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Early Literacy Interventions:

The Relative Roles of Storybook Reading, Alphabetic Activities, and their Combination

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Abstract

The study examined the differential contributions on vocabulary and alphabetic skills of three literacy programs: (a) storybook reading program; (b) alphabetic skills program; and (c) a combined program. It was expected that storybook reading would enhance primarily vocabulary while alphabetic skills training would promote primarily alphabetic skills. Program by age interactions were examined in two age groups (3-4 and 4-5 years old) to test whether the storybook reading program may be more productive for the younger children whereas alphabetic skills program more productive for the older children. Twelve low-SES preschools participated in the study, three in each program and three as a comparison group. Results indicated that the children in the three intervention programs progressed significantly more than the comparison group on *name writing, letter knowledge and phonological awareness*. Further, the alphabetic skills program outperformed the other groups on *word writing, letter knowledge and initial letter retrieval*, whereas the storybook reading program outperformed only the comparison group. Results on the combined program were mixed – enhancing more *initial letter retrieval* and *book vocabulary* than storybook reading program. In general, no differences emerged in the progress of younger vs. older children except on *receptive vocabulary* - the younger surpassing the older in all programs.

Early Literacy Interventions:
The Relative Roles of Storybook Reading, Alphabetic Activities, and their Combination

This study aimed to fill a gap in the literature by investigating the effects of early literacy intervention on vocabulary and alphabetic skills, as a function of different intervention activities and participants' age. The study compared the effects of three yearlong programs, one involving storybook reading, the second training in alphabetic skills, and the third combining major activities from these two programs. The programs targeted two age groups, 3-4 and 4-5 year olds, and were conducted in preschool settings in a low-SES township.

Programs aiming to promote early literacy in educational settings have focused mainly on two types of activities, storybook reading or training in alphabetic skills. Storybook reading addressed a wide span of ages, depending primarily on the skills addressed. It was frequently used to promote language in young cohorts: infants (e.g., High, LaGasse, Becker, Ahlgren, & Gardner, 2000), toddlers (e.g., Whitehurst, Arnold et al., 1994), or preschoolers (e.g., Wasik & Bond, 2001). The few studies that used storybooks as a vehicle to promote print concepts (Justice & Ezell, 2002) or phonological awareness (Ukrainetz, Cooney, Dyer, Kysar, & Harris, 2000) were directed toward older children – pre-kindergartners or kindergartners. In contrast, alphabetic skills training (phonological awareness and letter knowledge) has primarily targeted kindergartners (Ehri, Nunes, Willows, Yaghoub-Zadeh, & Shanahan, 2001; Fuchs et al., 2001) or first graders (Sylva, Hurry, Mirelman, Burrell, & Riley, 1999; Weiner, 1994).

Storybook Reading Programs

Reading books to young children constitutes a very common adult-child early literacy activity (van Kleeck & Stahl, 2003). This interactive context is considered productive in

promoting literacy because it is viewed as contextualized, meaningful, and motivating for young children (Watkins & Bunce, 1996). Storybook reading programs involve raising the frequency of reading and elaborating it in ways that encourage children's verbal participation. These programs have been productive in promoting children's expressive vocabulary (e.g., Whitehurst, Arnold et al., 1994; Hargrave & Sénéchal, 2000), syntax (Valdez-Menchaca & Whitehurst, 1992), and storytelling (Neuman, 1999). With respect to receptive vocabulary, results of storybook reading are mixed, with some studies showing gains (High et al., 2000; Wasik & Bond, 2001) and others not (Hargrave & Sénéchal, 2000; Valdez-Menchaca & Whitehurst, 1992; Whitehurst, Arnold et al., 1994). Regular storybook reading programs did not assess progress on alphabetic skills, probably as such progress was not expected. However, Neuman (1999), who did test for concepts of print, letter naming, and name and word writing following her storybook reading intervention, showed an improvement on these skills relative to a comparison group.

A few studies used storybooks to practice alphabetic skills. Justice and Ezell (2002) read books to pre-kindergartners, focusing in the experimental group on print concepts and in the comparison group on the pictures, and found an advantage in the former group on print concepts and alphabetic knowledge. Ukrainetz et al. (2000) read books to kindergartners and utilized words from the books to train children on phoneme identification, segmentation, and deletion. Training was productive almost across the board. These two studies did not assess progress on vocabulary, probably because they did not anticipate such progress.

Note that studies of storybook reading often targeted low-SES populations, under the assumption that these children are disadvantaged in terms of exposure to books and shared reading (see exception, Ukrainetz et al., 2000). In the present study, the storybook reading program addressed low-SES 3-5 year olds and assessed possible gains both in vocabulary and alphabetic skills.

Alphabetic Skills Training Programs

Phonological awareness, letter knowledge, as well as early writing among pre-kindergartners and kindergartners often comprise the best predictors of reading and spelling acquisition later, in school. This holds true across languages (e.g., Blachman, Tangel, Ball, Black, & McGraw, 1999; Bowey, 1995; Bruck, Genesee, & Caravolas, 1997; Byrne & Fielding-Barnsley, 1989; Cardoso- Martins, 1995; de Jong & van der Leij, 1999; Ehri et al., 2001; Muter, Hulme, Snowling, & Taylor, 1998), including Hebrew (e.g., Aram, in press; Shatil, Share, & Levin, 2000).

Programs aiming to promote alphabetic skills in pre-kindergarten and kindergarten have often dealt with letter knowledge, phonological awareness, or their combination in order to analyze which components contribute most to the trained skills or to word recognition and word spelling. These studies targeted either low SES (e.g., Blachman et al., 1999; Schneider, Roth, & Ennemoser, 2000) or middle SES (e.g., Kerstholt, van Bon, & Schreuder, 1997).

Research on letter knowledge programs found that training pre-kindergartners on letter naming and letter sound mappings was productive for learning word recognition (Roberts, 2003). Research on phonological awareness programs showed that training kindergartners on phonemes rather than on syllables improved their phonemic awareness (e.g., Cary & Verhaeghe, 1994). Most studies, though, examined the combined effects of a program training both phonological awareness and letter knowledge in comparison to the isolated training of phonological awareness. By and large, the combined programs were more productive in promoting kindergartners' alphabetic skills, word recognition, and spelling (e.g., Ball & Blachman, 1991; Brennan & Ireson, 1997; Blachman et al., 1999; Fuchs et al., 2001; Schneider et al., 2000). This conclusion was supported in two meta-analyses (Bus & van IJzendoorn, 1999; Ehri et al., 2001). In quite a few studies, intervention groups were matched a priori on vocabulary (Ball & Blachman, 1991; Brennan & Ireson, 1997; Blachman

et al., 1999; Schneider et al., 2000), but progress on vocabulary was not tested, probably because such progress was not expected.

In the present study, the alphabetic skills program practiced letter knowledge, phonological awareness, as well as writing among low-SES preschoolers as young as 3-5 years old, and assessed possible gains both in alphabetic skills and vocabulary.

Programs that Integrate Storybook Reading and Alphabetic Skill Activities

A few comprehensive programs have integrated storybook reading with alphabetic skills activities, showing progress on a wide range of literacy variables. For example, Yaden et al. (2000) enriched a comprehensive childcare setting (Para Los Niños) with many books, educational games, materials inviting literate activities, access to writing centers and lending libraries, and more. Preschoolers in this program surpassed age mates in other programs on concepts about print, letter recognition, and vowel and consonant recognition. Whitehurst et al. (1999) exposed low-SES preschoolers concomitantly to dialogic reading and sound foundation programs, leading to children's progress on a wide range of skills such as expressive vocabulary, print concepts, name writing, naming letters, and rhyming.

In the present study, the combined program included both storybook reading and training in alphabetic skills, each less intensely than the programs focusing on each activity separately. As above, the program took place among low-SES preschoolers (3-5 years old) and assessed possible gains both in alphabetic skills and vocabulary.

This Study's Design and Expectations

The present study elaborated on a previous work by Aram and Biron (2004), which compared two literacy programs, one focusing on storybook reading and the other on alphabetic skills. The programs were conducted in low-SES preschool settings among 3-5 years olds and were implemented by graduate students. Children in the two literacy programs surpassed children in a comparison group on phonological and orthographic awareness.

However, the alphabetic skills group outperformed the storybook reading group on phonological and orthographic awareness, word writing, and letter knowledge. In contrast, the storybook reading program showed no advantage over the alphabetic skills program.

A review of the literature for the purpose of this study suggested that Aram and Biron (2004) is the only study thus far comparing the differential gains from storybook reading versus training of alphabetic skills programs. Likewise, no study to the best or our knowledge, has compared the gains from a combined program of storybook reading with alphabetic skills, to the gains from programs focusing on these activities separately. Thus, the present study examined three different yearlong interventions: one focusing on storybook reading, a second focusing on alphabetic skills, and a third combining the two. In addition, a fourth matched untreated group served as a comparison group.

The first hypothesis for the current study was that the alphabetic skills program would promote alphabetic skills more than would the storybook reading program. The parallel hypothesis, that the storybook reading program would promote vocabulary more than would the alphabetic skills program, was less decisive. As for the combined program, in line with the literature on combined instruction (e.g., Share & Jaffe-Gur, 1999, Study 2), the hypothesis was that this program would promote all skills, though perhaps to a lesser extent for each. In addition, the combined program was expected to outperform the storybook reading program on alphabetic skills and to outperform the alphabetic skills program on vocabulary.

Inasmuch as most storybook reading programs have targeted preschoolers or younger children, whereas most alphabetic skills programs have targeted kindergartners or older children, the current study examined whether these two types of programs are equally suitable for promoting literacy in two age groups of preschoolers: 3 to 4 year olds and 4 to 5 year olds. Following Whitehurst et al.'s (1999) claim that younger children are at a more sensitive period for verbal development and thereby benefit more from literacy programs that

focus on language, the younger children (3-4 years olds) could be expected to gain more than the older children (4-5 years olds) on vocabulary. Although past research on alphabetical skills has not compared the current age groups, alphabetic programs' successful applications with kindergartners (Baker & Smith, 1999; Schneider et al., 2000) suggest that the older group in this study (age 4 -5) would gain more than their younger counterparts on alphabetic skills.

In very few intervention studies did the teachers themselves implement the programs (but see Blachman et al., 1999; Fuchs et al., 2001; Roskos & Neuman, 1998; Saracho, 2002). Consequently, the conclusions derived from many intervention studies are not necessarily transferable to regular classrooms where the teacher executes the program. Relative to experts (researchers with expertise in literacy enhancement), teachers may be limited in terms of their knowledge about literacy promotion and in their ability to invest resources (time, energy, etc.) into the program due to educational priorities and everyday responsibilities. However, programs implemented by teachers may offer greater productivity due to the potential for generalization. First, teachers may adapt their regular curriculum to serve the program's goals, thus widening the scope of intervention. Second, experts' involvement is limited to the research time boundaries, whereas teachers may internalize the program's principles and goals and continue using them for years to come, for the benefit of future cohorts. Thus, the present design conducted interventions utilizing the classroom teachers as mediators. Hence, this study used a quasi-experimental design. This design suits the naturally occurring assignment of children into different local preschool classes with their regular teachers, where it would be impractical and unethical to randomly allocate participants to groups (Angrist, 2003; Lomax, 2004).

In sum, expectations for this study were as follows. The storybook reading program would primarily promote vocabulary, whereas the alphabetic skills program would primarily

enhance alphabetic skills. The combined program would promote both vocabulary and alphabetic skills, the former to a lesser extent than in the storybook reading program, and the latter to a lesser extent than in the alphabetic skills program. Further, the younger group (3-4 years old) would surpass their older peers on vocabulary gains, whereas the older group (4-5 years old) would surpass their younger peers on alphabetic skills gains.

Method

Setting and Participants

The interventions took place in Jaffa, a low-SES township in central Israel, geographically adjacent and administratively affixed to the major city of Tel Aviv. The township's population is 47,000. Jaffa residents face a scarcity of education and health programs; a high level of violence and crime; a number of neighborhoods known for drug dealing; and a high percentage of multi-problem families who suffer from domestic violence, economic distress, poor health, single parenthood, etc. (Center for Socioeconomic Research, 2000). The unemployment rate is higher than the general rate in Israel, and 30% of Jaffa's residents regularly receive local welfare services, in comparison with 16% in Tel Aviv. The rate of persons per room is 1.53 in Jaffa, compared to 0.87 in Tel Aviv.

A total of 315 children, enrolled in the nine public preschools in Jaffa, participated in the literacy programs. Three preschools were randomly assigned to participate in each of the three intervention programs (the storybook reading program, the alphabetic skills program, and the combined program). Three preschools attended by 105 children from a neighboring low-SES township (Bat-Yam) served as the comparison group. Each of the participating preschools served about 35 children in two age groups (3-4 year olds and 4-5 year olds). Parents do not choose a specific preschool for their child; children are assigned to preschools randomly by the municipality. Children attend preschool six days per week for 5½ hours daily.

The 12 preschools were all part of the public national education system and used the same curriculum. Israeli preschools are equipped with children's books, which are mainly read aloud during the whole class circle. The frequency of this activity varies greatly, depending on the teacher's preferences. Alphabetic activities are generally rare in preschools. Exposure to alphabetic activities begins in kindergarten (5-6 years old), and formal instruction in reading and writing begins on entry to first grade (6-7 years old) (Share & Levin, 1999).

Each preschool had two female teachers (one fulltime and the other part time). The teachers had at least three years of experience and all but two had a teaching diploma.

_____ Insert Table 1 about here _____

To evaluate the effectiveness of the three intervention programs, 42 children were randomly sampled from each of the three programs and from the comparison group, yielding a total of 168 children. At the end of the school year, 12 children could not be assessed because they moved out of town or were absent at the time of the assessment. Table 1 presents the characteristics of the sample (N = 156). No significant differences emerged between the groups according to one-way analyses of variance (ANOVAs) conducted on child's age, maternal education, and number of children per family. On paternal education, fathers of the comparison group (M = 12.26, SD = 2.13) were slightly but significantly more educated than fathers in the alphabetic skills program (M = 10.43, SD = 1.98). Chi square analyses revealed no significant differences between the groups on number of younger versus older children, number of boys versus girls, number of Israeli natives versus immigrants (mostly from the former Soviet Union) among mothers or fathers, or number of single versus two-parent families.

Intervention Programs

The three programs were initiated in November, two months after the school year began, to provide the children with time to adapt to their preschools. Teachers added the interventions to the preschool's regular curriculum. Early interventions demonstrated the effectiveness of small-group tutoring (Ehri et al., 2001; Lauren & Allen, 1999). In each yearlong program, the teachers divided the children into small groups of 4 to 6 children creating fairly homogenous groups in terms of literacy, based on the pretest results and on teachers' informal impressions. Each group participated in 20- to 30-minute sessions twice a week. In all, each child participated in approximately 50 sessions. Teachers maintained a written attendance record for each session.

Teachers' intensive training constitutes an important component in early interventions (Lauren & Allen, 1999). Research has shown that interventions that deepen the teachers' expertise in discipline-specific knowledge gain more cooperation from the teachers and last longer (Dickinson & McCabe, 2001). In the current interventions, the two teachers in each preschool participated in a course of monthly 3-hour meetings over the whole school year. Each teacher participated in one course, either in the course of storybook reading or in the course of alphabetic skills. In the combined program one teacher in each preschool participated in one course and the other teacher in the other course. Each teacher training meeting included a lecture presenting contemporary models of early literacy development and promotion, together with a review of studies relevant to the program. In addition, the meetings incorporated an exchange of ideas and discussions of implementation problems. In each meeting, the teachers learned the goals and the contents of the coming month's sessions. They received printed one-page guidelines for each session as well as the necessary materials (games, books, stickers, etc.). However, teachers were taught to be sensitive to the children's competencies and to flexibly adapt the activities and the demands from the children to their zone of proximal development (Vygotsky, 1978). For example, the duration of a session was

suited to the group's attention span, gradually increasing throughout the year and never exceeding 30 minutes. The demand for productions also suited the children's capabilities. In the storybook reading program, the books' length and complexity increased during the year. In the alphabetic skills program, children could either use pencils or readymade letters to write or spell according to their abilities and preferences.

A coordinator, a graduate student specializing in early literacy, visited each preschool once a month for about 2 hours. In these visits, she observed the teachers' intervention with the children in one or two of the small groups and carried out consultation.

The Storybook Reading Program

This program utilized 10 children's books, each serving as the basis for a unit of about 4-6 successive sessions. Various ideas elicited by that particular book were discussed in the sessions (for examples, see Appendix). The topics were developmentally appropriate and close to the children's world (e.g., family, fears, friends, animals).

In each session, the teachers read the book aloud to the children twice, once at the beginning and once at the end of the session. Teachers asked open-ended questions, expanded on children's discourse, discussed central concepts and ideas raised in the books, and elaborated on them using games. The teachers encouraged the children to be active before, during, and after the story reading and to share their own relevant experiences. For example, while reading the book "*There's a nightmare in my closet*" by Mercer Mayer, the children discussed notions like fears, differentiating real fears from imaginary fears. To expand children's vocabulary, teachers introduced words from the stories and discussed them broadly. In the last session of the unit on each book, the teachers invited the children to tell the story by themselves as a group following the pictures. Toward the end of the year, activities included sorting and reorganizing the books in the preschool library by their topic, genre, and so on.

The Alphabetic Skills Program

This program involved games and activities that encouraged phonological awareness, letter knowledge, and eventually basic writing. An attempt was made to include these components in each session (for examples, see Appendix). Starting with the familiar (Wasik, 2001), children's own names and classmates' names were utilized throughout the program.

The practice of phonological awareness included segmenting words into syllables and sub-syllables and retrieving initial sub-syllables. For example, children searched in a box for objects whose names began with the same consonant-vowel sequence (CV) as their own names. Children practiced letter-name and letter-sound correspondences. For example, they mastered the names of the letters in their own name, or matched the first letter of a friend's name to his/her photograph. Children wrote not only with pencils but also used seals, stickers, magnetized letters, newspaper cuttings, etc. to form written words. Gradually, children started writing functional print, e.g., "Boys" and "Girls" signs for the bathroom and a telephone book of their classmates' numbers.

The Combined Program: Storybook Reading and Alphabetic Skills

This program included activities from both the storybook reading program and the alphabetic skills program. Of the two weekly sessions, one session dealt with storybook reading and the other with alphabetic skills. Thus, the children covered the same activities as in each of the other two programs but less intensely. Teachers utilized all 10 of the children's books, but each book served as the basis for a shorter unit of about two to three successive sessions instead of four to six. Likewise, teachers covered all the major topics in the alphabetic skills program, but practiced phonological awareness, letter knowledge, and writing just once a week.

Literacy Assessment Measures

Seven tasks measured alphabetic skills and vocabulary:

Name writing and word writing. The interviewer asked the child to write his/her name and two pairs of words: g*ɛzɛr* – *mɛlafɛfon* (carrot – cucumber) and *dag- tarnɛgol* (fish – rooster). The child received three A4 pages, one each for writing the name and the word pairs. Each written product was scored on a scale adapted from Levin and Bus (2003) developed for children between 2½ to 4½ years old. The scale comprised three sequential general schemes: graphic, writing-like, and symbolic. The graphic scheme included scribbles (scored 1) and a single good form like a square or a circle (scored 2). The writing-like scheme included horizontal or vertical line(s) or small plain circles or dots (scored 3). The symbolic writing scheme included using numbers or random letters (scored 4), partially phonetic spelling (scored 5), and conventional spelling (scored 6). The score on name and the mean score on the four words served as the *name writing* and *word writing* scores respectively. The reliability across the five words was α = .98.

Letter knowledge. The interviewer asked the children to name 8 printed letters, each presented on a card (200 Times New Roman). These letters were chosen from the 27 Hebrew letters because they were reported as the easiest for young children to name (Levin, Patel, Margalit, & Barad, 2002). The 3-point scale scored the number of letters named correctly: (1) no letter; (2) one to two letters; (3) three or more letters. The reliability of the scale was α = .86.

Initial letter retrieval. The interviewer asked children to retrieve the first letter of 10 spoken words that were familiar to children in the age range studied. Each word contained two to three syllables, such as *gina* (garden) or *aviron* (airplane). Children's responses were scored on a 3-point scale: (1) erroneous answers or "I don't know"; (2) correct first syllable (e.g., "*gina* starts with gi"); or (3) correct letter retrieval. The mean score across words served as the *initial letter retrieval* score. The reliability of the scale was α = .90.

Phonological awareness. Sensitivity to alliteration and rhyme are preliminary indicators of phonological awareness (Adams, 1991; Goswami & Bryant, 1990). Two tasks,

10 items each, were developed for alliteration and for rhyming. In the alliteration task, the interviewer asked children if the first syllable of two spoken words was the same or not. For example, *sapa* (sofa) and *salat* (salad) begin with the same syllable, unlike *gamad* (midget) and *dayag* (a fisherman). In the rhyming task, she asked if two spoken words rhymed or not. For example, *xalon* (window) and *balon* (balloon) rhyme, unlike, *kisɛ* (chair) and *sakin* (knife). Prior to testing, the interviewer presented two sample pairs and provided corrective feedback with explanation. The sum of correct answers across the two tasks served as the *phonological awareness* score. The reliability across the items of the two tasks was $\alpha = .70$.

Receptive vocabulary. The Peabody Picture Vocabulary Test (PPVT) was used to examine children's receptive vocabulary, using Solberg and Nevo's (1979) translation to a Hebrew items set. The interviewer asked the child to choose one picture out of four, depicting a spoken word. Inasmuch as only preliminary Hebrew norms were available for children older than the present sample, raw scores were used. The *receptive vocabulary* score amounted to the number of correct responses. The reliability of the PPVT test was $\alpha = .84$.

Book vocabulary. This test was developed by selecting 20 words from the 10 children's books used in the storybook reading and combined programs (two words from each book). Criteria for word selection were: (a) presumed novelty for young children and (b) more than two appearances in the book. Selected words included *dimaa* (a tear), *zoef* (enraged), and *gur* (cub). The design of the test followed that of the PPVT: For each item, the interviewer asked the child to choose one picture out of four, depicting a spoken word. The *book vocabulary* score amounted to the number of correct responses. The reliability among the items was $\alpha = .74$.

Assessment Procedure

Preschoolers were tested in November (pretest) and in June (posttest) on all tests. Six trained graduate students assessed the children. The same student administered all the tasks

for a given child, individually in a quiet room inside the preschool over three sessions (of approximately 20 minutes each). The tasks were administered in random order.

Results

The results comprise two parts. The first part examines the matching procedure at the pretest between the four groups (storybook reading, alphabetic skills, combined, and comparison) in the two age groups (3-4 and 4-5 year olds). The second part compares children's progress from pretest to posttest in these groups.

Pretest: Assessment of Matching Procedure Across Programs and Age Groups

Table 2 presents the pretest descriptive data of literacy measures within groups and ages. The upper part refers to the performance of the total sample, the middle part to the performance of younger children, and the lower part to that of the older children. Results reveal that the sample exhibited sufficient variance in all measures. To compare the children's literacy in the four groups (the three treatments and the comparison) at the two ages (3-4 and 4-5 year olds) prior to the intervention, a two-way multivariate analysis of variance (MANOVA) was conducted for all literacy measures: 4 (*program*: storybook / alphabetic / combined / comparison) X 2 (*age*: 3-4 / 4-5 year olds). A significant multivariate effect emerged for *age*, F (8, 141) = 5.41, $p < 0.001$, *program*, F (24, 429) = 1.88, $p < 0.01$, and for the *age by program* interaction, F (24,429) = 1.91, $p < 0.01$.

_____ Insert Table 2 about here _____

For *age*, the univariate analyses revealed that the older children aged 4-5 years scored significantly higher ($p < 0.01$) on all literacy measures than did the younger children aged 3-4 years, F(1) = 24.10, 7.78, 9.60, 18.29, 7.22, 21.18, 14.90 on *name writing, word writing, letter knowledge, letter retrieval, phonological awareness, receptive vocabulary,* and *book vocabulary*, respectively. These differences support the assumption that these measures were sensitive to the differences between the two age groups. For *program*, the univariate analyses

revealed only two significant effects, in *word writing*, F (3, 156) = 3.49, $p < .01$, and in *letter knowledge*, F (3, 156) = 2.19, $p < .01$. Post-hoc Bonferroni tests showed that on these two skills, children in the alphabetic skills program scored significantly lower than those in the comparison group, but not than those in the other two intervention groups. For the *age* by *program* interaction, the univariate analyses revealed only one interaction, on *name writing*, F (3, 156) = 4.79, $p < .05$. Post hoc Bonferroni tests showed that younger children in the alphabetic skills program scored significantly lower that did younger children in the combined program and in the comparison group. No other *age* by *program* interactions emerged (see middle and lower parts of Table 2). In sum, analyses indicated that, by and large, the three groups were well matched on all literacy measures. The comparison group was slightly more advanced than the alphabetic skill program on two alphabetic skills.

Qualitative inspection of the pretest data showed that at the beginning of the year the younger children wrote their *name* and *words* using writing-like schemes, and the older children had started using random letters. On *letter knowledge*, the younger children recognized none, one, or two letters, and the older children, on average, approached recognition of two letters. On *initial letter retrieval*, the younger children rarely responded at all and the older children had begun retrieving the initial syllable. On the *phonological awareness* tests (rhyming and alliteration), where children could answer by guessing, the younger children performed on a chance level and the older children scored moderately higher than chance. On *receptive vocabulary* for younger and older children, the mean scores were about the middle of the range suitable for their age. In sum, children in this sample were at the preliminary phases in alphabetic skills as expected for their young age and low SES. Likewise, their vocabulary seemed to be at the level expected for their age and SES group.

Treatment Effects:

Comparing Progress of the Younger and the Older Children in the Four Groups

To determine the differential effects of the three programs on the two age groups, a progress score was computed by deducting the pretest from the posttest scores. A two-way MANOVA for the progress on all literacy measures was conducted: 4 (*program*: storybook / alphabetic / combined / comparison) X 2 (*age*: 3-4 / 4-5 year olds). Table 3 presents the children's progress data (means, standard deviations, and post hoc results) across groups and ages. The upper part refers to the progress of the total sample, the middle part to the progress of younger children, and the lower part to that of the older children. The multivariate analysis showed a significant effect for *program, F* (21, 432) = 6.17, $p < .001$, no significant effect for *age,* yet a significant interaction for *program* by *age, F* (21, 432) = 2.22, $p < .01$.

_____ Insert Table 3 about here _____

On *program,* all the univariate effects were significant ($p < 0.01$) with the exception of *receptive vocabulary, F* (3) = 9.99, 11.98, 24.42, 7.37, 16.42, 3.40 on *name writing, word writing, letter knowledge, letter retrieval, phonological awareness,* and *book vocabulary*, respectively. Post-hoc Bonferroni tests revealed the sources of these effects. As expected, the three intervention groups progressed significantly more than the comparison group on a wide range of skills: *name writing*, *letter knowledge* and *phonological awareness*. A similar but non-significant trend appeared on *receptive vocabulary, F* (3) = 2.14, $p = .09$. As predicted, the alphabetic skills group progressed more than the two other intervention groups on alphabetic skills: *word writing, letter knowledge*, and *initial letter retrieval*. Likewise, the combined group progressed more than the storybook reading group and more than the comparison group on *initial letter retrieval*. Unexpectedly, the storybook reading group did not surpass the other intervention groups on any measure. Further, surprisingly, the combined program progressed more than all other groups on *book vocabulary*.

As to age, only one significant univariate effect emerged. In *receptive vocabulary*, F (1, 148) = 5.02, p = 0.03, the younger children progressed significantly more than the older children, as expected.

Three significant univariate interactions emerged between *program* and *age*, for the progress in *name writing*, F (3, 156) = 2.78, $p < .05$, *letter knowledge*, F (3, 156) = 2.93, < .05, and *phonological awareness*, F (3, 156) = 3.62, $p < .05$. Post-hoc Bonferroni tests revealed the source of each of these interactions. On *name writing*, only in the alphabetic skills group, the younger children progressed significantly more than their older counterparts (M = 2.68 vs. 1.58). Recall that in this program the children studied the alphabet and practiced writing emphasizing names. On *letter knowledge*, only in the storybook reading program, the older children progressed more than the younger (M = 0.82 vs. 0.30). Recall that this program exposed children to books but did not emphasize letters. On *phonological awareness*, no significant differences appeared between the progress of the older and the younger children in any of the three intervention groups. Unexpectedly, in the comparison group, the younger children progressed more than their older counterparts (M = 0.65 vs. -2.33).

Discussion

The present study employed a quasi-experimental design to examine the differential effects of three programs conducted by teachers in preschools, aiming to promote alphabetic skills and vocabulary among young children (aged 3-4 and 4-5 years) from a low-SES township. In line with the literature, the storybook reading program was primarily expected to promote vocabulary. The alphabetic skills program was primarily expected to enhance alphabetic skills. The combined program was expected to augment both vocabulary and alphabetic skills. However, this program was expected to enhance vocabulary to a lesser extent than the storybook reading program, and alphabetic skills to a lesser extent than the alphabetic skills program. Further, the younger group (3-4 years old) was expected to surpass

their older peers on vocabulary gains, whereas the older group (4-5 years old) was expected to surpass their younger peers on alphabetic skills gains.

In line with expectations, all three intervention groups progressed more than did the comparison group on measures of both alphabetic skills and vocabulary (*name writing, letter knowledge, phonological awareness,* and, nearly significantly, *receptive vocabulary*). As expected, the alphabetic skills group gained more than the other two intervention groups on alphabetic skills (*word writing, letter knowledge,* and *initial letter retrieval*). Also, as expected, the combined group gained more than the alphabetic skills group on vocabulary (*book vocabulary*), and more than the storybook reading group on an alphabetic skill (*initial letter retrieval*). Unexpectedly, the storybook reading program showed an advantage only over the comparison group but not over the other intervention groups.

The advantages apparent in the intervention groups relative to the comparison group should not be taken as self-evident. Recall that these children were very young (3-5 year olds), at an age that has rarely been considered suitable for training on alphabetic skills. Moreover, the population was from a low SES known to be at academic risk, in both vocabulary (e.g., Hoff, 2003) and alphabetic skills (e.g., Korat, 2005). Finally, the programs were executed by the teachers within their everyday agenda, a highly demanding context for teachers. Nevertheless, the advantage of the intervention groups over the comparison group may be partly attributed to the Hawthorne effect.

Turning to the separate effect of each intervention program, storybook reading was found to be productive in promoting *name writing, letter knowledge, phonological awareness,* and, marginally, *receptive vocabulary,* relative to the comparison group. These findings are in line with Neuman's (1999) and Aram and Biron's (2004) research, suggesting that prior intervention studies on storybook reading in preschools that focused on linguistic outcomes may have overlooked possible gains in alphabetic skills. This conclusion is supported by

studies on home literacy showing reliable moderate relations between storybook reading and emergent literacy (phonological awareness, letter knowledge, and so forth). (See reviews by Bus and van IJzendoorn, 1995 and by Scarborough and Dobrich, 1994.)

The unexpected finding that this storybook reading program, which focused on language, did not enhance receptive vocabulary (*PPVT* and *book vocabulary*) more than the other intervention programs deserves explanation. This finding should not be regarded as coincidental because some studies have already reported that storybook intervention demonstrated no effect on receptive vocabulary even relative to a no-intervention comparison group (Aram & Biron, 2004; Neuman, 1999; Whitehurst, Arnold et al., 1994; Hargrave & Sénéchal, 2000). It may be suggested that the storybook reading program as designed in the present study does promote receptive vocabulary. Nevertheless, the alphabetic skills program that emphasized words, their phonology, their letters, and grapho-phonemic mapping may have alerted children to the lexicon to the extent that it became as powerful as the storybook reading program in promoting receptive vocabulary.

The alphabetic skills program was the most effective in promoting alphabetic skills. Children in this group gained significantly more than the comparison group on each alphabetic skill, and more than the other two intervention groups on *word writing, letter knowledge,* and *letter retrieval.* Note that this program was the only one that promoted *word writing* relative to all groups. It seems that *word writing*, which involves letter knowledge, phonological awareness, and grapho-phonemic mapping, deserves intensive and systematic practice with the alphabetic code (Adams, 1991). Word writing, not often assessed prior to first grade, was found to be among the best predictors of reading and spelling acquisition in first and second graders (e.g., Aram, in press; Aram & Levin, 2004; Levin, Ravid, & Rapaport, 2001; Levin, Share & Shatil, 1996; Sénéchal, LeFevre, Thomas, & Daley, 1998).

The intensity issue leads to the analysis of the benefits offered by the combined program that practiced both storybook reading and alphabetic skills, but each less intensively than in the programs devoted to only one of these activities. In comparison with the other intervention programs, the combined program led to a broader spectrum of gains, including both alphabetic skills and vocabulary. This raises the question of whether the combined gains offer a long-term advantage. Dickinson and Smith (1994) claimed that variability in the nature of the literacy care provided in preschool has a considerable impact on the emergence of language and literacy skills.

It is true that the combined program led to lesser gains in alphabetic skills than did the intense alphabetic skills program. However, the children in the current sample, aged 3 to 5, faced an imminent 1-2 years of study in the early education system, before beginning formal reading and spelling acquisition in the first grade. Hence, they would have sufficient time to further practice alphabetic skills. Moreover, low-SES preschoolers like those in the present study usually reveal a disadvantage not only in alphabetic skills but also in linguistic skills (Hoff, 2003). The gains in vocabulary, which were highest in the combined group, are probably important for success in school in general (Walker, Greenwood, Hart, & Carta, 1994) and in reading comprehension in particular (Joshi, 2005).

With regard to age, by and large, very few differences emerged between the progress of the younger children and that of their older counterparts. No differences appeared between the progress of the younger and the older children on *word writing*, *initial letter retrieval*, *phonological awareness* or *book vocabulary* in any of the programs. These findings are interesting vis-à-vis the general assumption that the older group should gain more than the younger on alphabetic skills. These skills are often regarded as just emerging at around age 4, and consequently their assessment and training are viewed as developmentally immature beforehand.

The success of these programs with such young groups probably stemmed partially from the interventions' deliberate attempt to maintain sensitivity to children's competencies and interests (see Appendix on activities in the intervention program). The activities were designed as age-appropriate games dealing with topics close to young children's world, for instance the emphasis on the child's own name (Levin, Both, Aram, & Bus, 2005; Treiman & Broderick, 1998). Session duration, books' length and complexity, accessibility to a variety of alphabetic materials, and so on were all geared to accommodate children's attention span, abilities, and preferences. The importance of sensitivity and adjustment to children's level of development has been demonstrated abundantly in the literature, in studies both on language acquisition (Reese, 1995) and on storybook reading (Pellegrini, Perlmutter, Galda, & Brody, 1990).

In contrast with the general similarity of progress in the two age groups, on *receptive vocabulary* the younger children progressed more than their older counterparts in all programs. This outcome coincides with Whitehurst et al.'s (1999) finding that storybook reading programs are more productive for preschoolers than for kindergartners. Younger children, they claimed, are at a more sensitive period for verbal development and thereby benefit more from literacy programs that focus on language.

Implications, Limitations, and Directions for Future Study

The following features appear likely to have contributed to the effectiveness of the current intervention programs: age appropriateness of activities, small-group format, twice-weekly frequency, sensitivity to individual differences, preplanned systematic design and intensive teachers' training. In particular, this study illustrates the feasibility of promoting not only vocabulary but also alphabetic skills from the early age of 3 years.

The present study responded to Blachman et al.'s (1999) call for research into literacy programs provided during the regular school day in the regular classroom by the teachers.

The current study is one of the few training studies involving preschoolers, in which teachers were responsible for the implementation. It demonstrated that when teachers receive training and support during the year as well as age-appropriate materials and activities, they can successfully implement early literacy programs, while maintaining their regular curriculum.

Several limitations of this study must be considered. First, as a quasi-experiment, the current data cannot be interpreted as reflecting cause-effect relations, despite the fact that the municipality's random assignment of children to the various preschools, and the random assignment of preschools to the programs, added to the strength of the results. Wiersma (2000) claimed that if participants are randomly assigned to groups in the first place, then if the researcher randomly assigns groups to conditions, he/she could study causality. However, such interpretations must be made with utmost caution. Second, the present study limited language measures to vocabulary (PPVT and book vocabulary), but there is much more to language (Purcell-Gates, 2004). Future research would do well to examine the benefits of literacy interventions as impacting a broader set of language measures like morphology, syntax, and pragmatics. Third, the present study compared three literacy programs and concentrated only on the different nature of activities and age groups. We did not compare different levels of training for teachers and did not include home literacy activities. An interesting direction for future study should include or even focus on these components. Finally, we assessed the children at the beginning and the end of the intervention year. It is important to follow up on children’s literacy achievements longitudinally, so as to study the lasting effects of the different literacy interventions.

References

Adams, M. J. (1991). *Beginning to read*. Cambridge, MA: MIT Press.

Angrist, J. D. (2003). Randomized trials and quasi-experiments in education research. *NBER Reporter, Summer*, 11-14.

Aram, D. (in press). The continuity in children's literacy achievements: A longitudinal perspective from kindergarten to school. *First Language*.

Aram, D., & Biron, S. (2004). Joint storybook reading and joint writing interventions among low SES preschoolers: Differential contribution to early literacy. *Early Childhood Research Quarterly, 19,* 588-610.

Aram, D., & Levin, I. (2004). The role of maternal mediation of writing to kindergartners in promoting literacy achievements in school: A longitudinal perspective. *Reading and Writing: An Interdisciplinary Journal, 17,* 387-409.

Baker, S., & Smith, S. (1999). Starting off on the right foot: The influence of four principles of professional development in improving literacy instruction in two kindergarten programs. *Learning Disabilities Research & Practice, 14,* 239-253.

Ball, E. W., & Blachman, B. A. (1991). Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly, 26,* 49-66.

Blachman, B. A., Tangel, D. M., Ball, E. W., Black, R., & McGraw, C. K. (1999). Developing phonological awareness and word recognition skills: A two-year intervention with low-income, inner-city children. *Reading and Writing: An Interdisciplinary Journal, 11*, 239-273.

Bowey, J. A. (1995). Socioeconomic status differences in preschool phonological sensitivity and first grade reading achievement. *Journal of Educational Psychology, 87,* 476-487.

Brennan, F., & Ireson, J. (1997). Training phonological awareness: A study to evaluate the effects of a program of metalinguistic games in kindergarten. *Reading and Writing: An Interdisciplinary Journal, 9,* 241-263.

Bruck, M., Genesee, F., & Caravolas, M. (1997). A cross linguistic study of early literacy acquisition. In B. Blachman (Ed.), *Foundations of reading acquisition and dyslexia: Implications for early interventions* (pp. 145-162). Mahwah, NJ: Erlbaum.

Bus, A. G., & van IJzendoorn, M. H. (1995). Mothers reading to their three year olds: The role of mother-child attachment security in becoming literate. *Reading Research Quarterly, 40,* 998-1015.

Bus, A. G., & van IJzendoorn, M. H. (1999). Phonological awareness and early reading: A meta-analysis of experimental training studies. *Journal of Educational Psychology, 91*, 403-414.

Byrne, B., & Fielding-Barnsley, R. (1989). Phonemic awareness and letter knowledge in the child's acquisition of the alphabetic principle. *Journal of Educational Psychology, 81,* 805-812.

Cardoso-Martins, C. (1995). Sensitivity to rhymes, syllables, and phonemes in literacy acquisition in Portuguese. *Reading Research Quarterly, 30,* 808-828.

Cary, L., & Verhaeghe, A. (1994). Promoting phonemic analysis ability among kindergartners: Effects of different training programs. *Reading and Writing: An Interdisciplinary Journal, 6,* 251-278.

Center for Socioeconomic Research. (2000, February). *Netunim statistim al yafo [Statistical data about Jaffa*] (Studies and Surveys No. 69). Tel Aviv: Author. (Hebrew).

de Jong, P. F., & van der Leij, A. (1999). Specific contributions of phonological abilities to early reading acquisition: Results from a Dutch latent variable longitudinal study. *Journal of Educational Psychology, 91,* 450-476.

Dickinson, D. K., & McCabe, A. (2001). Bringing it all together: The multiple origins, skills, and environmental supports of early literacy. *Learning Disabilities: Research and Practice, 16,* 186-202.

Dickinson, D. K., & Smith, M. W. (1994). Long term effects of preschool teachers' book readings on low income children's vocabulary and story comprehension. *Reading Research Quarterly, 29,* 104-122.

Ehri, L. C., Nunes, S. R., Willows, D. M., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis. *Reading Research Quarterly, 36,* 250-287.

Fuchs, D., Fuchs, L. S., Thompson, A, Otaiba, S. A., Yen, L., Yang, N., et al. (2001). Is reading important in reading readiness programs? A randomized field trial with teachers as program implementers. *Journal of Educational Psychology, 93,* 251-267.

Goswami, U., & Bryant, P. (1990). *Phonological skills and learning to read.* Hillsdale, NJ: Erlbaum.

Hargrave, A. C., & Sénéchal, M. (2000). A book reading intervention with preschool children who have limited vocabularies: The benefits of regular reading and dialogic reading. *Early Childhood Research Quarterly, 15,* 75-90.

High, P. C., LaGasse, L., Becker, S., Ahlgren, I. & Gardner, A. (2000). Literacy promotion in primary care pediatrics: Can we make a difference? *Pediatrics,* 105, 927-934.

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development, 74,* 1368-1378.

Joshi, M. R. (2005). Vocabulary: A critical component of comprehension. *Reading and Writing Quarterly: Overcoming learning difficulties, 21,* 209-219.

Justice, L. M., & Ezell, H. K. (2002). Use of storybook reading to increase print awareness in at-risk children. *American Journal of Speech-Language Pathology, 11*, 17–29.

Kerstholt, M. T., van Bon, W. H. J., & Schreuder, R. (1997). Using visual support in preschool phonemic segmentation training. *Reading and Writing: An Interdisciplinary Journal, 9*, 265-284.

Korat, O. (2005). Contextual and non-contextual knowledge in emergent literacy development: A comparison between children from low SES and middle. *Early Childhood Research Quarterly, 20*, 220-2388.

Lauren, L., & Allen, L. (1999). Factors that predict success in an early literacy intervention project. *Reading Research Quarterly, 34*, 404-424.

Levin, I., Both, A., Aram, D., & Bus, A. (2005). Writing starts with own name writing: From scribbling to conventional spelling of Israeli and Dutch children. *Applied Psycholinguistics, 26*, 463-478.

Levin, I., & Bus, A. (2003). How is emergent writing based on drawing? Analyses of children's products and their sorting by children and mothers. *Developmental Psychology, 39*, 891-905.

Levin, I., Patel, S., Margalit, T., & Barad, N. (2002). Letter-names: Effect on letter saying, spelling and word recognition in Hebrew. *Applied Psycholinguistics, 23*, 269-300.

Levin, I., Ravid, D., & Rapaport, S. (2001). Morphology and spelling among Hebrew-speaking children: From kindergarten to first grade. *Journal of Child Language, 28*, 741-772.

Levin, I., Share, D. L., & Shatil, E. (1996). A qualitative-quantitative study of preschool writing: Its development and contribution to school literacy. In C. M. Levy, & S. Ransdaell (Eds.), *The science of writing* (pp. 271-293). Mahwah, NJ: Erlbaum.

Lomax, R. G. (2004). Whither the future of quantitative literacy research? *Reading Research Quarterly, 39,* 107-112.

Muter, V., Hulme, C., Snowling, M., & Taylor, S. (1998). Segmentation, not rhyming, predicts early progress in learning to read. *Journal of Experimental Child Psychology, 71*, 3-27.

Neuman, S. B. (1999). Books make a difference: A study of access to literacy. *Reading Research Quarterly, 34,* 286-311.

Pellegrini, A. D., Perlmutter, J. C., Galda, L., & Brody, G. H. (1990). Joint reading between Black Head Start children and their mothers. *Child Development, 61,* 443-453.

Purcell-Gates, V. (2004). Family literacy as the site for emerging knowledge of written language. In B. H. Wasik (Ed.), *Handbook of family literacy* (pp. 101-116). Mahwah, NJ: Lawrence Earlbaum.

Reese, E. (1995). Predicting children's literacy from mother-child conversation. *Cognitive Development, 10*, 381-405.

Roberts, T. A. (2003). Effects of alphabet-letter instruction on young children's word recognition. *Journal of Educational Psychology, 95*, 41-51.

Roskos, K., & Neuman, S. (1998). Play as an opportunity for literacy. In O. N. Saracho, & B. Spodek (Eds.), *Multiple perspectives on play in early childhood education* (pp. 100-115). Albany, NY: State University of New York Press.

Saracho, O. N. (2002). Teachers' roles in promoting literacy-related play. In O. N. Saracho, & B. Spodek (Eds.), *Contemporary perspectives in literacy in early childhood education: Contemporary perspectives in early childhood education* (Vol. 2, pp. 23-34). Greenwich: Age.

Scarborough, H. S., & Dobrich, W. (1994). On the efficiency of reading to preschoolers. *Developmental Review, 14*, 245-302.

Schneider, W., Roth, E., & Ennemoser, M. (2000). Training phonological skills and letter knowledge in children at risk for dyslexia: A comparison of three kindergarten intervention programs. *Journal of Educational Psychology, 92,* 284-295.

Sénéchal, M., LeFevre, J., Thomas, E. M., & Daley, K. E. (1998). Differential effects of home literacy experiences on development of oral and written language. *Reading Research Quarterly, 33,* 96-116.

Share, D. L., & Jaffe-Gur, T. (1999). How reading begins: A study of preschoolers' print identification strategies. *Cognition and Instruction, 17,* 177-213.

Share, D. L., & Levin, I. (1999). Learning to read and write in Hebrew. In M. Harris, & G. Hatano (Eds.), *Learning to read and write: A cross-linguistic perspective* (pp. 89-111). Cambridge: Cambridge University Press.

Shatil, E., Share, D. C., & Levin, I. (2000). On the contribution of kindergarten writing to grade one literacy: A longitudinal study in Hebrew. *Applied Psycholinguistics, 21,* 1-21.

Solberg, S., & Nevo, B. (1979). Tseadim rishonim likrat standartizatsia shel mivchan hapeabody leivrit. [Preliminary steps towards an Israeli standardization of the Peabody Test]. *Megamoth, 3,* 407-413. (Hebrew).

Sylva, K., Hurry, J., Mirelman, H., Burrell, A., & Riley, J. (1999). Evaluation of a focused literacy teaching programs in reception and year 1 classes: Classroom observations. *British Educational Research Journal, 25,* 617-635.

Treiman, R., & Broderick, V. (1998). What's in a name? Children's knowledge about the letters in their own names. *Journal of Experimental Child Psychology, 70,* 97-116.

Ukrainetz, T. A., Cooney, M. H., Dyer, S. K., Kysar, A. J., & Harris, T. J. (2000). An investigation into teaching phonemic awareness through shared reading and writing. *Early Childhood Research Quarterly, 15*, 331-355.

Valdez-Menchaca, M. C., & Whitehurst, G. J. (1992). Accelerating language development through picture book reading: A systematic extension to Mexican day-care. *Developmental Psychology, 28*, 1106-1114.

van Kleeck, A., & Stahl, S. A. (2003). Preface. In A. van Kleeck, S. A. Stahl, & E. B. Bauer (Eds.), *On reading books to children* (pp. vii-xiii). Mahwah, NJ: Lawrence Erlbaum.

Vygotsky, L. S. (1978) *Mind and society: The development of higher psychological processes*. Cambridge: Harvard University Press.

Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development, 65*, 606-621.

Wasik, B. A. (2001). Teaching the alphabet to young children. *Young Children, 56*, 34-40.

Wasik, B. A., & Bond, M. A. (2001). Beyond the pages of a book: Interactive book reading and language development in preschool classrooms. *Journal of Educational Psychology, 93*, 243-250.

Watkins, R. V., & Bunce, B. H. (1996). Natural literacy: Theory and practice for preschool intervention programs. *Topics in Early Childhood Special Education, 16*, 191-212.

Weiner, S. (1994). Effects of phonemic awareness training on low and middle achieving first graders' phonemic awareness and reading ability. *Journal of Reading Behavior, 26*, 277-300.

Whitehurst, G. J., Arnold, D. S., Epstein, J. N., Angell, A. L., Smith, M., & Fischel, J. (1994). A picture book reading intervention in day care and home for children from low-income families. *Developmental Psychology, 30*, 679-689.

Whitehurst, G. J., Epstein, J. N., Angell, A., Payne, A. C., Crone, D., & Fischel, J. E. (1994). Outcomes of an emergent literacy intervention in Head Start. *Journal of Educational Psychology, 84*, 541-556.

Whitehurst, G. J., Zevebergen, D. A., Crone, D. A., Schultz, M. D., Velting, O. N., & Fischel, J. E. (1999). Outcomes of an emergent literacy intervention from Head Start to second grade. *Journal of Educational Psychology, 91,* 261-272.

Wiersma, W. (2000). Research methods in education: An introduction (*7th ed*.). Boston: Allyn & Bacon.

Yaden, D. B., Tam, A., Madrigal, P., Brassell, D., Massa, J., Altamirano, S., & Armendariz, J. (2000). Early literacy for inner city children: The effects of reading and writing interventions in English and Spanish during preschool years. *The Reading Teacher, 54,* 186-189.

Appendix

Examples of Storybook Reading and Alphabetic Skills Program Sessions

Storybook Reading Program

Session no. 1 (out of four): "A cat on the mat" by Brian Wildsmith

1. Show the children the book cover and ask them to guess about its subject (A cat sitting alone on a mat is progressively joined by more and more animals until it hisses them all away). Who is the book's main character? How do I know? Where is the author's name written? Where do I see the book's name?
2. Read the book's name aloud and ask the children to predict the story. "Now, what do you think this book will be about?"
3. Read the story aloud, showing the illustrations.
4. Discuss difficult words with the children.
5. Discuss crowdedness and spaciousness: Play a game with the children practicing these concepts. To the sound of a gong, ask the children to stand very close to each other and then, at the next sound of the gong, ask them to spread themselves around the room.
6. Discuss situations of crowdedness: When do I experience crowdedness and how do I feel in these situations?
7. Read the story aloud.

Session no. 2: "A cat on the mat" by Brian Wildsmith

1. Show the book to the children and ask them to share memories, to recall what the story is about.
2. Read the story aloud, showing the illustrations.

3. Go through the pages and, at each page, ask the children to tell the story and to answer whether the cat was pleased when a new animal came to join it.
4. Discuss features of the animals (size, color, preferred food, habitat, etc.)
5. Dramatize the story. Encourage children to tell the story and play the different animals.

Alphabetic Skills Program

Session no. 3: "Me and my name" (a session held twice during the 3rd week of the program)

1. On the table, spread out photographs of the children in the group (taken and developed by the teacher earlier) and pre-prepared cards of their printed names. Add two photographs and two printed names of classmates who do not belong to their small group.
2. Ask the children if they see photographs of children who are not in their group. After the children find the photographs, ask their help in finding the printed names of these children.
3. Ask the children: How do I know which printed name belongs to a child? Suggest: I can check if I know the letters. If not, I can count the letters in each printed name, say the name aloud and try and figure out which name is longer. I can say, "Listen, the name Odelia sounds longer then the name Gil. Odelia is written with more letters; I see six letters in the name Odelia and only three in the name Gil."
4. When the "mystery" is solved, ask each child to take his/her own photograph and printed name. Encourage the children to count the letters in their names and put a sticker over each letter.

5. Play a memory matching game with the children, using the photographs and the printed names of the children in the group and including the two children whose photographs and names were added that day.

Session no. 4: "Me and my name" (held twice during the 4th week of the program).

1. On the table, spread out the photographs of the children in the group and the cards with their printed names. Add printed cards with the first letters of each name. Ask each child to pick up his/her photograph and printed name.
2. Holding a pile of stickers that display the letters of the alphabet, tell the children: "I want to give you the first letter of your name. Can you help me and tell me which letter I need to give you?" If a child does not know to name the letter, ask the child to point to it on the letter cards that are on the table. If the child does not know, show him/her the letter and name it.
3. Give each child the sticker with the first letter of his/her name while saying it aloud. For example: "Here is I. I is the first letter in the name Iris."
4. Spread letter stickers of different sizes and colors out on the table and let the children find several stickers displaying their initial letter. Ask the children to adhere several stickers with their initial letter around their printed name.
5. The session ends with each child saying his/her name, the first syllable of the name, the first letter, and goodbye (e.g., "My name is Maria, my name starts with ma, with the letter M, goodbye").

Table 1

The Sample (N = 156): Characteristics of the Three Intervention Groups and the Comparison Group

	Storybook reading program (*N* = 37)	Alphabetic skills program (*N* = 38)	Combined program (*N* = 40)	Comparison group (*N* = 41)
Age in months at the pretest [a]	48.48 (7.28)	46.50 (5.73)	46.12 (6.13)	47.31 (6.94)
n for age group: 3-4 / 4-5 years	20 / 17	19 / 19	21 / 19	20 / 21
n for gender: boys / girls	18 / 19	18 / 20	24 / 16	22 / 19
Maternal education [a]	11.76 (1.71)	11.26 (2.09)	12.03 (1.42)	12.07 (2.39)
Paternal education [a]	11.17 (1.72)[cd]	10.43 (1.98)[c]	11.64 (1.29)[cd]	12.26 (2.13)[d]
No. children in family[a]	2.67 (0.99)	2.13 (0.81)	2.48 (1.36)	2.59 (1.02)
Israeli born mothers [b]	84	63	73	66
Israeli born fathers [b]	73	61	68	64
Single parents [b]	38	29	30	17

[a] *M* (*SD*).

[b] Percentages.

[c,d] Means that are marked by different signs ([c,d]) differ significantly by Bonferroni tests.

Table 2

Child's Literacy Measures at the Pretest Across Groups and Ages: Means and Standard Deviations

	Possible range	Storybook reading program *M* (*SD*)	Alphabetic skills program *M* (*SD*)	Combined program *M* (*SD*)	Comparison group *M* (*SD*)
Total sample					
Name writing	1 - 6	3.08 (1.38)	2.87 (1.56)	3.18 (1.03)	3.63 (1.55)
Word writing	1 - 6	2.43 (0.80) [a b]	2.27 (0.92) [a]	2.75 (0.90) [a b]	2.93 (0.84) [b]
Letter knowledge	1 - 3	1.57 (0.69) [a b]	1.45 (0.69) [a]	1.80 (0.85) [a b]	1.98 (0.82) [b]
Letter retrieval	1 - 3	1.21 (0.37)	1.11 (0.29)	1.14 (0.35)	1.22 (0.38)
Phonological aw.	0 – 20	10.92 (2.55)	10.23 (2.76)	10.95 (2.91)	11.54 (3.10)
Rec. vocabulary	0 - 55	31.68 (6.85)	31.03 (7.93)	30.13 (6.47)	30.20 (6.83)
Book vocabulary	0 - 20	11.11 (3.57)	9.82 (3.50)	9.20 (4.58)	10.02 (4.23)
Younger children (3-4 years old)					
Name writing	1 - 6	2.35 (0.75) [a b]	2.05 (0.91) [a]	3.05 (0.80) [b]	3.35 (1.23) [b]
Word writing	1 - 6	2.16 (0.73)	1.86 (0.73)	2.70 (0.73)	2.94 (0.74)
Letter knowledge	1 - 3	1.35 (0.67)	1.32 (0.58)	1.43 (0.67)	2.00 (0.72)
Letter retrieval	1 - 3	1.01 (0.04)	1.00 (0.00)	1.06 (0.09)	1.18 (0.31)
Phonological aw.	0 – 20	11.00 (2.20)	9.32 (2.08)	10.29 (1.71)	10.70 (2.45)
Rec. vocabulary	0 - 55	29.55 (6.79)	26.74 (5.33)	28.10 (6.51)	29.20 (6.69)
Book vocabulary	0 - 20	10.35 (3.63)	8.74 (2.68)	7.38 (4.54)	9.05 (4.50)
Older children (4-5 years old)					
Name writing	1 - 6	3.94 (1.48) [a]	3.68 (1.67) [a]	3.32 (1.25) [a]	3.90 (1.79) [a]
Word writing	1 - 6	2.74 (0.79)	2.68 (0.91)	2.81 (1.07)	2.93 (0.94)
Letter knowledge	1 - 3	1.82 (0.63)	1.58 (0.76)	2.21 (0.85)	1.95 (0.92)
Letter retrieval	1 - 3	1.44 (0.44)	1.22 (0.37)	1.24 (0.49)	1.26 (0.49)
Phonological aw.	0 – 20	10.82 (2.98)	11.22 (3.05)	11.68 (3.74)	12.33 (3.48)
Rec. vocabulary	0 - 55	34.18 (6.21)	35.32 (7.87)	32.37 (5.79)	31.14 (6.99)
Book vocabulary	0 - 20	12.00 (3.39)	10.89 (3.94)	11.21 (3.78)	10.95 (3.84)

Note: On all measures, mean performance of the older group was significantly higher than that of the younger group.

[a,b] Means that are marked by different signs ([a,b]) differ significantly by Bonferroni tests.

Table 3
Discrepancy Scores (Posttest Minus Pretest) Across Groups and Ages: Means and Standard Deviations

	Possible range	Storybook reading program *M* (*SD*)	Alphabetic skills program *M* (*SD*)	Combined program *M* (*SD*)	Comparison group *M* (*SD*)
Total sample					
Name writing	-5 to +5	1.49 (1.57) [b]	2.13 (1.56) [b]	1.40 (1.71) [b]	0.24 (1.51) [a]
Word writing	-5 to +5	0.61 (1.12) [a]	1.43 (1.00) [b]	0.38 (0.93) [a]	0.16 (0.92) [a]
Letter knowledge	-2 to +2	0.54 (0.69) [b]	1.45 (0.72) [c]	0.65 (0.92) [b]	0.00 (0.71) [a]
Letter retrieval	-3 to +3	0.27 (0.51) [a]	0.68 (0.57) [c]	0.48 (0.75) [b]	0.10 (0.43) [a]
Phonological aw.	-20 to +20	2.86 (3.44) [b]	4.32 (3.63) [b]	3.70 (3.92) [b]	-0.88 (3.92) [a]
Rec. vocabulary	-55 to +55	3.78 (6.21)	4.16 (7.23)	5.25 (6.34)	1.73 (6.08)
Book vocabulary	-20 to +20	3.19(3.17) [ab]	3.61 (2.57) [ab]	5.10 (4.28) [b]	2.66 (3.77) [a]
Younger children (3-4 years old)					
Name writing	-5 to +5	1.70 (1.45)	2.68 (1.67)	1.00 (1.67)	0.55 (1.47)
Word writing	-5 to +5	0.50 (1.27)	1.53 (1.07)	0.40 (0.82)	0.14 (0.94)
Letter knowledge	-2 to +2	0.30 (0.57)	1.53 (0.61)	0.86 (0.96)	-0.10 (0.55)
Letter retrieval	-3 to +3	0.34 (0.44)	0.57 (0.52)	0.43 (0.70)	0.06 (0.37)
Phonological aw.	-20 to +20	1.90 (3.19)	5.42 (3.25)	4.19 (4.04)	0.65 (3.27)
Rec. vocabulary	-55 to +55	4.45 (6.08)	7.21 (5.40)	6.43 (7.40)	1.25 (6.61)
Book vocabulary	-20 to +20	3.30 (3.21)	3.68 (2.94)	6.33 (3.81)	2.95 (4.58)
Older children (4-5 years old)					
Name writing	-5 to +5	1.24 (1.71)	1.58 (1.26)	1.84 (1.67)	-.05 (1.53)
Word writing	-5 to +5	0.74 (0.92)	1.34 (0.94)	0.35 (1.06)	0.18 (0.93)
Letter knowledge	-2 to +2	0.82 (0.73)	1.37 (0.83)	0.42 (0.83)	0.09 (0.83)
Letter retrieval	-3 to +3	0.18 (0.58)	0.79 (0.62)	0.54 (0.83)	0.15 (0.48)
Phonological aw.	-20 to +20	4.00 (3.46)	3.21 (3.72)	3.16 (3.82)	-2.33 (4.00)
Rec. vocabulary	-55 to +55	3.00 (6.46)	1.12 (7.65)	3.95 (4.78)	2.19 (5.66)
Book vocabulary	-20 to +20	3.06 (3.21)	3.53 (2.22)	3.74 (4.38)	2.38 (2.87)

[a, b, c] Means that are marked by different signs ([a,b,c]) differ significantly by Bonferroni tests