Lonigan, 1998).

A multiple regression analysis was conducted with these four predictors entered simultaneously, as the extant literature has yet to clarify the relative contribution of these predictors to emergent literacy growth. We regressed the four predictors onto a variable representing literacy performance at the end of the intervention (rather than growth during intervention), as the gradual emergence of literacy variability during the 12-week intervention period reflected an aspect of intervention research that has often been bypassed. To obtain a composite index of literacy outcome, we performed a principal components analysis on children’s scores on the five emergent literacy measures at the end of intervention. Despite the widespread use of principal components analysis and the eigenvalue one rule as a method of data reduction (e.g., Whitehurst et al., 1994), we recognize that some researchers have questioned the relative merits of this technique as compared to the more theoretically oriented common factor analysis (Bentler & Kano, 1990; McArtdle, 1990; Widaman, 1993). Nevertheless, in the present study, we opted for principal components analysis rather than common factor analysis because we wanted to focus on examining the variability in literacy performance following the intervention program.

Results from the principal components analysis indicated that five components were needed to account for all of the variability in the children’s literacy performance; however, only the largest unrotated component was used in subsequent data analysis to represent an overall emergent literacy outcome. All five literacy measures were observed to have moderate to high loadings (ranging from .29 to .57) on this component. This corresponded well with our intention to derive a single composite index that could represent equally well both the written language and phonological awareness aspects of literacy outcome. This component (hereafter referred to as literacy outcome) accounted for 57.6% of the variance among the outcome variables; this component score was used as the dependent variable in our regression analysis.

The four predictors together accounted for 74.4% (65.8% adjusted) of the variance in literacy outcome. $R$ for regression was significantly different from zero, $F(4, 12) = 8.70, p = .002$. However, in terms of individual predictors, only oral language and literacy orientation contributed significantly to the prediction of literacy outcome. The 95% confidence limits of the regression coefficient for oral language were 0.023 to 0.106 and those for orientation were .050 to 2.056. On the basis of the squared semipartial correlations ($sr^2$), oral language in isolation contributed to 24.8% of the explained variance, and orientation constituted another 11.2% in unique variability. Although post hoc correlation analysis revealed that the children’s speech production and behavior were moderately correlated with literacy outcome ($r = .45$ and $-.42$, respectively), these two predictors did not contribute significantly to the prediction of literacy outcome. The unstandardized regression coefficients (B), standardized regression coefficients ($\beta$), and other results from the regression analysis are summarized in Table 5.

**Conclusions and Discussion**

The following provides an overview of the major findings of this study. First, preschool children exhibiting multiple risk factors demonstrated substantial emergent literacy growth during the 12-week intervention period, encompassing both the experimental explicit program and the comparison program. The gains observed were widespread, encompassing both written language and phonological awareness. Growth was most robust for alphabet knowledge, phonological segmentation, and rhyme production; in these three areas, children’s task performance more than doubled over the 12-week intervention period.

Second, children’s emergent literacy performance changes were more profound during the experimental explicit intervention program, relative to the comparison condition featuring adult–child shared storybook reading. In the 6 weeks children spent participating in explicit, structured emergent literacy activities targeting awareness of the written language and phonological features of language, substantial widespread change was observed.

**TABLE 5. Standard multiple regression of four predictors on literacy outcome.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>$\beta$</th>
<th>$sr^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.940</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral language</td>
<td>-8.382</td>
<td>.570</td>
<td>.25</td>
</tr>
<tr>
<td>Speech production</td>
<td>0.065</td>
<td>.095</td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td>0.006</td>
<td>.149</td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td>1.053*</td>
<td>.555</td>
<td>.11</td>
</tr>
</tbody>
</table>

*Note. $R^2 = .74$; Adjusted $R^2 = .66$; $R = .86$$^**$

*Unique variability = .36; shared variability = .38.

* $p < .05$. ** $p < .01$. 

328 American Journal of Speech-Language Pathology • Vol. 12 • 320–332 • August 2003
comes in the elementary years is that children with more
tendency for these children to have lower reading out-

between the severity of LI during preschool and the

period. These findings suggest the possibility that the link

emergent literacy skills at the end of the intervention

played a significant role in explaining the variance in

literacy intervention. Children's oral language proficiency

language proficiency to the outcome of preschool emergent

delineating the substantial mediating influence of oral

(i.e., affecting multiple aspects of language performance;

relatively severe and/or widespread language difficulties

problems are more likely to occur in children having

history of preschool LI have suggested that reading

association between school-age reading proficiency and

child is higher than occurs for their nonimpaired peers

understood that although not all preschool children with

These observations concern oral language and literacy

affordance of emergent literacy development.

Third, children’s oral language proficiency and their

orientation to literacy emerged as significant and unique

predictors of emergent literacy outcome. Oral language

skill explained nearly 25% of the variance in literacy

outcome, whereas orientation constituted another 11% in

unique variability. This finding demonstrates the impact of

oral language proficiency to children’s responsiveness to

emergent literacy intervention, and also argues the import-

ance of orientation, or literacy interest, as an additional

mediating influence.

This study provides evidence that emergent literacy

intervention can make meaningful differences to young at-

risk children, particularly those experiencing multiple risk

factors. The findings argue the importance of children’s

participation in explicit instructional activities focused on

specific areas of skill development (e.g., letter naming,

name writing, rhyming). Explicit intervention was found

to be more effective and efficient for advancing wide-

spread change (i.e., affecting all of the performance

indicators studied) relative to literature-based activities in

which literacy goals were less explicitly addressed.

Importantly, the performance indices (i.e., dependent

variables) used in this study comprised measures highly

associated with later literacy achievement. Thus, given

the current interest in identifying approaches that effectively

and efficiently promote skill development in areas

associated with literacy outcome, particularly for at-risk

children, this study provides critical evidence that partici-

pation in explicit skill-building activities is an effective

means for enhancing emergent literacy growth.

Two additional observations from this investigation are

of significance in light of the present interest in structuring

effective emergent literacy intervention for at-risk children.

These observations concern oral language and literacy

orientation. With respect to oral language, it is currently

understood that although not all preschool children with

oral language problems will go on to experience reading

difficulties, the rate of reading problems among these

children is higher than occurs for their nonimpaired peers

(Catts et al., 2001). Several prospective studies of the

association between school-age reading proficiency and

history of preschool LI have suggested that reading

problems are more likely to occur in children having

relatively severe and/or widespread language difficulties

(i.e., affecting multiple aspects of language performance;

e.g., Bird et al., 1995; Bishop & Adams, 1990).

The present findings contribute to this research base by
delineating the substantial mediating influence of oral

language proficiency to the outcome of preschool emergent

literacy intervention. Children’s oral language proficiency

played a significant role in explaining the variance in

emergent literacy skills at the end of the intervention

period. These findings suggest the possibility that the link

between the severity of LI during preschool and the

tendency for these children to have lower reading out-

comes in the elementary years is that children with more

severe impairments are less influenced by intervention. For

these children in particular, qualitatively and quantitatively

different intervention approaches may be required to

optimize early and later literacy outcomes.

With respect to literacy orientation, several researchers

have recently argued the importance of literacy orientation

or literacy interest to facilitating emergent literacy growth

(e.g., Frijters et al., 2000; Whitehurst & Lonigan, 1998).

Kaderavek and Sulzby (1998a), in particular, have studied

literacy orientation in children experiencing oral language

problems, finding that preschoolers with LI are relatively

more likely to exhibit low orientation to literacy activities.

These researchers have also asserted that low orientation

may contribute to the protracted nature of these young-

sters’ emergent literacy development, and have argued for

applied research to further elucidate the role of orientation

in emergent literacy development.

Convergent with Kaderavek and Sulzby’s (1998a)

argument of the importance of literacy orientation to

emergent literacy development, we found orientation to

explain a significant portion of the variance in literacy

outcome. Children’s engagement and interest in literacy

activities therefore seems critical to successful literacy

achievement, even in the earliest stages of development. Of

additional note is the finding that oral language and literacy

orientation together explained a substantial amount of

the variance in literacy outcome, accounting for a significant

36% of variability in outcome. This suggests that children

with LI who concomitantly exhibit low literacy orientation

may be particularly vulnerable for experiencing only

marginal gains during literacy intervention.

Several limitations should be noted. The first involves

our measures. Only quantitative indices of emergent

literacy performance were collected; likewise, these

measures represented only several discrete areas of

performance. These data may not adequately reflect how

children may perform on other more diverse types of

performance-based or observational instruments examining

children’s naturalistic literacy behaviors or skills in other

contexts of use (e.g., in the classroom, at home). Future

research examining the effectiveness of various interven-

tion approaches should examine literacy performance

across various contexts of use and employ a variety of

qualitative and quantitative indices. Likewise, it is impor-

tant to note that our prediction equation explained only a

moderate portion of the unique variability in outcome.

Further investigations are needed to study additional

literacy, language, social, and behavioral indices that may

be associated with intervention outcome

The second set of limitations, related to the first,

concerns our assessment focus. We examined only

emergent literacy task performance, pursuant to the a priori

aims of this clinical investigation. We therefore did not

characterize children’s oral language skills, except to

develop a descriptive profile of children at the start of

intervention. This is an important limitation in that we

were unable to examine the relative influence of the two

intervention programs on oral language ability. There is

considerable evidence demonstrating the impact of

participation in shared storybook reading interactions, as


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Contact author: Laura Justice, PhD, 242 Ruffner Hall, Curry School of Education, University of Virginia, Charlottesville, VA 22904. E-mail: lmj2@virginia.edu