

Beyond the Pages of a Book: Interactive Book Reading and Language Development in Preschool Classrooms

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The effects of a book reading technique called interactive book reading on the language and literacy development of 4-year-olds from low-income families were evaluated. Teachers read books to children and reinforced the vocabulary in the books by presenting concrete objects that represented the words and by providing children with multiple opportunities to use the book-related words. The teachers also were trained to ask open-ended questions and to engage children in conversations about the book and activities. This provided children with opportunities to use language and learn vocabulary in a meaningful context. Children who were in the interactive book reading intervention group scored significantly better than children in the comparison group on Peabody Picture Vocabulary Test–III and other measures of receptive and expressive language. Book reading and related activities can promote the development of language and literacy skills in young children.

Shared book reading is an important activity that provides a context for language development in young children (Dickinson & Snow, 1987; Dickinson & Tabors, 1991; Sénéchal, LeFevre, Thomas, & Daley, 1998; Snow, 1983). Although there has been some controversy concerning the magnitude of the effect of early book reading on later literacy and academic skills (Scarborough & Dobrich, 1994), most scholars agree that shared book reading contributes in important ways to early literacy and language development (Bus, van IJzendoorn, & Pellegrini, 1995; Lonigan, 1994; Payne, Whitehurst, & Angell, 1994; Snow, Burns, & Griffin, 1998). A central feature of shared book reading is that it provides opportunities for learning decontextualized language and vocabulary (Dickinson & Snow, 1987; Snow, 1983). Decontextualized language refers to language that is used to convey new information to audiences who have limited shared experience with the context of the information. Through book reading, children learn vocabulary that they may not necessarily encounter in daily conversations and learn about conventions of print and the syntactic structure of language. Children's decontextualized language skills have been shown to be related to conventional components of literacy, such as decoding, understanding story narratives, and print production (Dickinson & Snow, 1987).

Book reading also provides the context for rich conversations between a child and an adult. During book reading, interactions frequently go beyond the text of the story and invite dialogue

between the adult and the child. Children whose parents engage in conversations that go beyond the explicit information presented in the story performed better on vocabulary measures as compared with children whose parents focused primarily on the explicit message of the story (DeTemple & Snow, 1992). Similarly, children who were engaged in more high-level conversations and dialogue about the story performed better on vocabulary and language measures than did children who focused primarily on low-level utterances such as describing a page or answering questions that required a "yes" or "no" response (Haden, Reese, & Fivush, 1996).

Unfortunately, children raised in poverty often enter school with limited exposure to books and underdeveloped literacy and language skills (Adams, 1990; Snow et al., 1998). In a longitudinal study, Hart and Risley (1995) found that, by age 3, children from low-income families had significantly lower vocabularies compared with children from middle- and high-income homes. These findings are consistent with the Carnegie Foundation report, "Ready to Learn: A Mandate for the Nation" (Boyer, 1991), which reported that 35% of the children entering school lacked necessary skills in the areas of vocabulary and sentence structure. Of these, a disproportionate number were from low-income homes. In general, children from high-poverty schools arrive at school significantly behind their more advantaged peers, with this gap persisting as children go from elementary to high school (Puma et al., 1997). Specific to book reading, the amount of book reading and literacy activities in low-income preschool classrooms varies greatly from quality literacy experiences to little exposure to books (Dickinson, 1999).

The purpose of the present study was to examine the effects of a book reading approach on the language skills of at-risk preschool children. The project involves both shared book reading and extension activities supporting the use of the vocabulary presented in books. The design for this study was informed by previous research on shared book reading and young children.

There has been extensive research that supports the importance of the relationship between children's home book reading and

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preschool language abilities (Beals, DeTemple, & Dickinson, 1994; Crain-Thoreson & Dale, 1992; DeBaryshe, 1993; Mason & Dunning, 1986; Robbins & Ehri, 1994; Wells, 1986; Whitehurst & Lonigan, 1998). In a series of studies, Sénéchal and her colleagues (Sénéchal & Cornell, 1993; Sénéchal, LeFevre, Hudson, & Lawson, 1996; Sénéchal, Thomas, & Monker, 1995) demonstrated the development of vocabulary through book reading experiences. For example, Sénéchal et al. (1995) showed that children who were actively engaged in reading a book with an adult learned more vocabulary than did children who listened passively to the book reading. In a related study, Sénéchal et al. (1996) found that children's knowledge of storybooks contributed unique variance to their expressive and receptive vocabularies.

In a series of influential studies, Whitehurst and his colleagues (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Payne et al., 1994; Valdez-Menchaca & Whitehurst, 1992; Whitehurst, Arnold, et al., 1994; Whitehurst, Epstein, et al., 1994; Whitehurst et al., 1988) demonstrated that a program of shared reading, called "dialogic reading," can produce substantial changes in low-income preschool children's language skills. Dialogic reading includes a series of procedures in which the adult asks open-ended questions, creates opportunities for the children to participate in storytelling, and actively listens and encourages a discussion about the story. For example, the adult reader asks the child to elaborate on a page that they just read together (e.g., "Tell me more about what we read.") or asks "what," "where," or "why" questions that encourage the child to respond in his or her own words. One-to-one interventions with dialogic reading have resulted in significant gains in language skills for children in high-, middle-, and low-income families (Valdez-Menchaca & Whitehurst, 1992; Whitehurst et al., 1988).

Most of the studies on shared book reading have been done with an adult, typically a parent, reading one-to-one with a young child. Less is known about the effects of shared book reading activities in classrooms (Karweit & Wasik, 1996). In an observational study of 25 preschool classrooms, Dickinson and Smith (1994) found that teachers' questioning styles have an effect on children's vocabulary development. Whitehurst, Epstein, et al. (1994) examined the effects of dialogic reading on 4-year-olds in Head Start who were read to in small groups of four. There were significant effects for writing and concepts of print and findings that approached significance on language measures. Unlike the robust results from the one-to-one intervention with dialogic reading, Whitehurst, Arnold, et al. (1994) found that the classroom-based interventions had less of an effect. In addition, the home intervention component of dialogic reading was found to be critical to the program's success (Lonigan & Whitehurst, 1998; Whitehurst, Arnold, et al., 1994; Whitehurst, Epstein, et al., 1994).

For many low-income children, out-of-home settings are the primary place where they experience shared reading. Having an effective language and literacy intervention that could be used in a whole-group classroom setting would have a significant impact on at-risk children's literacy development.

The purpose of the present study was to determine whether shared reading in the classroom can be infused with many of the positive attributes of one-to-one reading in the home. Our approach was based on the following premises. First, we wanted to *optimize children's opportunities for learning vocabulary from book reading*. This goal was accomplished by having children

encounter the focal vocabulary multiple times and in multiple contexts beyond the pages of the book. As Robbins and Ehri (1994) and Huttenlocher, Levine, and Vevea (1998) found, children need repeated exposures to words to acquire them and use them productively.

Second, it was important to make target vocabulary salient so that children in groups of 12 to 15 could benefit from the instruction. This goal was accomplished by providing children with concrete representations of the words and having the children encounter similar words in different books. By having the children see and interact with the objects, we hoped to increase the probability that they would learn and remember the words.

Third, on the basis of Whitehurst's work, we provided teachers with book reading strategies that emphasized open-ended questioning and invited dialogue with children. When teachers engage children in discussions about books and other content, children's vocabulary can increase (Dickinson, Cote, & Smith, 1993). In combining effective book reading methods in a group approach, we hoped to foster vocabulary development in low-income 4-year-olds in a classroom setting.

Method

Participants

One hundred twenty-seven 4-year-olds from low-income families participated in this research. The mean age was 4 years, 3 months, with the children's ages ranging from 3 years, 11 months to 4 years, 7 months. The children attended a Title I early learning center in Baltimore, Maryland. The center is a public school that serves 3-, 4-, and 5-year-old children, 95% of whom are eligible for free or reduced lunch. Ninety-four percent of the children are African Americans who are eligible for placement based on a school readiness screening that was developed by the school district. The screening measures include receptive and expressive language measures, categorization tasks, and simple counting.

The 4-year-olds' teachers in the school were informed of the project and told that if they agreed to participate, half of the teachers would be assigned to a control group, and the remaining half would participate in the intervention. Four of the five teachers agreed to participate in the project regardless of their group placement. Both the morning and afternoon classes of all four teachers participated in this project.

Procedures

Two teachers were randomly assigned to the intervention condition, and two were assigned to the control condition. Initially, there were 64 children in the intervention group and 63 in the control group. Six children transferred from the school, leaving 61 in the intervention and 60 in the control group.

The intervention was conducted for 15 weeks, between mid-October and May. Because of both the school's and the teachers' schedules, the intervention did not occur over consecutive weeks. During the first 4 weeks of the intervention, Mary Alice Bond, an experienced preschool teacher, modeled the shared book reading for the intervention teachers and also assisted with the extension activities. During the remaining 11 weeks, the intervention teachers did the book reading and center extension activities by themselves.

The intervention consisted of training teachers in interactive book reading techniques and book reading extension activities as well as providing the necessary books and materials for the activities. The first part of the intervention began with training the teachers in interactive book reading strategies. This training consisted of instruction in (a) defining vocabulary words and providing opportunities for the children to use vocabulary from

the books, (b) asking open-ended questions and allowing children to talk beyond a "yes" or "no" response, and (c) providing children with opportunities to talk and to be heard.

Specifically, the intervention teachers were instructed to introduce the target vocabulary before the book reading. The teachers were trained to show the children an object that represented a vocabulary word and ask, "What is this?" or "What do you call this?" The teacher would then say, "What can I do with this ____?" or "Tell me what you know about this ____." During the book reading, teachers were trained to ask questions that promoted discussions, such as "Tell me more about what is happening on this page." "What do you think will happen next?" and "Why do you think that the character did that?" The teachers were provided with examples of these open-ended questions. As the teachers implemented the intervention, they began to develop their own questions that encouraged children to talk about the book. After reading the story, teachers were instructed to ask the children reflection questions such as "What part of the book did you like the best?" and "Tell me why you think the boy thought that the carrot would grow." (See the Appendix for excerpts from before, during, and after interactive book reading in both the intervention and control classes.)

Because this intervention was conducted with whole groups, teachers were also given guidance in techniques that would help children to listen while a child was speaking. Mary Alice Bond then modeled these strategies in the intervention classrooms. After the modeling, the teachers discussed the strategies they observed and the alternative strategies that could have been used. In addition to training, the teachers were provided with books and materials to implement the interactive book reading.

Each intervention teacher was given a box of materials for the topic that was to be presented. The materials in each box were organized around specific themes or topics that are commonly used in preschool classrooms, such as "welcome to school," "clothing," and "the seasons." Each box contained two age-appropriate trade books related to a topic or theme. The two books contained similar vocabulary words on the selected topic. Each box also contained concrete objects that represented the target vocabulary in the trade books. The intervention teachers and the researchers collaborated in selecting the target vocabulary words. The target words represented common words that were thought to be unfamiliar to the children in the study yet necessary for story comprehension. Materials also included a big book of pictures of the target vocabulary words and the same book in a smaller form. In addition, the teacher was given written instructions for center activities that would reinforce the use of the target vocabulary. For example, the garden prop box contained two trade books: *The Carrot Seed* by Ruth Krauss and *Jack's Garden* by Henry Cole. The box also contained the following objects: seeds, a shovel, a rake, a small version of a garden hose, a watering can, insects, flowers, a stalk of corn, and a carrot.

In addition to the books and props, instructions and materials were provided for a related activity that was scheduled for after the book reading. The activities included arts and crafts such as making a paper-plate garden and painting a garden picture, science activities such as planting carrot or bean seeds, and cooking activities such as making a vegetable platter and eating it during snack. Their selection was based primarily on the amount of time available in the schedule to conduct the activity and the teachers' perceptions of the children's interest. All of the materials were provided to the teachers for the activities; thus, their choices were not limited by access to supplies. Our goal was to make the intervention as adaptable as possible to many preschool classrooms. Because the whole-group activity came after book reading in both the intervention and control class schedules, the control classes did engage in arts and crafts and science activities during the same time. However, on the basis of our observations of the control classes, the group activities were not related to the book reading. The intervention teachers were instructed to use the activity time as an opportunity to reinforce the book vocabulary in another context. No other specific training regarding these activities was given to the intervention teachers. On two occasions, the control teachers were asked to implement the same activity as the intervention teachers so that a comparison

could be made. However, as the control teachers were doing group activities at that time, it was not asking them to do something unfamiliar.

Initially, the intervention teachers were asked to read each trade book twice, but schedule demands did not allow for this. Instead, each week, the teachers read one of the two trade books twice and the second trade book once. The teachers implemented the following schedule in presenting the books and materials in their classrooms. On Day 1, the teacher presented the props and asked the children to identify the objects. In doing this, the teachers were given the opportunity to present and discuss vocabulary words before the children read the story. The teacher would hold up a story prop and ask the group of children, "What is this?" or "What do you call this?" If the children were unable to accurately label the prop, the teachers would provide the correct label. If the children were able to correctly identify the prop, the teacher would acknowledge the correct label and continue to the next prop. The teacher would then introduce one of the two trade books. The trade book was read using interactive reading strategies that encouraged the children to talk about the vocabulary in the context of the book. On Day 2, the teacher began with the children labeling the props. The teacher read the same trade book again. Also on Day 2, the children worked in small groups on center activities that provided opportunities to reinforce the vocabulary words from the story. On Day 3, the teacher read the second trade book, and the children labeled the props. On Day 4, the children did a center activity that was related to the book. The big book containing pictures of the target vocabulary words was read to the children as they followed along with a smaller version of the book. In addition to the props being used during the interactive book reading time, the props were placed in the classroom to give children opportunities to play and interact with them. The control classrooms did not have these specific props available to them.

The teachers in the control classrooms were given copies of the same trade books used in the intervention classrooms and read the books the same number of times that they were read in the intervention group. However, the control teachers were not trained in interactive book reading strategies. Both the intervention teachers and the control teachers in this preschool followed similar daily schedules and implemented similar themes. A similar amount of time was allocated for book reading in both the intervention and control classes.

Assessments

All children were pretested individually on the Peabody Picture Vocabulary Test—III (PPVT—III; Dunn & Dunn, 1998). Similar to most interventions conducted to date, the PPVT—III was used as a baseline and outcome measure for receptive vocabulary skills.

At the end of the 15-week intervention, all children were administered three measures of vocabulary development. First, the PPVT—III was administered. Second, a receptive language measure, modeled after the PPVT—III, was constructed with a subset of the vocabulary words that were presented during the 15 weeks of interactive book reading. Out of the 100 target words in all of the stories, 44 were randomly selected to use in this receptive language assessment. Like the PPVT—III, this assessment required the children to discriminate among four pictures and identify the one that corresponded to the target vocabulary words. Third, a measure of expressive vocabulary was administered. The expressive language measure consisted of pictures that served as referents for the words used during the interactive book reading. The children were shown a picture and asked to name the object in the picture. Words used in the receptive assessment were not used in the expressive assessment. A pretest measure of the expressive and receptive measures was not administered because the target vocabulary was not identified prior to the intervention. All children were individually assessed on all three measures. The PPVT—III provided a general measure of vocabulary development. The expressive measures provided a measure of the specific words that the children learned from the stories and were able to identify without having to use the label for the

word. The expressive measures required that the children have a conceptual understanding of the word and the correct label for the word.

In addition to measures of vocabulary development, classrooms were observed to determine whether the teacher reinforced target vocabulary words outside the context of the interactive book reading. Observations of teachers' use of the vocabulary were conducted at two times in each of the classrooms (A.M. and P.M.) during the 9th and 11th weeks of the intervention. All teachers were observed while they read the same two stories. Teachers in the intervention classrooms were asked to read the trade books and implement one of the center activities after the book reading. For the first week of the intervention, teachers in the control group were asked to read the trade book and transition to a center activity of their choice after the reading. After the first observation in the control classroom, we found that teachers did not relate small-group activities to the book reading. To assess whether control teachers would reinforce the book vocabulary during small-group activities, teachers in the control group were asked to implement the same small-group extension activities that were implemented by teachers in the intervention group (for Lessons 9 and 11 only). This allowed us to observe the same activities in both the intervention and control groups. However, the control teachers were not provided with any additional instructions for the extension activities.

A frequency count was tallied of the number of times the teacher used a target vocabulary word from the story. The purpose of these observations was to determine whether (a) the teachers, in addition to book-related activities, actually used the book-related vocabulary when talking to the children during the activities and (b) the teachers in the intervention and control classrooms used the terms in different ways in extension activities.

Results

The first set of analyses examined whether children in the experimental classrooms showed stronger growth in vocabulary than did children in the control classrooms. In the second set of analyses, descriptive information on teacher behaviors is provided to determine the extent to which training seemed to modify the instructional approach of teachers in experimental classrooms.

Language Assessments

The design of this study was 2 (condition: treatment, control) \times 4 (teacher) \times 2 (time of day: A.M. class, P.M. class), with teachers nested within condition (2 experimental, 2 control) and time of day nested within teachers (each taught an A.M. class and a P.M. class). For PPVT-III scores, the design included a repeated measure factor as well (pretest, posttest). The first statistical decision was to determine the need to include all of these factors in the analyses. Preliminary tests showed no significant differences between the means for the two experimental teachers and between the means for the two control teachers (All F s < 1.0) and no significant differences between the A.M. and P.M. classes taught by each teacher (All F s < 1.0). Therefore, teacher and time of day were not considered to be between-group factors. The means for all analyses are shown in Table 1.

The second analytical decision considered the appropriate unit of analysis. The decision to use students as the unit of analysis when intact classrooms receive treatments is both common and widely criticized (e.g., Blair & Higgins, 1986; Blair, Higgins, Topping, & Mortimer, 1983; Cronbach, 1976; Hopkins, 1982), and the matter is far from resolved. It is the case that the assumption of independence of scores required for analysis of variance (ANOVA) is violated when students, as a group, receive a treatment and are the unit of analysis. Further, Monte Carlo studies

Table 1
Means for All Measures by Condition, Trial, and Teacher

Measure	Experimental teachers		Control teachers	
	Teacher A	Teacher B	Teacher C	Teacher D
PPVT-III				
Pretest	74.37	74.52	72.51	74.23
Posttest	81.58	81.67	72.43	73.62
Experimental measures				
Receptive	37.88	38.02	27.09	27.05
Expressive	7.59	7.29	2.47	2.97

Note. Receptive and expressive measures were given at the posttest only. PPVT-III = Peabody Picture Vocabulary Test—III.

conducted on t tests (without an obvious treatment comparison) suggest that Type I error is greatly inflated when students, instead of classroom means, are used as the unit of analysis (Blair et al., 1983). However, because of the sharp reduction in the degrees of freedom for error, Type II error is greatly increased through the use of classroom means. Moreover, there are statistically sound alternatives to using classroom means for intact classrooms (using students as the unit) that produce F values that are similar to those produced in standard ANOVAs when students are the unit of analysis (e.g., treating students, teachers, and methods as random effects; see Hopkins, 1982). Given that each unit of analysis has its strengths and weaknesses, the data are reported in two ways: (a) with classrooms as the unit of analysis and (b) with students as the unit of analysis. The results were identical for both kinds of analyses, so it is unlikely that our results are due to either Type I or Type II error.

A third analytical decision related to the fact that each teacher taught an A.M. and a P.M. class. When classroom means are the unit of analysis, each teacher would contribute two means if time of day were ignored, as preliminary analyses suggested that it should be. To avoid this dependency problem, we conducted an ANOVA comparing treatment and control classrooms for just the A.M. classes and an ANOVA comparing treatment and control classrooms for just the P.M. classes.

The expected result was a Treatment \times Trial interaction if the intervention was effective (i.e., no difference in PPVT-III scores at the pretest but a significant difference at the posttest). The analyses with classroom as the unit of analysis revealed the expected interaction for both the A.M. classes, $F(1, 2) = 62.73, p < .016$, and P.M. classes, $F(1, 2) = 346.08, p < .001$. The means were 73.66 (treatment) and 72.01 (control) for PPVT scores at the pretest and 81.30 (treatment) and 72.10 (control) for PPVT scores at the posttest. The comparable analyses with students as the unit of analysis produced the same Treatment \times Trial interaction, $F(1, 120) = 13.69, p < .001$.

A similar approach was used to examine treatment effects on the receptive and expressive vocabulary posttest measures constructed for this study. With classroom as the unit of analysis, the ANOVAs for the receptive measures revealed significant main effects of condition for both the A.M. classes, $F(1, 2) = 133.940, p < .007$, and P.M. classes, $F(1, 2) = 293.68, p < .003$. The means for the receptive measure were 37.85 (treatment) and 28.09 (control) for the A.M. classes and 38.05 (treatment) and 26.06 (control) for the

P.M. classes. With students as the unit of analysis, main effect of condition was again significant, $F(1, 120) = 76.61, p < .001$ (collapsing across A.M. and P.M.).

For the expressive measure, note that a strict scoring criterion was applied. For children to receive a point for their response, they needed to say the exact word for the object that was used in the book reading. For example, they needed to use the word *firefighter* instead of responses such as "person who puts out fires." Results with the classroom as the unit of analysis revealed the expected main effect of condition for both the A.M. classes, $F(1, 2) = 189.81, p < .005$, and P.M. classes, $F(1, 2) = 126.13, p < .008$. The means were 7.49 (treatment) and 2.71 (control) for the A.M. classes, and 7.39 (treatment) and 2.78 (control) for the P.M. classes. With students as the unit of analyses, the F value was $F(1, 120) = 128.43, p < .001$.

Classroom Observations

As noted earlier, a frequency count of the number of times each teacher used any of the 10 target vocabulary words during the 20-min extension activities was recorded. A separate 2 (group: treatment, control) \times 10 (each word) ANOVA was conducted for each of the two extension activities. There were significant main effects of group and word for each activity, as well as significant Group \times Word interactions: $F(9, 54) = 17.02, p < .001$, and $F(9, 54) = 26.39, p < .001$, respectively, for the interactions. Intervention teachers used the target words significantly more often than control teachers did, but the differences were especially pronounced for certain words (see Table 2). During both extension activities, teachers in the intervention group used, on average, 7 out of the 10 target words, and teachers in the control groups used, on average, 4 out of 10 words. The intervention did have an effect

on teacher behaviors, specifically in terms of enhanced frequency of elaborated use of the target words.

Discussion

The primary purpose of this study was to evaluate the effectiveness of a classroom-based interactive book reading project for low-income 4-year-olds. It was expected that by providing children with multiple opportunities to interact with vocabulary words through book reading, story props, and extension activities, children would learn the vocabulary associated with these activities. In addition, because teachers were trained to use book reading strategies that focused on increasing the use of language and emphasizing vocabulary, it was hypothesized that this intervention would have a more broad effect on children's vocabulary development.

Children whose teachers provided multiple opportunities to interact with vocabulary words learned more book-related vocabulary compared with children who were exposed to just the books. Through the interactive book reading, the teachers introduced vocabulary words in a meaningful context. Also, children were given the opportunities to talk and ask questions about the story and to listen to other children's conversations about the stories. The story props helped the vocabulary words come alive for the children and provided additional opportunities to hear the label for the words. In addition, as the props were very interesting and inviting to the children, it was likely that motivation to learn the names for the props was enhanced. The extension activities further provided a meaningful context in which children could use the vocabulary from the book. For example, as the children made musical instruments that they learned about in a book, they learned the names for the instruments that they made. As Robbins and Ehri (1994) and Huttenlocher et al. (1998) have shown, children learn words to which they are repeatedly exposed. The book reading, story props, and extension activities provided multiple contexts to hear and use the vocabulary words from the story. Children in the intervention and control classroom were read the identical stories, yet in the control group, teachers did not systematically extend the use of the story vocabulary beyond the pages of the book. Instead, what we observed was the lack of repeated opportunities to learn the interactive book vocabulary in a meaningful context. This could explain the significantly lower performance of the control group on the receptive and expressive book vocabulary measures.

In addition to learning vocabulary specific to the book reading, children in the intervention group also scored significantly better on the PPVT-III compared with children in the control group. One possible explanation for these results is that intervention teachers generalized the training from the book reading to other aspects of their teaching. Teachers were trained to ask open-ended questions, to discuss new words, and to encourage the children to participate in the story discussion. During the extension activities, the teachers made connections between the story and activity. There were increased opportunities for children to talk and discuss both the story and the extension activities as well as how these educational experiences related to their lives. In turn, the children were influenced by the teachers' behaviors. We observed, and the teachers reported, that the children in the intervention group became very comfortable in asking the teachers to explain a word they didn't know or in asking questions during a story, during the extension activities, and during other activities that were conducted in the

Table 2
Frequency of Word Usage Group \times Word Interaction

Words	Treatment	Control
Week 9 lesson		
Grass	3.75*	2.00
Seeds	8.00*	2.00
Shovel	3.50*	0.00
Rake	0.25	0.00
Insects	0.75	0.50
Soil	8.00*	2.00
Watering can	2.50	0.00
Lawn mower	0.00	0.00
Flowers	1.25	0.25
Bird	0.75	0.25
Week 11 lesson		
Harp	0.50	0.00
Tambourine	8.75*	0.50
Guitar	1.00	1.00
Violin	0.75	0.50
Rhythm sticks	2.25	3.00
Piano	1.75	0.75
Maracas	8.50*	0.50
Trumpet	0.50	0.25
Drum	2.50*	0.75
Cymbals	2.00*	0.25

* $p < .05$.

preschool classroom. We also observed that, compared with teachers in the control condition, teachers in the intervention group more frequently used the proper label for words instead of referring to an object by using a pronoun such as *it* or by pointing to the object. These experiences may have resulted in children being more interested in words and curious about their meaning. Also, children talking more and engaging in more conversations can result in increasing the frequency with which children encounter and use more words.

There are important educational implications of this study. This study suggests that in a Title I preschool, it is possible to implement a classroom intervention that can have positive effects on vocabulary development in young children. This vocabulary development was demonstrated both on measures specific to the intervention and on a standardized test. As mentioned previously, for some children in high-poverty schools, their classroom experiences are an essential part in teaching them language and vocabulary. Although classroom experiences cannot possibly match the impact of one-to-one reading, this study demonstrates one possible way to teach vocabulary to young children in a meaningful context in a whole group. The interactive book reading project described in this study offers one method of helping 4-year-olds learn vocabulary. As Hart and Risley (1995) found, teaching young children language and vocabulary in the early years helps them develop skills that they can continue to build on. Providing an effective intervention for preschoolers hopefully can foster important vocabulary skills and motivate children to expand their language and learn new words.

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Appendix

Intervention and Control Teachers Before, During, and After Reading of *The Carrot Seed*

The following vignettes illustrate a lesson of an intervention and control teacher reading *The Carrot Seed* to his or her class. They include a description of before, during, and after reading the story.

Intervention Teacher

Before Reading

The intervention teacher begins the lesson by showing the children the garden props, which include objects from the book, and asking them to name the props. After a child names the object, the teacher asks what the child can do with the object. The children then select a few props that they would use to help plant seeds, and the teacher asks them to share their experiences of planting seeds. The teacher then introduces the book *The Carrot Seed*.

Teacher: Today we are going to read a book about planting. The name of the book is *The Carrot Seed* by Ruth Krauss. In this book, we will find many of the words that we have just seen the objects for. Let's look at the cover of the book to see what you think this book is about. What does it look like the boy is doing? [The teacher chooses four children to make predictions about the book.]

During Reading

The teacher reads the book and asks open-ended questions that involve the children in the story.

Teacher: How did the little boy plant the seed?
 Child 1: He dug a hole.
 Teacher (to same child): Tell me more.
 Child 1: He dug a hole in the ground and he put the seed in.
 Teacher: How did he dig the hole?
 Child 2: With a shovel like this. [The child demonstrates the action of digging.]
 Teacher: Kind of like the shovel that I showed you. [She points to the shovel in the prop box.]
 Teacher (while continuing to read): Why do you think that the boy's family did not think that the seed would grow?
 Child 3: Because the seed was no good.
 Teacher: Tell me why you would think that the seed is no good.
 Child 3: Because it was brown and a carrot is orange.
 Teacher: Well, that is a good point but many seeds are brown in color.

I will show you them later when we do some planting. Why else did the family think that the boy's seed would not grow?

Child 4: Because the boy didn't plant it right.

Teacher: Tell me more about that.

Child 4: He didn't plant it in a good spot. He should have planted it in another part of the yard.

Child 5: He didn't dig the hole deep enough, like it needs to be real deep like this. [The child stretches out his arms to indicate the amount.]

Teacher: Well let's see what happens. (The teacher continues to read and asks two additional questions: "How did the boy feel as he was watching his carrot grow?" and "Tell me about this page" [the page when the carrot was starting to sprout]).

After Reading

The teacher reviews the story by asking the children questions.

Teacher: Let's think about the story that we just read. How did the little boy take care of the seed?

Child 6: He watered it.

Teacher: Yes, he watered it. What else?

Child 1: He watched it and he saw it grow.

Teacher: Yes, watched it carefully. What else?

Child 7: He watched it like we have been watching our plants grow. See how our plants are growing. They are [growing] because we watered them and made them grow.

The teacher asks the children two additional questions and concludes by telling the children that during center time, they will have the opportunity to plant their own carrot seed. The intervention teacher has been trained to make connections between the vocabulary and concepts in the story and the center activity.

Control Teacher

Before Reading

The teacher displays the book and introduces the cover.

Teacher: Today we are going to read the book *The Carrot Seed*. The author is Ruth Krauss. Let's look at the cover of the book. Here is a little boy. He is planting something. What do you think he is planting?

During Reading

The teacher reads the story and asks the following questions:

Teacher: What kind of seed did the boy plant?

Child 1: A carrot seed.

Teacher: Yes, very good. [Teacher reads more and asks another question.] Who said the seed would not come up?

Child 2: The mom.

Teacher: Yes, who else?

Child 3: The dad.

Teacher: Good listening to the story.

After Reading

Teacher: That was a great story. Did you like it?

Child 4: Yes.

Child 5: Yes, I liked it.

Teacher: Let's go to our centers and see what we will be doing there today.

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