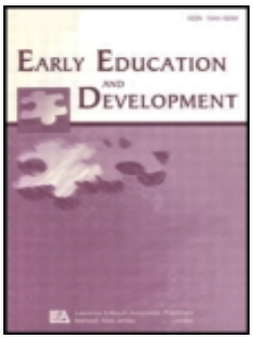

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Read Alouds and Beyond: The Effects of Read Aloud Extension Activities on Vocabulary in Head Start Classrooms

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A study was conducted in 26 Head Start classrooms with 264 children to compare the effect of a read aloud plus extension activities intervention over a control group to the effect of a read aloud only intervention over a control group on preschool children's vocabulary. Children were assessed before and after the intervention on target vocabulary and general vocabulary measures. *Research Findings*: The results suggest that the effects of the read aloud plus intervention were stronger than the effects of the read aloud only intervention on target word learning. In addition, the effects of the read aloud plus intervention on target word learning were stronger for children with higher versus lower general vocabulary knowledge. Neither intervention had an effect on general word knowledge. *Practice or Policy*: Observation and fidelity data are used to contextualize the findings, and the results are discussed in light of the extant literature on preschool vocabulary interventions.

A major goal of the national Head Start initiative is to support the language and literacy development of at-risk young children (U.S. Department of Health and Human Services, 2010). Despite the focus on language and literacy, children in Head Start are still scoring nearly a standard deviation below the mean on norm-referenced measures of vocabulary (Hammer, Farkas, & Maczuga, 2010). Considering the well-established relationship between vocabulary and comprehension (Cunningham & Stanovich, 1997; Freebody & Anderson, 1983; Manyak & Bauer, 2009; Snow, Porche, Tabors, & Harris, 2007), it is of great concern that children in Head Start are so far behind many of their peers in word knowledge.

Children in Head Start may have limited word knowledge for a variety of reasons. For example, maternal education, ethnicity, and frequency of home literacy activities are all factors related to vocabulary (Hammer et al., 2010). Children who have mothers with low levels of

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education, children from minority ethnic groups, and children from homes in which there are few literacy activities are particularly at risk for having limited vocabulary compared to their more advantaged peers. Children who are dual language learners (DLLs) are also at risk for experiencing limited vocabulary in English, the language of school, because they often do not use English to speak with family and friends at home (August, Carlo, Dressler, & Snow, 2005; Leung, Silverman, Nadakumar, Qian, & Hines, 2011; National Center for Education Statistics, 2009). Head Start programs strive to ensure that, regardless of the reason why children have less robust word knowledge, they will be able to catch up to their peers and acquire the foundation they need for success in school. Therefore, vocabulary instruction in Head Start classrooms must be optimally effective.

Read alouds provide a rich context for vocabulary instruction, and many preschool teachers use read aloud time to focus on vocabulary words as they share books with young children (Connor, Morrison, & Slominski, 2006). In addition to read alouds, activities that extend children's opportunities to learn words beyond read aloud time may also promote preschool children's vocabulary (Bond & Wasik, 2009; Coyne, McCoach, Loftus, Zipoli, & Kapp, 2009; Leung, 2008). The practice of implementing read aloud extension activities seems promising because it provides multiple opportunities for children to encounter words across contexts. However, planning and implementing these extension activities comes at a cost in that the more time spent on these activities, the less time teachers have to focus on the numerous other objectives in the preschool curriculum. Thus, it is important to ask whether there is an added value of read aloud extension activities. In addition, because there is wide variability in vocabulary even within Head Start programs, it is important to ask whether extension activities equally benefit children with more or less vocabulary. Thus, the present study investigates the effects of read alouds and read alouds plus extension activities on children's vocabulary and the effects for children at different levels of vocabulary knowledge. Although this study does not lead to definitive conclusions about the role of extension activities in vocabulary learning, the findings of the study add to the limited research base on the use of read alouds plus extension activities to support word learning for children who have limited vocabulary knowledge.

THEORETICAL FRAMEWORK

Social contructivist theory, which is founded in the philosophy of Vygotsky (1986), suggests that children learn words through social interactions with others. The read aloud experience fosters the social construction of vocabulary knowledge because, during read alouds, adults can scaffold children's understanding of words within a shared context. In fact, through dialogue about the content of books, including the words in the texts, children can develop an understanding of concepts with which they have no direct experience (DeTemple & Snow, 2003). Therefore, read alouds can serve to build children's background knowledge as well as their vocabulary. Children certainly learn words through indirect exposure by associating a spoken word with an object, action, or concept in their immediate environment, but direct instruction in the context of read alouds ensures that young children who may not regularly encounter a wide range of contexts or sophisticated words in their everyday lives have meaningful, scaffolded encounters with such words through books.

The value of extension activities (e.g., acting out and illustrating words during morning meeting, drawing and writing using words during small-group time, and using words in dramatic play

during centers time) to foster word learning is supported, in part, by Vygotsky's (1978) theory of the psychology of play, according to which children internalize connections between words and referents as they use words to represent and act out imaginary situations. Vygotsky's (1978) focus on the development of symbolism through play, drawing, and, eventually, writing also provides a basis for considering extension activities as a valuable addition to read alouds. As children represent words through actions and illustrations and as children learn that spoken words can be written to convey meaning, they develop the understanding that words are abstract symbols of concrete or conceptual referents, and they solidify their knowledge of the associations between words and referents to which they are exposed.

READ ALOUDS

There is a wide range of research confirming the effectiveness of using read alouds as a context for teaching vocabulary to young children (e.g., Bus, van IJzendoorn, & Pellegrini, 1995; Mol, Bus, & de Jong, 2009). However, correlational and experimental research suggests that the effect of read alouds on vocabulary depends on the quantity and quality of interaction between children and their parents or teachers (Brabham & Lynch-Brown, 2002; Dickinson & Smith, 1994; Hindman, Connor, Jewkes, & Morrison, 2008; Silverman, 2007; Walsh & Blewitt, 2006). Over the past 20 years, many school-based read aloud intervention studies have shown positive effects on children's vocabulary (e.g., Hargrave & Sénéchal, 2000; Wasik, Bond, & Hindman, 2006; Whitehurst, Arnold, Epstein, Angell, Smith et al., 1994). Together, these studies suggest characteristics of read alouds that support children's vocabulary learning.

One well-established read aloud intervention is dialogic reading (Whitehurst et al., 1994), which includes training for parents or teachers on how to leverage dialogue to support children's language development. Through asking questions, providing feedback, and extending conversation, parents and teachers can support children in participating in and learning from the read aloud context. Across studies, children whose parents and teachers participated in training for dialogic reading scored higher on measures of expressive vocabulary compared to children in control groups (e.g., Hargrave & Sénéchal, 2000; Valdez-Menchaca & Whitehurst, 1992; Whitehurst et al., 1988, 1994). Although dialogic reading is intended to support language development in general, there is little emphasis on explicit vocabulary instruction in the dialogic reading approach.

Other read aloud studies, however, have targeted vocabulary through direct instruction. Wasik, Bond, and Hindman (2006), for example, trained teachers in an intervention group to read books on a particular theme and, before and after read alouds, label objects that represented target words related to that theme. Teachers were also encouraged to discuss the target words and comment on how the target words were used in the read aloud books. Results showed that children in intervention classrooms outperformed children in control classrooms on standardized measures of receptive and expressive vocabulary. Collins (2010) specifically studied the effect of explicit vocabulary instruction on the word learning of DLLs in preschool. She compared the target word learning of children in a comparison group, who heard read alouds including target words without rich explanation, and children in a treatment condition, who heard read alouds including target words with rich explanations. Rich explanations included (a) pointing to an illustration, (b) providing a definition, (c) giving a synonym, (d) making a gesture (when

applicable), and (e) using the word in a new context. Children in the treatment condition outperformed children in the comparison group on a researcher-developed receptive measure of target word knowledge. In addition, Gonzalez and colleagues (2011) trained preschool teachers to implement an intervention that included teaching new vocabulary words through pictures, definitions, and discussion of target words. Results showed that children in the intervention group scored higher than children in the control group on researcher-developed measures of expressive and receptive vocabulary as well as a standardized measure of receptive vocabulary. Results from these studies as well as other studies with slightly older children (e.g., Beck & McKeown, 2007; Biemiller & Boote, 2006; Coyne, Simmons, Kame'enui, & Stoolmiller, 2004) show the benefits of explicit vocabulary instruction during read alouds.

EXTENSION ACTIVITIES

In addition to read alouds, many teachers extend vocabulary instruction to other parts of the day (Silverman & Crandell, 2010). In other words, they reinforce words taught during read aloud time during other activities, such as morning meeting, centers, and small-group instruction. For example, in a study by Silverman and Crandell (2010), a teacher taught the word *relatives* during read aloud time and then guided children to draw pictures of their relatives during small-group time. Such extension activities may be important because repeated exposure to words, active involvement in word learning, and exposure to words across varied contexts builds word knowledge (Coyne et al., 2009). Much of the evidence for the use of extension activities to support vocabulary development is correlational. For example, Wasik et al. (2006), in the intervention study discussed previously, also trained teachers to use target words during extension activities and found that the more intervention teachers discussed words during extension activities, the higher the vocabulary of the children in the class. In addition, Bierman et al. (2008) revealed that Head Start children who participated in an enriched intervention that included hands-on extension activities performed significantly better on measures of vocabulary than children who participated in ''usual practice.'' However, the studies by Wasik et al. and Bierman et al. were not designed to explicitly investigate the effect of extension activities on vocabulary learning in that they did not specifically compare the effects of read alouds versus read alouds plus extension activities.

Few intervention studies have looked directly at extended vocabulary instruction. One exception is a kindergarten within-subjects design study by Coyne et al. (2009). The authors compared embedded instruction, in which target words were introduced solely within the read aloud experience, and extended instruction, in which words were taught during read alouds and children had opportunities to interact with target words outside of the context of the story. The authors found that words taught through extended instruction were learned more fully than words taught through embedded instruction, which resulted in only partial word knowledge. However, the authors also discussed the trade-offs between embedded and extended instruction. In embedded instruction, teachers can quickly address target words within a confined period of time. Extended instruction requires more time, and therefore teachers have to balance how much time to spend on vocabulary versus the other essential skills they need to address in a given day. While extended instruction may promote deeper learning, it is not as efficient as embedded instruction alone. Considering the paucity of intervention research that focuses on the effect of extension activities, more research is needed to understand the value of this form of additional instruction.

DIFFERENCES FOR CHILDREN WITH HIGHER AND LOWER VOCABULARY KNOWLEDGE

Silverman and Crandall (2010) suggest that the effect of vocabulary instruction differs depending on children's incoming vocabulary level. For example, in their observation study, Silverman and Crandall (2010) found that children with higher vocabulary knowledge tended to benefit more from verbal instructional practices such as defining and contextualizing words, whereas children with lower vocabulary knowledge tended to benefit more from nonverbal instructional practices such as acting out and illustrating words. Other studies have shown differential effects of vocabulary instruction depending on children's level of vocabulary. For example, Reese and Cox (1999) found that instruction that included extended talk before and after read alouds was helpful to children with higher vocabulary knowledge, whereas instruction that included descriptions of pictures throughout read alouds was beneficial to children with lower vocabulary knowledge. Connor et al. (2006) found that code- and meaning-focused activities were related to higher vocabulary scores for children with higher vocabulary knowledge, but only meaning-focused activities were related to higher vocabulary scores for children with lower vocabulary knowledge. Some studies have shown that children with lower initial vocabulary gain most from vocabulary intervention, which supports them in catching up to their peers with higher vocabulary knowledge (Coyne et al., 2004; Silverman & Hines, 2009). However, other studies suggest that children with higher vocabulary knowledge benefit most from vocabulary intervention, perpetuating the problem of a vocabulary gap between those with more and less vocabulary (Biemiller, 2001; Penno, Wilkinson, & Moore, 2002; Stanovich, 1986).

This debate is especially relevant for teachers working with DLLs, for whom the question is whether the same kind of instruction shown to be effective for monolingual English speakers is effective for DLLs in preschool. For the most part, research suggests that vocabulary instruction that is effective for native English speakers is effective for DLLs; however, additional instructional practices are particularly supportive of DLL vocabulary learning (Gersten et al., 2007). Among these supportive practices is multidimensional vocabulary instruction, which includes nonverbal support such as acting out words and showing pictures of words. In one study (Silverman, 2007), kindergarten DLLs who participated in a vocabulary intervention that combined (a) word learning in authentic contexts, (b) support for word learning through visual aids, (c) explicit information about words, and (d) repeated exposure to words learned words and grew in general English vocabulary knowledge faster than their English-only peers. However, much more research is needed to understand the differential effects of vocabulary instruction so that research and development can focus on how to reach the children who need the most support for vocabulary development.

THE PRESENT STUDY

The goals of the present study were to explore the effect of a read aloud plus extension activities intervention relative to an intervention that included read alouds alone. Both conditions were compared to a control group conducting business as usual. Children were assessed on (a) knowledge of target vocabulary and (b) general vocabulary knowledge. In addition, the study investigated whether effects were moderated by children's level of general vocabulary knowledge. The study was implemented in 26 Head Start classrooms that were assigned to one of three

conditions: control, read aloud, or read aloud plus. Children in these classrooms were assessed before and after the 12-week intervention study.

METHOD

Participants

Participants included teachers and students from Head Start classrooms in the northeastern United States. These classrooms were part of eight centers with one to six classrooms per center. Centers were under one of two administrative programs. The lead teacher in each classroom was the primary teacher participant, although teacher aides supported the project in the classrooms. A total of 26 teachers agreed to participate in the project. Parents of all children in participating classrooms were invited to enroll their children in the study. We obtained permission from the parents of 364 children. Of these children, 5% ($n = 20$) moved before the end of the study, 5% ($n = 20$) were deemed un-testable because of especially low English language ability, and 16% ($n = 60$) were absent on at least one of the four testing days. Thus, analyses were conducted on the remaining 264 children with complete data. Excluding 27% of the sample is substantial but not unexpected given the transience, the limited English background, and the absenteeism of the population in the areas where we conducted the study.

Demographic data on the 264 children in the study were obtained from school records and parent surveys. Federal regulations allow up to 10% of Head Start slots to go children whose families are above the federal poverty guideline. In this sample, exactly 10% of children were from families above the federal poverty standard. In addition, children can be enrolled in Head Start for a full day or a half day. Less than half of the children in the sample were enrolled for the full day. More than three fourths of the children were considered DLLs. DLLs are children who are acquiring two or more languages simultaneously and children who are learning a second language while continuing to develop their first language. In addition to speaking English, 56% of the sample spoke Spanish, 7% Arabic, and 6% Portuguese. In all, 22 languages in addition to English were represented in the sample. All other languages were spoken by less than 3% of the students. See Table 1 for further demographic information on the sample.

TABLE 1
Demographics of Participating Children by Condition

Characteristic	*Total sample (n = 264)*	*Control (n = 88)*	*Read aloud (n = 91)*	*Read aloud plus (n = 85)*
Male	52	48	55	53
Dual language learner	79	66	85	87
Black	8	7	13	2
Latino	56	31	60	79
White	17	34	8	9
Other	16	28	19	9
Low income	90	86	91	93
Full day	42	31	20	76
Age (in years)	4.42 (.58)	4.39 (.62)	4.35 (.59)	4.52 (.58)

Note. All values are percentages of children within each condition except for age, which is presented as mean (*SD*).

All 26 lead teachers in the present study were female. Teachers were asked about their background via a teacher survey. Teachers had taught for 13.05 years on average ($SD = 7.79$ years). The range was 2 to 38 years. Moreover, 28% of teachers spoke another language besides English. Five teachers spoke Spanish, one teacher spoke Greek, and one teacher spoke Arabic. Most classroom instruction was delivered in English, though occasionally teachers used children's native language (particularly Spanish) to support individual student learning. Teachers were asked about the highest level of education they had obtained: 28% reported high school or a general equivalency diploma, 28% reported an associate's degree, 36% reported a bachelor's degree, and 12% reported a master's degree. Teachers were also asked to identify their race/ethnicity: 72% reported White, 12% reported Latino, 4% reported Black, 4% reported other, and 8% chose not to respond.

Classrooms were randomly assigned to a condition. There were nine classrooms in the control condition, nine in the read aloud only condition, and eight in the read aloud plus condition. Teachers did not differ by condition on years of experience ($F(2, 25) = .98$, $p = .39$) or level of education ($\chi^2(6, n = 26) = 7.78$, $p = .25$). Of the final sample of 264 children, 88 children were in control group classrooms, 91 were in read aloud only classrooms, and 85 were in read aloud plus classrooms. See Table 1 for demographic information on the sample by condition. Differences by condition on key background variables are discussed in the Results section.

Intervention

Overview

The intervention was designed for 4 days a week for 12 weeks. Teachers in the read aloud and read aloud plus conditions conducted read alouds for 30 min on each of the four intervention days per week. Teachers in the read aloud plus condition spent 5 min during regularly scheduled morning meeting, small-group, and centers time (i.e., a total of 15 min across these three activities) introducing read aloud extension activities on each of two intervention days per week. The intervention protocol in both the read aloud only and read aloud plus conditions incorporated elements of research-based best practice. For example, in the read aloud only condition, target words were defined in child-friendly language, target words were repeated, teachers reviewed target words, and teachers asked analytic questions about target words. In the read aloud plus condition, teachers reviewed target words, introduced drawing/writing activities focused on target words, and initiated hands-on activities related to target words. Additional efforts were made to meet the needs of the DLL population in the sample. For example, during read alouds, teachers guided children to do something physically active such as make a gesture to reinforce word learning, and in the read aloud plus condition, teachers showed pictures of target words in different contexts to support word learning. Note that because different classrooms were using different curricula, we did not attempt to align the intervention with regular classroom instruction.

Read Alouds

The read aloud only and read aloud plus conditions included the same read aloud protocol that required teachers to read the same books in the same order. The read aloud protocol included 24 books and 48 target words. Teachers read each book twice per week for roughly

30 min each day. The intervention protocol targeted two words per book. Teachers were provided with books and lesson plans to use to implement the intervention.

Themes. The intervention was segmented into three themes: food, animals, and transportation. Themes were used to help children develop background knowledge on specific topics so that they could more readily learn words related to that topic (Neuman, 2006). We chose these three themes for the intervention because preschool children typically know at least some words in each of these domains (Pan & Gleason, 2001). For children with limited vocabulary, we wanted to build their word knowledge on topics likely known by peers with more advanced vocabulary so that they could catch up. For children with more advanced vocabulary, we wanted to capitalize on their likely familiarity with the topics to expand their word knowledge to more sophisticated words.

Book choice. In each theme, four books were narrative and four books were informational. Although narrative texts predominate in early childhood classrooms, information books offer interesting content and rich opportunities for building background knowledge and developing vocabulary (Duke, 2000; Pentimonti, Zucker, Justice, & Kaderavek, 2010; Yopp & Yopp, 2006). Therefore, we included books from the more familiar narrative genre as well as texts from the less familiar but equally rich information genre to support children's learning of new words and concepts in the intervention. Connecting narrative and information books thematically served to help children develop background knowledge on specific topics, which supports word learning (Neuman, 2006). We chose books to be age appropriate and interesting to children. We also sought guidance from teachers in selecting books. We surveyed teachers before the intervention to determine whether they thought books were suitable for their students and to avoid books they had already read in their classrooms.

Word choice. Beck, McKeown, and Kucan (2002) recommended teaching three words from one book per week in the early grades. We chose to focus on two words from each of two books for a total of four words per week. Focusing on a small number of words per week allowed us to provide ample opportunity for children to use and discuss words. Beck et al. also suggested teaching words that are important to the text at hand, useful for children to know, and helpful for building conceptual understanding. Beck et al. recommended avoiding words that are common in everyday language because children will learn these words through regular classroom activities. We followed these guidelines in choosing words. We also tried to choose words that would be unknown to children so we could see growth in word learning, and we attempted to choose words that were pictured in the text and somewhat concrete to support student learning and ease assessment development. See Appendix A for a list of the intervention target words.

Lessons. Lesson plans were provided for each day of instruction. During prereading on Day 1 of a book reading, teachers were asked to relate the book to the theme, introduce the title and author, and preview one or two target words. During reading on the first day of book reading teachers were asked to stop 5–6 times to ask questions and highlight vocabulary words. After reading on Day 1, teachers were asked to define target words, review target words in the context of the text at hand, provide examples of target words, and ask children to act out words when applicable. On Day 2, teachers were asked to review the definitions of words and have children say words during prereading, stop 5–6 times during reading to review words in the context of the

book, and review words one final time after reading. See Appendix B for an excerpt showing how words were defined in intervention lesson plans.

Extension Activities

Whereas teachers in the read aloud only condition were asked not to review words at other times of the day for the purposes of this study, teachers in the read aloud plus condition were asked to review target words and initiate opportunities for children to use words during each of three non-read-aloud periods on Day 2 of the read aloud. The first period for the review of words was set during the morning meeting, a regularly scheduled circle time (i.e., a time when students gathered on the floor for teacher-led activities) in which teachers reviewed the weather, the schedule, and key concepts for the day. During the morning meeting, teachers were asked to define the two target words from the book, show pictures to illustrate target words, and have children act out or answer questions about the target words. The second and third activities took place during centers time. The second activity was a small-group activity in which teachers suggested that students either draw or write about one of the target words. For the third activity, teachers invited students to participate, voluntarily and without teacher guidance, in various centers that were meant to reinforce children's understanding of the other target word.

Teachers in the read aloud plus condition were given descriptions of activities and specific language to use during brief (i.e., 5-min) teacher-managed portions of instruction to be implemented during each non-read-aloud period. Teachers were also given picture cards for target words to use during the morning meeting as well as activity sheets to use during small-group instruction time. Teachers gathered their own materials for use during centers time in the read aloud plus condition. See Appendix C for an example of the descriptions of the extension activities provided to teachers in the read aloud plus condition.

Training

Before they were assigned to a condition, all teachers participated in a 2-hr professional development session on oral language development in preschool provided by the study investigators. Then teachers were randomly assigned to one of three conditions: control (i.e., business as usual), read aloud only, or read aloud plus. Teachers in the control group participated in an additional 2-hr session on general language enrichment activities. Teachers in the read aloud only and read aloud plus conditions met separately for an overview of their intervention conditions. Teachers in the read aloud and read aloud plus groups also met with investigators again for a 1-hr follow-up meeting to ask questions and get clarification about halfway through the intervention. Investigators explicitly asked teachers to refrain from augmenting and extending the intervention to maintain consistency across classrooms.

Observations

Observations were conducted to compare instruction across conditions and to evaluate fidelity to the intervention. Each lead teacher in each classroom in the study was observed on two occasions during read aloud, morning meeting, small-group, and centers time. The two observations

per teacher were averaged for each teacher. One classroom was only observed once, so the data for that observation were doubled. Then observation data were averaged across teachers by condition to enable us to compare instruction across conditions and evaluate fidelity.

Comparing across Conditions

To compare classrooms across conditions, observers identified whether teachers defined words or reviewed words during the following time periods: (a) before the read aloud, (b) during the read aloud, (c) after the read aloud, (d) during the morning meeting, (e) during small-group time, and (f) during centers time. For each time period, observers recorded a 1 if vocabulary words were defined or reviewed and a 0 if vocabulary words were not defined or reviewed. As noted, we averaged observation data across two observations such that, for example, during the morning meeting (a) if a teacher did not review words on either observation occasion her average would be 0, (b) if she reviewed words on both occasions her average would be 1, and (c) if she reviewed words on one occasion but not the other her average would be 0.5. Next we calculated the average across teachers by condition for each of the time periods. Note that when the average was closer to 0, teachers rarely defined or reviewed words during the given time period; when the average was closer to 1, teachers often defined or reviewed words during the given time period. Table 2 shows the averages across teachers by condition on a scale of 0 to 1.

Analysis of variance was conducted to determine whether differences in the observation data were significant. Post hoc analysis showed that differences between the control group on the one hand and the read aloud and read aloud plus groups on the other were significant for before, during, and after read aloud time, suggesting that teachers in the read aloud and read aloud plus conditions defined or reviewed words during read aloud more often than teachers in the control condition, on average. Although there were no significant differences by condition for the morning meeting time period, differences between the control and read aloud conditions on the one hand and the read aloud plus condition on the other were significant for small-group and centers time. Therefore, for two of the extension activities, the read aloud plus teachers on average defined or reviewed words more often than teachers in the other two conditions. See Table 2 for significant contrasts by condition.

TABLE 2
Means (*SD*) by Condition of Teachers' Scores, Which Represent the Extent to Which Teachers Defined Words in Various Classroom Activities, From Classroom Observation Data

Time Period	*Control (a)*	*Read aloud (b)*	*Read aloud plus (c)*	*Significant contrasts between conditions*
Before read aloud	0.05 (.17)	0.50 (.35)	0.56 (.32)	a & b, a & c
During read aloud	0.44 (.39)	0.94 (.17)	1.00 (.00)	a & b, a & c
After read aloud	0.00 (.00)	0.83 (.25)	1.00 (.00)	a & b, a & c, b & c
Morning meeting	0.22 (.36)	0.17 (.35)	0.19 (.26)	None
Small group	0.11 (.22)	0.00 (.00)	0.50 (.46)	a & c, b & c
Centers	0.17 (.25)	0.11 (.22)	0.69 (.00)	a & c, b & c

Note. Teachers were given a score of 1 if they defined a word and a score of 0 if they did not define a word during each of the time periods listed in the table. Teachers were observed twice. Scores were averaged across the two observations. Thus, if teachers defined a word during an activity on one observation but not on the other, they scored 0.50. Finally, scores were averaged across teachers by condition to derive the means and standard deviations in the table.

Fidelity to the Intervention

Observations were also used to assess fidelity to the read aloud and extension activity intervention protocols. Observers recorded a 1 for the presence or a 0 for the absence of essential elements of the protocols. Fidelity scores were averaged across observations for each teacher. To evaluate fidelity to the read aloud protocol across the read aloud and read aloud plus conditions, we averaged scores across teachers by condition. Analysis of variance was used to evaluate differences by condition. There was no difference between the read aloud and read aloud plus conditions for defining words before reading and reinforcing word learning after reading, but there was a difference between the conditions on discussing or using words during the reading. Teachers in the read aloud plus condition did this to a significantly greater extent than teachers in the read aloud condition. See Table 3 for averages by condition and significant contrasts.

To evaluate fidelity to the read aloud plus protocol across teachers in the read aloud plus condition, we derived scores for each teacher and averaged them across teachers for each essential element in the protocol (see Table 4). Overall, fidelity to the read aloud plus protocol was low during the morning meeting, somewhat higher during small-group time, and somewhat higher still during centers time. Overall, the average for fidelity to the read aloud plus protocol was .52, suggesting that teachers implemented the extension activities with fidelity about half the time.

Measures

Children were assessed on target vocabulary words and general vocabulary knowledge. For the assessment of target vocabulary words, children were given a receptive target vocabulary assessment (TVA) that included four pictures from the read aloud intervention book in which the target word had appeared. One of the pictures represented the target word and three were foils. The advantage of using pictures from the intervention books was that this guaranteed that the target words were pictured in a child-friendly, age-appropriate way. Though using pictures from the books in the assessment could be seen as favoring the intervention conditions, as children in the control condition did not see the books, having multiple pictures from the same book likely mitigated that possibility because children who had seen the book could easily be distracted by other pictures from the book. Children had to have specific knowledge of the target word to choose the correct picture. Because the primary comparison of interest was whether read alouds plus extension activities had a greater effect on word learning than read alouds only, and because the pictures from the book were not shown during extension activities, using pictures from the books was deemed a reasonable assessment strategy.

TABLE 3
Means (*SD*) for Teacher Fidelity to the Read Aloud Intervention Protocol, by Condition

Variable	*Read aloud (a)*	*Read aloud plus (b)*	*Significant contrasts between conditions*
Before read aloud: Define words	0.89 (.22)	1.00 (0)	None
During read aloud: Discuss or use words	0.72 (.26)	1.00 (0)	a & b
After read aloud: Reinforce word learning through questioning about words or acting out words	0.67 (.43)	0.94 (.18)	None
Overall fidelity	0.76 (.24)	0.98 (.06)	a & b

TABLE 4
Means (*SD*) for Teacher Fidelity to the Extension Activity Protocol for the Read Aloud Plus Intervention

Variable	*Read aloud plus*
Morning meeting: Show pictures of words	.25 (.27)
Morning meeting: Extend word learning	.19 (.26)
Small group: Discuss or use words	.50 (.27)
Small group: Facilitate activity connected to words	.69 (.26)
Centers: Discuss or use words	.75 (.27)
Centers: Introduce activities connected to words	.75 (.27)
Overall morning meeting fidelity	.22 (.25)
Overall small-group fidelity	.59 (.23)
Overall centers fidelity	.75 (.23)
Overall fidelity to ''plus'' extension activities	.52 (.15)

Children were asked to point to the picture that matched the word spoken by the test administrator (i.e., a trained graduate assistant). A total of 24 words were assessed on the TVA, which amounted to half of the words targeted during the read aloud and read aloud plus interventions. The pretest was used in the analysis as an independent variable, controlling for children's prior knowledge of words. The internal consistency (Cronbach's alpha) at pretest was .46. The low alpha at pretest was likely attributable to children's unfamiliarity with the measure and limited vocabulary knowledge at the beginning of the year. The posttest was used as a dependent variable. The internal consistency of the posttest was .68, which is acceptable for an experimental outcome measure (Gersten et al., 2005).

For the assessment of general vocabulary knowledge, children took the Peabody Picture Vocabulary Test–4 (PPVT; Dunn & Dunn, 2007), a norm-referenced measure of general receptive vocabulary. The PPVT is suitable for use with children older than 2 years, 6 months. On the PPVT, children are asked to point to one of four pictures that matches the word spoken by the test administrator. Raw scores and standard scores ($M = 100$, $SD = 15$) were derived for analyses in this study. The TVA and PPVT were administered in two separate sessions to avoid testing fatigue. The correlation between the TVA and PPVT was .42 at pretest and .53 at posttest. The correlation between the pretest and posttest TVA was .45.

Receptive tasks were chosen in this study for three main reasons: (a) Given that expressive vocabulary knowledge typically lags behind receptive vocabulary (Bates et al., 1994), it was anticipated that children would be able to demonstrate their nascent knowledge of words more easily through a receptive task; (b) given that many children learning a second language go through a nonverbal period in which they are acquiring but not yet using their second language (Tabors, 2008), it was determined that the use of a receptive task would be more appropriate for evaluating the learning of the DLL children in the sample; and (c) given that preschool intervention that involves repeated exposure to words was shown to have an effect on receptive vocabulary in the past (Sénéchal, 1997), it was deemed appropriate to measure the effect of the present intervention through a receptive task.

Analysis

First descriptive statistics were examined. Then hierarchical linear modeling was used as an analytic method to account for the nesting of children within classrooms and the assignment

of classrooms to condition in the study. Two sets of models were developed. In the first set of models, the posttest TVA was the dependent variable. In the second set of models, the posttest PPVT score was the dependent variable. Models were run using both raw scores and standard scores for the PPVT. There were no differences in conclusions derived from models with raw and standard scores. Because the use of standard scores eases interpretability, final models are presented using these scores. To control for pretest differences among the conditions, we included pretest TVA and pretest PPVT as covariates in analyses of posttest TVA variables. Pretest PPVT was included as a covariate in the analysis of the posttest PPVT variable. Also, to account for demographic differences among conditions, we entered child and teacher background variables in the initial model in each set of analyses. Background variables included whether children were (a) above the Head Start income threshold; (b) enrolled for the full day; (b) DLLs; (c) Black, Latino, White, or other; and (d) male or female. Children's age in years as well as teachers' highest level of education and years of experience were also included in initial models. Nonsignificant background variables were not carried over into further models. The effect of condition and interactions between pretest PPVT and condition were explored in all analyses. Post hoc analyses were conducted to explore the effect of fidelity.

RESULTS

Descriptive Statistics

On average, children scored 7.54 ($SD = 2.89$) at pretest and 10.06 ($SD = 3.90$) at posttest on the TVA. Furthermore, children scored 86.43 ($SD = 18.12$) at pretest and 89.07 ($SD = 17.00$) at posttest on the PPVT (i.e., standard scores). Table 5 shows descriptive statistics by condition. There was no difference among conditions on pretest TVA, $F(2, 238) = 2.85$, $p = .06$. There was also no difference across conditions on pretest PPVT, $F(2, 238) = 1.53$, $p = .22$. There was no difference across conditions on whether children were above or below the Head Start income threshold (χ^2 (2, $n = 264$) $= 2.28$, $p = .32$) or whether children were male or female (χ^2 (2, $n = 264$) $= .99$, $p = .61$). However, there were differences by condition on whether children attended full day (χ^2 (2, $n = 264$) $= 64.66$, $p < .01$); whether children were DLLs (χ^2 (2, $n = 264$) $= 14.23$, $p < .01$); and whether children were Black, White, Latino, or other (χ^2 (6, $n = 264$) $= 6.79$, $p < .01$).

TABLE 5
Means (*SD*) From Assessments of Participating Children by Condition

Assessment	*Control (n = 88)*	*Read aloud (n = 91)*	*Read aloud plus (n = 85)*
Pretest TVA	8.11 (3.06)	7.07 (2.52)	7.46 (3.02)
Posttest TVA	9.25 (3.22)	9.77 (3.94)	11.21 (4.27)
Pretest PPVT	90.92 (18.09)	84.15 (18.98)	84.21 (16.43)
Posttest PPVT	94.11 (16.09)	87.34 (9.77)	85.69 (15.68)

Note. PPVT scores are standard scores. TVA = target vocabulary assessment; PPVT = Peabody Picture Vocabulary Test–4.

Hierarchical Linear Modeling

Unconditional models of the outcome variables were explored to determine the amount of variance at the classroom and student levels. The classroom level accounted for 19% of the variance in posttest TVA (Akaike's information criterion = 1,455.9) and 26% in posttest PPVT (Akaike's information criterion = 2,200.5). Next conditional models were fit. A series of models was examined for each outcome. First a baseline model with background variables was fit. Next, carrying over only significant background variables, the effect of condition was explored. Finally, the interaction between pretest PPVT and condition was investigated (see Tables 6 and 7).

TABLE 6
Hierarchical Models Fit for Posttest TVA

Variable	*Model 1*	*Model 2*	*Model 3*
Fixed effects			
Intercept	−8.85***	−12.09***	−9.30***
Student-level variables			
Pretest TVA	0.19**	0.20**	0.20**
Pretest PPVT	0.12***	0.12***	0.10***
Age	1.91***	1.97***	1.85***
Head Start[a]	−0.37		
Full day	−0.53		
English only	−0.21		
Race: Black[b]	0.27		
Race: Latino[b]	0.49		
Race: Other[b]	0.46		
Gender: Male	0.26		
Classroom-level variables			
Years of experience	−0.00		
Degree: High school or GED[c]	−0.57		
Degree: Associate's degree[c]	−1.76		
Degree: Bachlor's degree[c]	−1.27		
Read aloud[d]		1.64**	−0.29
Read aloud plus[d]		2.57***	−2.98
Read Aloud[d] × Pre-PPVT			0.02
Read Aloud Plus[d] × Pre-PPVT			0.06
Variance components			
Classroom-level (intercept)	1.18 (.64)*	0.52	0.54
Child-level (residual)	6.94 (0.65)***	6.72***	6.57***
AIC	1285.0	1277.0	1281.6

Note. TVA = target vocabulary assessment; PPVT = Peabody Picture Vocabulary Test–4; GED = general equivalency diploma; AIC = Akaike's information criterion.

[a]Below the Head Start income threshold.

[b]Compared to White (Asian and ''other'' categories were collapsed because there were so few Asians in the sample).

[c]Compared to master's degree.

[d]Compared to the control condition.

*$p < .05$. **$p < .01$. ***$p < .011$.

TABLE 7
Hierarchical Models Fit for Posttest PPVT

Variable	*Model 1*	*Model 2*	*Model 3*
Fixed effects			
Intercept	34.81***	35.62***	44.16***
Child-level variables			
Pretest PPVT	0.68***	0.68***	0.59***
Age	0.35		
Head Start[a]	2.47		
Full day	−0.34		
English only	−5.04*	−5.23**	−5.63**
Race: Black[b]	3.68		
Race: Latino[b]	−0.31		
Race: Other[b]	1.53		
Gender: Male	−0.59		
Classroom-level variables			
Years of experience	−0.16		
Degree: High school or GED[c]	−1.40		
Degree: Associate's Degree[c]	1.16		
Degree: Bachlor's Degree[c]	−1.14		
Read aloud[d]		−1.18	−13.35
Read aloud plus[d]		−2.74	−13.53
Read Aloud[d] × Pre-PPVT			0.14
Read Aloud Plus[d] × Pre-PPVT			0.12
Variance components			
Classroom-level (incercept)	0.00	0.09	0.00
Child-level (residual)	97.97***	99.53***	99.12***
AIC	1923.1	1958.9	1960.1

Note. PPVT = Peabody Picture Vocabulary Test–4; GED = general equivalency diploma; AIC = Akaike's information criterion.

[a]Below the Head Start income threshold.

[b]Compared to White (Asian and ''other'' categories were collapsed because there were so few Asians in the sample).

[c]Compared to master's degree.

[d]Compared to the control condition.

*$p < .05$. **$p < .01$. ***$p < .011$.

TVA

On the posttest TVA, there was a significant effect of pretest TVA, pretest PPVT, and age, but no other background variables were significant in the baseline model (i.e., Model 1). In Model 2, when condition was added to the model, there was a significant effect of the read aloud condition over the control and a significant effect of the read aloud plus condition over the control. The least square means were 8.56 for the control condition, 10.23 for the read aloud condition, and 11.40 for the read aloud plus condition. Thus, the effect size (Hedges's *g*) of the read aloud over the control condition was .44, and the effect size of the read aloud plus condition over the control was .68. Finally, in Model 3 when the interaction effects between condition and pretest PPVT were explored, there was a significant interaction for the read aloud plus condition compared to the control condition. Thus, the effect of the read aloud plus condition differed by children's initial vocabulary level as measured on the pretest PPVT.

The pattern of the interaction effect could best be understood by estimating adjusted means for two prototypical values of initial vocabulary level (i.e., pretest PPVT). The first value (85) was chosen to be close to the mean of the sample (86) and at 1 *SD* below the mean of the norm-referenced population (''low''). The second value (100) was chosen to represent high children in the sample and average children in the norm-referenced population (''high''). For low children, the least square means were 8.60, 10.07, and 11.26 for the control, read aloud, and read aloud plus conditions, respectively. For high children, the least square means were 9.72, 11.59, and 13.62 for the control, read aloud, and read aloud plus conditions, respectively. For low children, the effect size (Hedges's g) of the read aloud plus condition over the control condition ($g = .65$) was greater than the effect of the read aloud condition over the control condition ($g = .41$). The trend was the same for high children, but the difference between the effects was greater. For high children, the effect size of the read aloud plus condition over the control condition was .90 and the effect size of the read aloud condition over the control condition was .50. In post hoc contrasts, differences between (a) read aloud and control and (b) read aloud plus and control were significant for high and low children. The contrast between read aloud plus and read aloud was not significant for low children ($p = .0729$), but it was significant for high children ($p = .0137$).

PPVT

For the posttest PPVT, in Model 1, there was an effect of pretest PPVT and dual language status. Therefore, dual language status was carried through to Models 2 and 3. In Model 2, there was no effect of condition, and in Model 3 there was no interaction between condition and pretest PPVT. Dual language status was significant in both Models 2 and 3. Analyses not shown in the tables found no interaction between condition and dual language status. The least square means by condition from Model 2 were 91.88, 90.71, and 89.15 for the control, read aloud, and read aloud plus conditions, respectively.

Post Hoc Exploratory Analysis of Fidelity

Because teachers in the read aloud only and read aloud plus groups varied in the extent to which they were faithful to the read aloud and read aloud plus intervention protocols, we tested whether teachers' fidelity influenced results on the TVA. First we investigated, among the read aloud and read aloud plus groups that received the read aloud intervention, whether there was an effect of fidelity to the read aloud intervention. Controlling for pretest PPVT, pretest TVA, and age, we found that there was an effect of teachers' fidelity to read alouds ($\beta = 3.06$, $p = .0383$) such that children in classrooms in which teachers showed greater fidelity to the read aloud protocol had higher scores on the TVA. Next we explored, among the read aloud plus group that received the intervention including extension activities, whether there was an effect of fidelity to the extension activity portion of the intervention. Controlling for the same variables as above as well as teachers' fidelity to the read aloud intervention ($\beta = -5.88$, $p = .4013$), we found that there was no effect of fidelity to the read aloud plus condition ($\beta = -2.72$, $p = .3881$). Given the limited number of teachers in the read aloud plus condition and the limited range of fidelity to the extension activities among the read aloud plus teachers ($M = .53$, $SD = .13$), it is not surprising that no effects were found for differing levels of fidelity in this condition.

DISCUSSION

Read aloud interventions have been shown to have positive effects on children's vocabulary (e.g., Bus et al., 1995; Mol et al., 2009). Some evidence suggests that extending instruction beyond read aloud time to other parts of the preschool day may add to the benefit of the read aloud intervention (Coyne et al., 2009). However, few studies have been conducted that clarify whether intervention that incorporates read alouds plus extension activities has a greater effect than intervention that includes read alouds alone. The present study sought to add to the research base by comparing the target word learning and general vocabulary acquisition of Head Start children in a control condition, a read aloud intervention, and a read aloud plus extension activities intervention. The scope of the study was intentionally circumscribed with a relatively short duration and constrained intervention so that the discrete effect of adding extension activities to read alouds could be investigated. Limitations of the study, noted previously and discussed in ''Limitations,'' preclude the definitive determination of conclusions about the role of read alouds plus extension activities in promoting vocabulary. However, findings from the study are suggestive and provide a foundation for future research on building children's vocabulary through read alouds plus extension activities.

Specifically, on target word learning, results showed that the effect of the read aloud plus extension activities condition over the control condition was greater than the effect of the read aloud only condition over the control condition. This finding is in line with previous research that suggests that more extensive instruction on vocabulary leads to greater learning of words (Bierman et al., 2008; Coyne et al., 2009; Wasik & Bond, 2006). The effect of the read aloud plus condition was particularly pronounced for children with higher rather lower vocabulary knowledge. This result is consistent with other research showing differential effects for children with higher and lower vocabulary (Marulis & Neuman, 2010; Penno et al., 2002; Reese & Cox, 1999). There were no effects on general vocabulary learning. This outcome is not surprising given the narrow scope of the study. The following discussion addresses several issues that are relevant to interpreting and contextualizing the results of the study.

Read Alouds Only Versus Read Alouds Plus Extension Activities

This study provides evidence that extending instruction on vocabulary beyond read alouds to other parts of the Head Start day may lead to greater effects for vocabulary intervention. However, as Coyne et al. (2009) pointed out, the benefits of extending instruction must be weighed against the time and resources needed to implement extension activities in the classroom. On the one hand, the magnitude of the effect of read alouds plus extension activities over read alouds alone, although significant, was minimal. Children in the control condition improved by 5%, children in the read aloud only condition improved by 11%, and children in the read aloud plus condition improved by 16% on the TVA. On the other hand, the time and resources used to implement the intervention were negligible. The intervention added only 15 min of teacher-managed instruction (i.e., 5 min per extension activity) to the intervention twice a week during activities that were already part of the classroom schedule, and teachers participated in only 3 hr of training to implement the intervention. It could be argued that if the intervention had been more extensive and teachers had participated in additional training, the effects of

the read aloud plus condition may have been more impressive. Under the circumstances, the added benefit of the read aloud plus condition is noteworthy because it suggests that attention to vocabulary during extension activities may be worth the costs in time and resources.

Differential Effects of Read Alouds Plus Extension Activities

The aim of vocabulary intervention is to support vocabulary learning and growth, especially for children who are far behind in vocabulary compared to their peers. In this study, children in the sample were, on average, 1 *SD* behind in vocabulary knowledge. We compared the effects of the intervention on children who were high and low in vocabulary knowledge in the sample, but it is important to note that children deemed high in the sample were actually at the normative mean. We found that the effects of the read aloud and read aloud plus interventions were stronger for children with high vocabulary knowledge compared to their peers with low vocabulary knowledge. Although it is fairly common in vocabulary intervention to find that children with higher vocabulary are more responsive to intervention (Marulis & Neuman, 2010), it is important to consider why this phenomenon occurs so that future interventions can aim to add support for children with low vocabulary knowledge.

There are a few possible explanations in this study. First, it may be that children with low vocabulary knowledge need more extensive intervention to catch up to their peers. Using a response-to-intervention framework, it may be that intervention in Head Start classrooms needs to include instruction for the whole class and additional opportunities for instruction and review for children with low vocabulary knowledge (Loftus, Coyne, McCoach, Zipoli, & Pullen, 2010). Second, intervention targeted specifically to children with low vocabulary knowledge may need to include more basic words as well as more sophisticated words so that children with low vocabulary knowledge can catch up to their peers (Leung, Silverman, Nadakumar, & Hines, 2011). Finally, methods of instruction for children with low vocabulary knowledge may need to be different than those for children with average vocabulary knowledge. For example, intervention for children with low vocabulary knowledge may need to incorporate more visual and kinesthetic activities as well as more direct instruction than intervention for children with average vocabulary knowledge (Silverman, 2007). Future research should explore how to leverage extension activities to narrow the vocabulary gap among children in preschool.

Target Vocabulary Learning Versus Improvement in General Vocabulary Knowledge

As Marulis and Neuman (2010) pointed out, it is rare that vocabulary interventions show effects beyond target word learning on general vocabulary knowledge. In this study, as in previous studies, effects were found on target word learning but not on general vocabulary knowledge. There are many possible reasons why the intervention did not show effects on general vocabulary. The intervention was of short duration, it was not aligned with regular classroom instruction, and it focused on specific words rather than general word learning skills. Also, teachers received limited training and support and were asked not to extend instruction beyond the intervention. Finding differences on the target vocabulary measure was important to evaluate differences between the read aloud and read aloud plus conditions in this study, but to have a substantial impact

on children's vocabulary, intervention research needs to focus on how to show effects on more general measures of vocabulary beyond target word learning.

Observations and Fidelity to the Intervention

Evaluating the observation and fidelity data in this study helps to interpret the results. In the observation data, it was evident that teachers in the control classrooms rarely provided direct and explicit instruction in vocabulary during or outside of read aloud time. When they did focus on vocabulary words, it was usually during read aloud time, and instruction was typically basic and fleeting. For example, one teacher mentioned that the word *frigid* means ''cold,'' but she did not further discuss or review the word. Therefore, the explicit and robust focus on vocabulary in the read aloud only and read aloud plus conditions likely required teachers to implement instruction to which they were not accustomed. Teachers' limited use of explicit and robust vocabulary instruction may help explain, to some extent, the fidelity data. As Schwanenflugel et al. (2010) suggested, teachers may have difficulty implementing and sustaining activities that have not previously been part of their classroom instruction.

In the read aloud only condition, teachers were, for the most part, faithful to the intervention. However, teachers showed limited fidelity to aspects of the intervention, including discussing words during reading and reinforcing word learning after reading. It is interesting that teachers in the read aloud plus condition actually had higher fidelity to the read aloud portion of the intervention than read aloud only teachers. It may be that having extension activities to complement read aloud instruction made the intervention seem less of an add-on and more of an integrated part of the curriculum for read aloud plus teachers, and this may have led to their more faithful implementation of the read aloud part of the intervention. Yet although teachers in the read aloud plus intervention focused on vocabulary during extension activities to a greater extent than teachers in the other conditions, they showed limited fidelity to the extension activity portion of the read aloud plus condition. It may be that supporting vocabulary during non-read-aloud time was even more foreign to teachers than teaching words during read aloud time. Thus, teachers may need even more support to implement vocabulary instruction through extension activities.

The differential fidelity between the read aloud and read aloud plus teachers on the read aloud portion of the intervention makes it hard to discern whether the greater effect of the read aloud plus condition stemmed from teachers' greater fidelity to the read aloud portion of the intervention or their implementation of the extension activities. Indeed, analysis of the fidelity data suggests that greater fidelity to the read aloud intervention protocol was associated with greater gains in target word learning. There was no effect of greater fidelity to the extension activity portion of the read aloud plus protocol, but this may be due to the limited number of teachers and range of fidelity in the read aloud plus condition. Additional research is needed to understand the relationship between teachers' fidelity to the intervention and the effect of vocabulary instruction during read aloud extension activities. However, this study suggests that whether the effect of the read aloud plus intervention stems from the more encompassing focus on vocabulary, which shows up in more robust vocabulary instruction during read aloud time, or from the added instruction during extension activities, there may be a benefit to extending vocabulary intervention beyond read aloud time to other parts of the Head Start day.

Limitations

These findings must be interpreted cautiously given several limitations of the study. A primary limitation is the fact that, despite the random assignment used, the sample was not well balanced on demographic and pretest variables across conditions. Though this problem is tempered by the fact that we controlled for demographic and pretest differences, an imbalance across conditions could have had an impact on the comparisons made among the conditions. Furthermore, because of the differential fidelity between teachers in the read aloud and read aloud plus conditions and because of the range of activities (e.g., discussing, acting out, and drawing words) included in the read aloud plus extension activities condition, it is difficult to pinpoint the exact source of the greater effect of the read aloud plus extension activities condition. Future investigations on the effects of extension activities on vocabulary learning should aim to address these design limitations.

The narrow scope of the study, including the relatively short duration and constrained intervention, is an additional limitation. The circumscribed nature of the study was intentional to address the discrete research question regarding the relative effect of read alouds plus extension activities. However, the narrow scope of the study could have tempered the effects of the intervention. Given that much greater change in word knowledge is needed for children with limited vocabulary to catch up to their peers, further research investigating the potential of read alouds plus extension activities for supporting vocabulary should be designed with a greater scope.

Finally, the measures used in the study are another source of limitation. The use of only receptive measures is a drawback to the study, especially considering that other studies have shown effects on expressive but not receptive tasks (e.g., Hargrave & Sénéchal, 2000; Whitehurst et al., 1994). Also, using a standardized measure of general vocabulary knowledge (i.e., the PPVT) that is meant to capture vocabulary growth over a wide developmental period (i.e., early childhood through adulthood) is a limitation because doing so precluded the measurement of incremental change in general vocabulary knowledge over the short duration of the study. Subsequent studies should incorporate additional or alternative assessments to fully gauge the impact of extension activities on vocabulary.

Conclusions

Similar to research by Coyne et al. (2009), this study suggests that there may be a benefit to read alouds plus extension activities in vocabulary instruction. However, similar to previous research (Marulis & Neuman, 2010; Penno et al., 2002; Reese & Cox, 1999), children with lower vocabulary in the present study seemed to benefit less from the intervention than children with higher vocabulary. Much more research and development must focus on how to make vocabulary instruction optimally effective at accelerating the word knowledge of young children who are far behind the norm. Capitalizing on previous research on effective vocabulary instruction (Bierman et al., 2008; Coyne et al., 2009; Wasik & Bond, 2006) and building on the present study, future research should focus on whether and how read alouds plus extension activities could be designed and implemented to target children with limited vocabulary knowledge and support their early word learning.

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APPENDIX A

Books and Words Used in the Intervention Program by Theme and Genre

TABLE A-1
Books and Words Used in the Intervention Program by Theme and Genre

Word 1	*Word 2*	*Genre*	*Theme*	*Book*
field	**stalk**	Information	Food	*Where Does Food Come From?*
harvest	**plow**	Information	Food	*Vegetables We Eat*
sour	**bitter**	Information	Food	*Taste This*
prepare	territory	Information	Food	*Can a Camel Cook?*
cargo	harbor	Information	Transportation	*On the Go*
patrol	**stroll**	Information	Transportation	*What Do Wheels Do All Day?*
glide	spin	Information	Transportation	*On the Move*
haul	**passenger**	Information	Transportation	*Trains*
ray	**snail**	Information	Animals	*Starfish*
burrow	passage	Information	Animals	*Wonderful Worms*
roost	**swoop**	Information	Animals	*Beautiful Bats*
dye	**hatch**	Information	Animals	*Chickens Aren't the Only Ones*
pound	**pyramid**	Narrative	Food	*Eat Your Peas, Ivy Louise*
gross	**graze**	Narrative	Food	*Grasshoppers Gross Lunch*
knead	slice	Narrative	Food	*Little Red Hen Makes a Pizza*
list	thrilled	Narrative	Food	*Bunny Cakes*
steep	vehicle	Narrative	Transportation	*My Truck Is Stuck*
engineer	unload	Narrative	Transportation	*Chugga Chugga Choo Choo*
apron	**route**	Narrative	Transportation	*Bus Route to Boston*
bundle	rig	Narrative	Transportation	*The Trucker*
bury	**scrub**	Narrative	Animals	*Harry the Dirty Dog*
marsh	swamp	Narrative	Animals	*One Stuck Duck*
coral	decorate	Narrative	Animals	*A Home for Hermit Crab*
bank	**gasp**	Narrative	Animals	*Fish Is Fish*

Note. The words in bold were the words assessed on the target vocabulary assessment.

APPENDIX B

Excerpt From an Intervention Lesson Plan Accompanying a Read Aloud of *Harry the Dirty Dog* by Gene Zion

Prereading

Today we're going to read a story book about a dog named Harry. This story is *Harry the Dirty Dog* by Gene Zion. This story is about how much Harry hates to take baths. What do you think will happen in this story?

During Reading

(*p. 1*) Hmm, sounds like Harry knew it was time for a bath because the bath water was running. His family must use the *scrubbing* brush to clean Harry when he gets dirty. Say ''*scrub*.'' To *scrub* is to clean something with a brush or towel by rubbing hard and fast.

(*pp. 2–3*) So, Harry took his *scrubbing* brush and *buried* it in the backyard. Say ''*bury.*'' When you *bury* something, you put it underground and cover it up. Harry is *burying* his *scrubbing* brush outside to hide it from his family.

Post-Reading

We learned two important words today. Let's review them. *Scrub*. To *scrub* is to clean something with a brush or towel by rubbing hard and fast. Say ''*scrub.*'' [Wait] What did Harry do with his *scrubbing* brush in the story? [Use pictures in book for visual reinforcement] Yes, *bury*. Harry *buried* it in his backyard so he wouldn't have to take a bath. That means he put it underground and covered it up to hide it from his people. [Point out in book] Great job listening and learning today!

APPENDIX C

Sample Extension Activities Accompanying a Read Aloud of *Harry the Dirty Dog* by Gene Zion

Morning Meeting

- Let's review the words we learned yesterday: *scrub* and *bury.*
- To *scrub* is to clean something with a brush or towel by rubbing hard and fast. Say ''*scrub.*'' Act like you are *scrubbing* something.
- When you *bury* something, you put it underground and cover it up. Say ''*bury.*'' Let's act like we are dogs *burying* bones in the dirt.
- This is a picture of someone *scrubbing* something clean. This is a picture of the family *scrubbing* Harry from the book. This is a real picture of an dog *burying* a bone. Here's the picture of Harry *burying* his *scrubbing* brush from the book. I will post the picture cards on our vocabulary word wall so you can see them when you look around the room. [Post picture cards]

Small-Group Drawing/Writing

- To *scrub* is to clean something that is really dirty with a brush or towel by rubbing hard and fast. Today you will draw yourself when you were really dirty. While you're drawing, I want you to tell me how you got dirty and what you used to *scrub* off all the dirt. I'll help you write down your words on your paper.

Centers

- When you *bury* something, you put it underground and cover it up. Today in centers you will have the opportunity to work at three centers that have something to do with *burying.*
- In dramatic play, you can pretend you are a family with a dog. You can set up lots of places in your yard where your dog can *bury* things, like a bone or an old shoe.
- In the art center, you can make a peek-a-boo page. I have pasted cutouts of piles of dirt onto construction paper. It is only glued down on one side. You can lift up the pile of

dirt and draw something that you would like to *bury* under it. Your page will be like a peek-a-boo book where you lift up the flap to see what is *buried* underneath.

- In the math center (or sandbox/water table center), you can dig through the box to count how many different items are *buried* underneath the dirt (or sand). You might even sort the items that are alike once you get everything out. There are lots of special things *buried* under the dirt (or sand or water), so you have to take your time and dig carefully!