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Teaching Vocabulary During Shared Storybook Readings: An Examination of Differential Effects

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A storybook intervention for kindergarten children that integrates principles of explicit vocabulary instruction within the shared storybook reading experience is described with findings from an experimental study demonstrating the effects of this intervention on the vocabulary development of kindergarten students at risk of reading difficulty. Results indicated that in comparison to students in the control group, students in the intervention with lower receptive vocabulary skills demonstrated greater gains in explicitly taught vocabulary than did students with higher receptive vocabulary. Findings suggest that the explicit teaching of word meanings within storybook readings may help to narrow, or at least halt, the widening vocabulary gap among students.

Beginning reading research has converged on a profound and irrefutable finding over the past decade: Children enter kindergarten with “meaningful differences” in early literacy experiences (Hart & Risley, 1995). Even at this early age, children’s literacy development and opportunities are characterized by differences in skills, exposure, and opportu-

nities with the form, functions, and conventions of language and print (National Research Council, 1998).

For example, young children differ considerably in their understanding of and familiarity with the phonologic features of language and the alphabetic nature of our writing system (Torgesen et al., 1999). Whereas some children come to school having already grasped the insight that language can be broken down into individual phonemes that map onto letters, many other children have only the most rudimentary awareness of sounds and print. A large body of research evidence suggests that these differences in phonological awareness and letter knowledge have important implications for learning to read and predicting success in beginning reading acquisition (Foorman & Torgesen, 2001; National Reading Panel, 2000).

Similarly, young children possess vastly divergent vocabularies (Biemiller, 2001; Hart & Risley, 1995; National Research Council, 1998). Whereas some children enter school with thousands of hours of exposure to books and a wealth of rich oral language experiences, other children begin school with very limited knowledge of language and word meanings. Like the research base on phonological awareness and alphabetic understanding, teachers and researchers have long recognized the important and prominent role that vocabulary knowledge plays in becoming a successful reader (Becker, 1977; Cunningham & Stanovich, 1998; National Reading Panel, 2000; Storch & Whitehurst, 2002).

The research evidence is unequivocal: Children enter kindergarten with significant differences in critical early literacy skills, and these differences place many children at serious risk for failing to learn how to read and understand text. As a result, early intervention matters, and it matters more for children who enter with less. These children not only begin school with limited skills and knowledge, but also these initial differences grow larger and more discrepant over time (Biemiller, 2003; Stanovich, 1986). The goal of early intervention, therefore, is to target differences in early literacy skills and experiences at the outset of formal schooling before reading difficulties become entrenched and intractable (Coyne, Kame'enui, & Simmons, 2001). To this end, educators, policymakers, and researchers have actively and increasingly promoted prevention and early intervention efforts in beginning reading (e.g., *No Child Left Behind*, 2002).

The results of early intervention have been largely encouraging. Over the past 10 years, researchers have engaged in a concerted and ever more successful effort to develop effective instructional strategies and interventions to increase the phonological awareness and word identification skills of young children at risk for reading difficulties and disability (e.g., Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Simmons et al., 2004; Torgesen et al., 1999). Yet, even as the research community has concentrated its collective attention on helping children read words, there has been very little corresponding research recently on helping children understand words or develop equally critical vocabulary knowledge. This is particularly true for students in the early grades (National Reading Panel, 2000). As Biemiller and Slonim (2001) recently asserted: "Although vocabulary development is crucial for school success, it has not received the attention and interest that work on identifying printed words and spelling have received" (p. 511).

There is a need for research-based, intensive vocabulary interventions for young children at risk of experiencing reading difficulties. To address this need, we developed and

evaluated an intervention that integrated knowledge from two complementary research literatures: the storybook literature and the vocabulary literature. In developing the intervention, we incorporated validated principles of explicit and systematic vocabulary instruction from research conducted with students in Grades 3 and above (Beck, McKeown, & Kucan, 2002) into storybook reading activities typically used with children in preschool through Grade 2.

In this article, we summarize the research on storybook and shared book reading activities followed by the literature base on direct vocabulary instruction. Next, we describe a storybook intervention for kindergarten children that integrates principles of explicit vocabulary instruction within the shared storybook reading experience. We then summarize findings from an experimental study demonstrating the effects of this intervention on the vocabulary development of kindergarten students at risk of reading disability. In addition, we present secondary analyses that examine whether there were differential effects of the intervention for students who began kindergarten with low receptive vocabulary skills.

SHARED STORYBOOK READING ACTIVITIES IN PRESCHOOL TO GRADE 2

Older students in third grade and above acquire a great deal of new vocabulary through wide, independent reading (Anderson & Nagy, 1992). Younger students who have yet to become skilled readers, however, must learn word meanings through a different medium (Becker, 1977). The primary way for young nonreaders to be exposed to new vocabulary is within the context of oral language experiences such as shared storybook reading (Biemiller, 2003). Storybook reading activities are an excellent means for language and vocabulary development because of the opportunities for using decontextualized language during interactive discussion (Snow, 1991) and the relative rarity of the vocabulary encountered in storybooks compared with speech (Cunningham & Stanovich, 1998). For example, the complexity of vocabulary found in children's books is greater than in all of adult conversation, except for courtroom testimony (Hayes & Ahrens, 1988).

There is a growing literature documenting the effects of listening to storybooks on language and vocabulary development (Bus, van Ijzendoorn, & Pellegrini, 1995; National Reading Panel, 2000). For example, studies have found that children can learn the meanings of unknown words through incidental exposure during shared storybook reading activities (Elley, 1989; Nicholson & Whyte, 1992; Robbins & Ehri, 1994; Senechal & Cornell, 1993).

Researchers have begun to isolate factors that increase the likelihood that children will learn new vocabulary from listening to storybooks. These factors include engaging in rich dialogic discussion about the storybook (Senechal, 1997; Whitehurst, Epstein, et al., 1994; Whitehurst et al., 1999), reading storybooks multiple times (Robbins & Ehri, 1994; Senechal, Thomas, & Monker, 1995), providing performance-oriented readings (Dickinson & Smith, 1994), and reading storybooks with small groups of students (Whitehurst, Arnold, et al., 1994). Finally, it is important to choose engaging storybooks

with beautiful pictures and appealing stories that will capture and hold children's interest and attention.

The results of these studies suggest that shared storybook reading activities are a valuable way to support vocabulary development in young children. However, evidence also reveals that these activities are not equally effective for all students. Children who are at risk for reading difficulties with lower initial vocabularies are less likely to learn unknown words from incidental exposure during storybook reading activities than their peers with higher vocabularies (Nicholson & Whyte, 1992; Robbins & Ehri, 1994; Senechal et al., 1995). In other words, with traditional storybook reading activities, the initial vocabulary differences among students grow larger over time (Penno, Wilkinson, & Moore, 2002; Stanovich, 1986).

In response to this finding, researchers have called recently for more conspicuous, teacher-directed vocabulary instruction to complement traditional storybook reading activities for young children who are at risk for experiencing reading difficulties (Biemiller & Slonim, 2001; Simmons et al., 2004; Stahl & Shiel, 1999). For example, Robbins and Ehri (1994) concluded that "because children with weaker vocabularies are less likely to learn new words from listening to stories than children with larger vocabularies, teachers need to provide more explicit vocabulary instruction for children with smaller vocabularies" (p. 61).

The goal of our intervention was to intensify shared book reading activities with direct teaching of target vocabulary. To accomplish this, we looked to a separate but related knowledge base, the research on explicit vocabulary instruction (Baumann, Kame'enui, & Ash, 2003; Beck et al., 2002). In the next section, we summarize the vocabulary instructional literature.

EXPLICIT VOCABULARY INSTRUCTION IN GRADES 3 AND ABOVE

Although there is little research on explicit vocabulary instruction in kindergarten through Grade 2, there is a more extensive literature on direct vocabulary instruction in Grades 3 and above (Baker, Simmons, & Kame'enui, 1998; Baumann et al., 2003). There is especially strong evidence regarding the effectiveness of explicit vocabulary instruction that focuses on teaching students the meanings of specific words and instructional principles that maximize vocabulary learning (National Reading Panel, 2000).

Explicit vocabulary instruction should directly teach the meanings of words that are important for understanding the text and words that children will encounter often (Stahl, 1986). Effective strategies for directly teaching vocabulary include using both contextual and definitional information, giving multiple exposures of target words, and encouraging deep processing (National Reading Panel, 2000; Stahl, 1986; Stahl & Fairbanks, 1986). Activities that encourage deep processing challenge students to move beyond memorizing simple dictionary definitions to understanding words at a richer, more complex level by, for example, describing how they relate to other words and to their own experiences (McKeown & Beck, 2003).

Direct instruction of target words is also more effective when it adheres to validated principles of instructional and curricular design (Kame'enui, Carnine, Dixon, Simmons, & Coyne, 2002). For example, vocabulary instruction should be conspicuous (Baker et al., 1998). Conspicuous instruction is explicit and unambiguous and consists of carefully designed and delivered teacher actions. During vocabulary instruction, this would include direct presentations of word meanings using clear and consistent wording and extensive teacher modeling of new vocabulary in multiple contexts. Vocabulary instruction should also provide students with carefully scheduled review and practice to help them more firmly incorporate new vocabulary into their lexicon (Baker et al., 1998).

The vocabulary instruction literature has important implications for younger students at risk of reading difficulties. Previously, many researchers have argued that the number of words that children need to learn is so great that the role of direct instruction in helping children develop vocabulary knowledge is insignificant and inconsequential (Anderson & Nagy, 1992). Recently, however, other researchers have begun to question this assertion. Lower estimates of the number of root-word meanings that typical students acquire in a year suggest that direct instruction can, in fact, provide students with a significant proportion of words they will learn, especially students with less developed vocabularies (Biemiller, 2003; Stahl & Shiel, 1999).

To date, most research on explicit vocabulary instruction has been carried out with children in Grade 3 and above (e.g., Beck, Perfetti, & McKeown, 1982; Kame'enui, Carnine, & Freschi, 1982; McKeown, Beck, Omanson, & Perfetti, 1983). Unfortunately, waiting until third grade to address vocabulary development for students with low vocabularies systematically may be too late for children who enter school at risk for experiencing reading difficulties. The urgency of targeting vocabulary development in the early grades was made acutely apparent in recent research conducted by Biemiller and Slonim (2001). Their findings revealed that most of the vocabulary differences between children occur before Grade 3, at which point children with high vocabularies know thousands of more word meanings than children who are experiencing delays in vocabulary development.

In summary, research highlights the need for early interventions that offer effective classroom-based vocabulary instruction for young children at risk of experiencing reading difficulties. The two distinct research literatures outlined previously provide a conceptual and empirical basis for developing such an intervention by incorporating validated principles of explicit and systematic vocabulary instruction from research conducted with students in Grades 3 and above into storybook reading activities for young children in kindergarten through Grade 2. In the following section, we describe a storybook intervention informed by this conceptual framework.

AN EXPERIMENTAL STORYBOOK INTERVENTION

We are currently engaged in a longitudinal program of research to investigate ways to optimize early literacy instruction and intervention for children at risk of reading difficulties (Simmons et al., 2004; Simmons, Kame'enui, Stoolmiller, Coyne, & Harn, 2003). This research is guided by two primary questions: (a) What are the critical components

of early literacy instruction and how should we allocate instructional time among these literacy components? and (b) To what extent does instruction that is sufficiently explicit, systematic, and strategic meet the intensive literacy needs of children at risk of reading difficulty?

As part of this larger program of research, we developed a storybook intervention to increase children's vocabulary knowledge and enhance their comprehension, two critical components of early literacy instruction. When designing the elements of the intervention targeting vocabulary development, we explicitly incorporated and integrated the instructional principles distilled from our review of the storybook and vocabulary research. To make the linkage between the research principles and their application more transparent, we outline these connections in two tables. Table 1 summarizes the research principles gleaned from the shared storybook reading literature and how we incorporated them into our intervention. Table 2 summarizes our application of the research principles synthesized from the vocabulary instruction literature.

The intervention consisted of 108 half-hour lessons developed to accompany 40 children's storybooks. The storybooks were either classics or recent award winners. Three target vocabulary words to be taught explicitly were identified from each storybook. Target words were selected because they were important for understanding the story and likely to be unfamiliar to young children.

Lessons were sequenced in 20, six-day cycles. Each cycle was designed to complement two storybooks. One storybook was read on Days 1 and 3 of the cycle and the other storybook was read on Days 2 and 4. Days 5 and 6 focused on integrating and applying target vocabulary to generalized contexts. During Days 5 and 6, children were also given opportunities to retell the stories using selected illustrations as prompts. Teachers encouraged children to use target vocabulary during retells.

We evaluated the effects of our storybook intervention within the context of a large-scale experimental study with kindergarten children identified as at risk of experi-

TABLE 1
Shared Storybook Reading Literature

<i>Research Principle</i>	<i>Application</i>
Interesting and engaging storybooks	Storybooks chosen were either classics (e.g., <i>Bread and Jam for Francis</i> , <i>Harry the Dirty Dog</i>) or recent award winners (e.g., <i>Hush! A Thai Lullaby</i> , <i>McDuff Moves In</i>).
Rich dialogic discussion about storybooks	Teachers engaged children in scaffolded discussion of the story by activating prior knowledge, eliciting responses about story elements, linking story themes to children's own experiences, and facilitating story recalls.
Performance-oriented readings	Discussion took place primarily before and after story readings. Teachers read stories with expression and enthusiasm.
Multiple readings of storybooks	Storybooks were read two times over four lessons. Students also retold each story one additional time with prompted connections to the storybook's illustrations.
Small groups of students	Storybooks were read with groups of 2 to 5 children.

TABLE 2
Vocabulary Instruction Literature

<i>Research Principle</i>	<i>Application</i>
Carefully selected target words	Three target words were chosen and taught directly from each storybook. Words were selected because they were important to understanding the story and likely to be unfamiliar to kindergarten students.
Simple definitions within the context of the story	Teachers provided students with a simple definition or synonym (e.g., “ <i>rumpus</i> means wild play”) when introducing a new vocabulary word. Teachers then used the definition within the context of the story. In the story <i>Where the Wild Things Are</i> , for example, the teacher says, “I’ll say the sentence with the words that mean the same as <i>rumpus</i> . ‘Let the wild play start.’”
Conspicuous instruction	Definitions of target words were presented through instruction that was direct and unambiguous. Definitions were explicitly modeled by teachers using clear and consistent wording.
Rich instruction	Teachers provided children opportunities to discuss target words in extended discourse before and after stories. In addition, teachers provided children with structured discrimination and generalization tasks that challenged them to process word meanings at a deeper and more complex level (e.g., “Is <i>rumpus</i> more like sitting quietly or wild play?” “Have you ever been in a <i>rumpus</i> ?”).
Multiple exposures to target words and carefully scheduled review and practice	Target vocabulary words were introduced and reviewed a minimum of 6 days in a carefully scaffolded sequence. Each target word was first used by the teacher in context, practiced in sentences by students, incorporated into story recalls, and discussed in multiple novel contexts.

encing reading difficulties (Simmons et al., 2004). The kindergarten children were considered to be at risk based on their performance on letter naming and phonological awareness tasks administered at the beginning of the school year (Good, Simmons, & Kame’enui, 2001; Torgesen, 2000).

In November of the kindergarten year, 96 children from seven schools were randomly assigned to one of three intervention groups. Only one of the three groups received the storybook intervention. A second group received an intervention that focused on increasing phonologic and alphabetic skills, two other critical components of early literacy instruction. The remaining control group received a sounds and letters module of a commercial reading program (Open Court; Adams et al., 2000). Children in all groups received 30 min of small group intervention each day between November and May for a total of 108 instructional periods.

As expected, the group receiving the code-based instruction outperformed the storybook and control groups on measures of phonologic and alphabetic skills. However, the storybook group scored significantly higher than the code-based and control groups at posttest on an experimenter-developed, expressive measure of explicitly taught vocabulary. Effect sizes for these contrasts were moderate to large. The effect size for the story-

book group in contrast with the code-based group was $d = .73$ and the effect size for the storybook group in contrast with the control group was $d = .85$.

Results of this study suggested two primary conclusions (Simmons et al., 2004). First, because learning to read involves the complex interaction of multiple skills and strategies, sufficient instructional time should be allocated to each of the critical components of early literacy instruction. As predicted, the intervention that targeted code-based components produced large effects on children's phonologic and alphabetic skills, whereas the intervention that focused on vocabulary produced moderate effects in these areas. Second, instruction that is carefully designed and delivered can significantly increase the early literacy skills of kindergarten children at risk of reading failure. With specific regard to vocabulary, these results imply that (a) vocabulary development should be an important focus of early literacy intervention, and (b) explicitly teaching word meanings within the context of shared storybook reading is an effective method for increasing the vocabulary of young children at risk of experiencing reading difficulties.

Although these results support the overall effectiveness of the storybook intervention, we were interested in whether some students may have responded differentially. Previous research has indicated that children with lower initial vocabularies learn fewer word meanings during traditional storybook reading activities than children with higher vocabularies (Nicholson & Whyte, 1992; Penno et al., 2002; Robbins & Ehri, 1994). In the next section, we present secondary analyses of the data from this study that examine whether there were differential effects of the storybook intervention for students who began kindergarten with low receptive vocabulary skills.

METHOD

Participants

To examine whether there were differential effects of the storybook intervention for students with low receptive vocabulary, we conducted secondary analyses on data from the same kindergarten students that participated in the larger study. Students were selected to participate in the intervention study because they were considered to be at risk based on their performance on letter naming and phonological awareness tasks. However, these students also demonstrated below-average receptive vocabulary. The average standard score on the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1981) was 92, meaning that the receptive vocabulary of the "average" participant in the study was at the 30th percentile compared to a nationally normed sample.

For purposes of these analyses, we looked at student data from two of the three intervention groups, the group that received the storybook intervention ($n = 34$) and the control group ($n = 30$) that received a sounds and letters module of a commercial reading program (Open Court; Adams et al., 2000). We chose to focus our analyses on these two groups to provide a clearer comparison between students who received the storybook intervention and students in the control group. Previous analyses indicated that there were no differences between the control group and the code-based group on

TABLE 3
Means and Standard Deviations of Vocabulary Pretest
and Posttest Measures by Group

Measure	Pretest						Posttest					
	Storybook			Control			Storybook			Control		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n
PPVT	92.03	13.12	37	91.87	12.34	37	—	—	—	—	—	—
Taught vocabulary	9.36	5.12	33	11.25	5.11	28	15.38	5.54	34	11.80	4.83	30
Untaught vocabulary	8.03	3.55	32	8.27	4.26	30	11.79	4.89	34	10.77	4.99	30

Note. PPVT = Peabody Picture Vocabulary Test.

vocabulary outcomes. Descriptive statistics for participants on measures of vocabulary are displayed in Table 3. The sample sizes at each testing period vary slightly due to attrition and missing data. Information on sample sizes at each measurement point are included in the table.

Measure of Vocabulary Growth

At pre- and posttest, all participants were administered a measure assessing selected vocabulary from the stories used in storybook intervention. The National Reading Panel (2000) concluded that specific vocabulary growth is best assessed through researcher-developed measures because these measures are more sensitive to gains achieved through instruction than are standardized tools. To assess specific vocabulary growth, we developed a 20-word instrument in which students were asked to produce word meanings or tell anything they knew about target words. Ten specific words were randomly selected from the pool of explicitly taught vocabulary, and the remaining 10 words were randomly selected from the pool of words that appeared in the stories but received no explicit instructional emphasis. No more than one word per story occurred in the measure.

The measure was individually administered at pre- and postintervention in two separate sessions of 10 words each. Each assessment item consisted of two questions: (a) asking the definition of the word (e.g., “What is a principal?” “What does roared mean?”), and (b) asking a what, when, or how question (e.g., “What does a principal do?” “What do you do when you roar?”). To guide scoring, definitions for each word were specified, including dictionary definitions, synonyms, and the informal definition used during storybook instruction. A panel of four scorers further determined the criteria, awarding points to responses that did not match the listed definitions or synonyms. Student responses were scored on a scale of 0 to 3 points per word. A score of 3 was awarded to responses matching the listed definitions or synonyms; responses that had no relation to the listed definitions received 0 points. A separate total score was calculated for each student for taught words and untaught words. Total possible scores on each of the assessments ranged from 0 to 30 points. Interscorer reliability calculated on 10% of the words was above 90%.

RESULTS

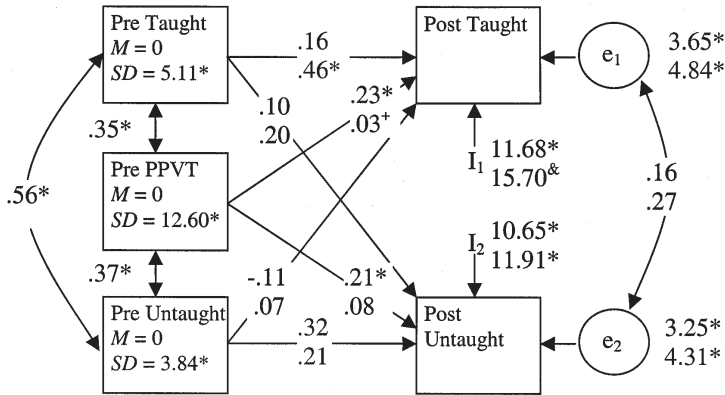
To test models of differential effectiveness based on students' initial receptive vocabulary, we compared the regressions of vocabulary posttest measures (taught and untaught) on pretest levels of the same variables and the pretest level of PPVT. Because we were interested in comparing vocabulary growth both across groups (i.e., the storybook group compared with the control group) and within groups (i.e., taught vocabulary compared with untaught vocabulary within the storybook group), we used structural equation modeling (SEM) to estimate a bivariate outcome regression model. The fact that the taught and untaught outcomes were substantially correlated and likely to remain so even after controlling for predictors precluded the use of simpler ordinary least squares regression procedures.

To address group equivalency at pretest, we employed random assignment of participant to condition and also constrained the pretest parameters (means, standard deviations, and correlations) to be equal across the groups. Estimation was carried out using M-Plus (Muthén & Muthén, 1998) using full information maximum likelihood assuming missing data were missing at random, that is, missing at random conditional on predictors included in the model. We constructed linear combinations of model parameters and standard errors to obtain critical ratios to examine differential effectiveness. Because of the modest sample size, we referred our critical ratios to the *t* distribution with degrees of freedom equal to the total sample size minus the number of fixed effects for obtaining *p* values.

Figure 1 shows a path diagram of the bivariate outcome regression model. Observed variables are shown by squares, latent variables by circles. Single-headed arrows starting from the predictor and going to the outcome indicate regression paths. Covariances or correlations are shown as double-headed arrows. An uppercase I indicates a regression intercept. Parameter estimates are shown as numbers in the diagram next to, or on, the model parameters they reference (e.g., the numbers on the single-headed arrows are the parameter estimates for the regression paths). All values attached to double-headed arrows are correlations, and the values next to the latent residual error variables (e_1 and e_2) are residual standard deviations. Estimates for the control group are shown above, and the corresponding estimates for the storybook group are shown below. The chi-square statistic at the bottom is based on the degrees of freedom created by the constraints on the pretest parameters. As can be seen in Figure 1, the constraints do not cause a significant decrement in fit.

All the pretest measures were centered about their respective grand means across groups so that the regression intercepts at the posttest represent the mean difference on the outcomes for children at mean levels of the pretest measures. As was the case in the primary analyses (Simmons et al., 2004), this model reveals an overall effect for group on taught vocabulary, $t(64) = 3.70$, $p < .001$, but not for untaught vocabulary, $t(64) = 1.30$, $p = .20$. In other words, students in the storybook group learned and demonstrated greater knowledge of target vocabulary than students in the control condition, but there were no group differences on untaught vocabulary.

Figure 2 uses the observed data to illustrate graphically the regressions of the residualized outcome scores plotted against the residualized initial PPVT scores for



Chi-Square = 8.60, $df = 9$, $p = .48$, RMSEA = .00

FIGURE 1 Path diagram of structural equation modeling of differential effectiveness. Control group parameters are on top, corresponding intervention group parameters are below except where constrained to be equal at the pretest. *Indicates the parameter is significantly different from zero. +Indicates the parameter is not significantly different from zero but is significantly different from the corresponding parameter in the other group. &Indicates the parameter is significantly different from zero and significantly different from the corresponding parameter in the other group. Pretest means were centered to zero to make regression intercepts more interpretable. PPVT = Peabody Picture Vocabulary Test.

taught and untaught vocabulary separately by group. This allows a visual examination of the fitted regression slopes for taught and untaught vocabulary for both the storybook and control groups. Because these simple regressions do not take into account missing data and the correlation between the two outcomes at posttest, the statistics are slightly different than those produced by the SEM model. The overall pattern of results, however, is the same. The intervention group is labeled “Storybook” and the control group is labeled “Open Court.” Basic regression statistics are shown across the top margin of each plot.

Differential Effects Across Groups

To examine differential effects across groups, we examined *t* statistics testing whether the effects of initial PPVT were significantly different for students in the storybook group compared to students in the control group. For example, if the storybook intervention was uniformly beneficial regardless of initial status on PPVT, the effects would be the same across the two groups. Likewise, the slopes of the regression lines in Figure 2 would appear similar in both the storybook and control groups. On the other hand, if the storybook intervention tended to benefit students with initial high PPVT scores the most, the effect would be greater in the storybook group. In this case, the regression line would be steeper in the storybook group than in the control group. Finally, if the storybook intervention had a compensatory effect, students with initially lower PPVT scores would benefit the most compared to the control group, the effect

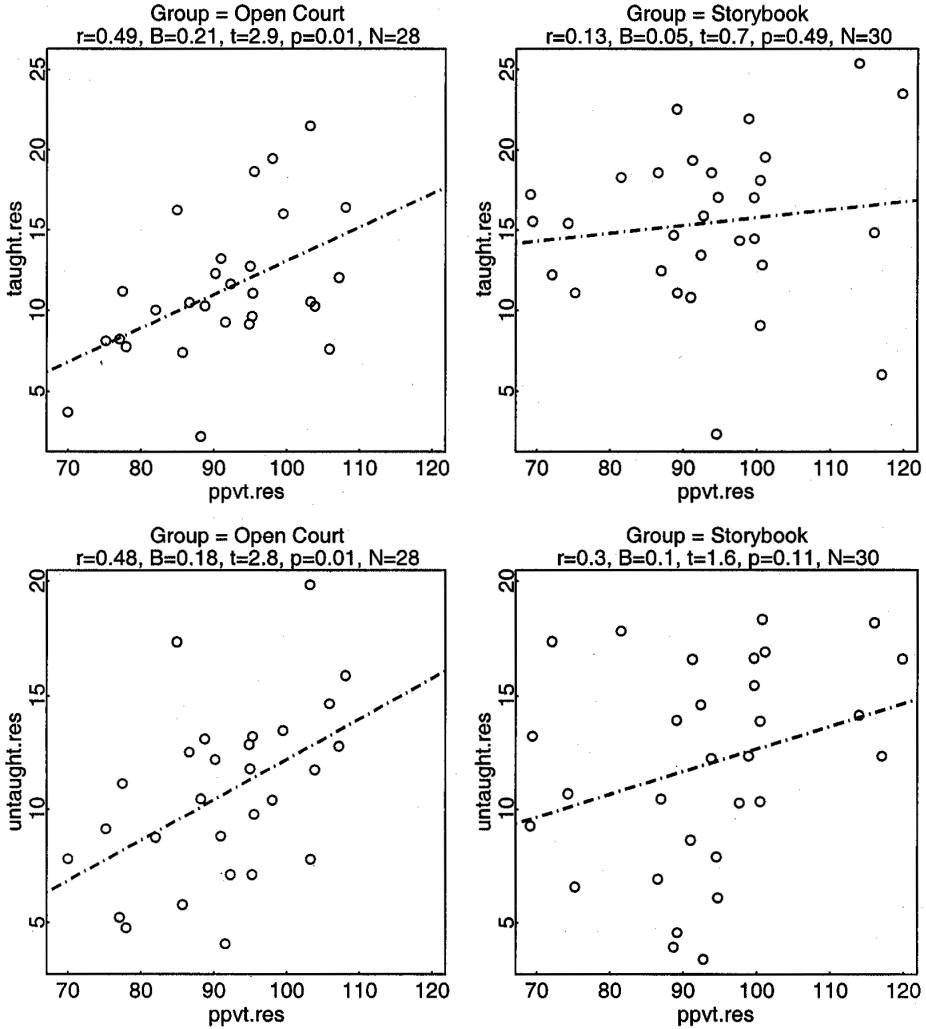


FIGURE 2 Residualized initial Peabody Picture Vocabulary Test (PPVT) scores versus residualized outcome scores for taught and untaught vocabulary.

would be greater in the control group, and the regressions would appear flatter in the storybook group than the control group.

According to the SEM analyses, there was a statistically significant difference in the effect of initial PPVT for taught vocabulary between the storybook group and the control group, $t(61) = 2.07, p = .04$. In Figure 2, the slope of the regression line for taught vocabulary in the storybook group is clearly flatter than the slope of the regression line for the control group. Conversely, there was not a statistically significant difference in the effect of initial PPVT for untaught vocabulary between the storybook group and the control group, $t(64) = 1.45, p = .15$. In this case, although the slope of the regression line for un-

taught vocabulary in the storybook group appears to be slightly flatter than the slope of the regression line for the control group, this difference is noticeably smaller than for taught vocabulary and is not statistically significant.

For taught vocabulary, this finding indicates that in comparison with students in the control group, the storybook intervention was differentially effective based on initial PPVT scores. This result clarifies the main effect finding that students who received the storybook intervention made greater gains in taught vocabulary than students in a control group. Specifically, the finding of differential effectiveness suggests that students with lower receptive vocabulary benefited more from the storybook intervention in relation to students who did not receive the storybook intervention.

For untaught vocabulary, primary analyses revealed that there was no main effect of group. In other words, students in the storybook group did not learn the meanings of untaught words at a greater rate than students in the control group. This result is reinforced by the finding showing no differential effects based on initial vocabulary status. Although there is a slight trend suggesting that students with lower initial PPVT scores may have benefited more, this result was not statistically significant.

Differential Effects Within Groups

To examine differential effects within groups, we examined *t* statistics testing whether the effects of initial PPVT were significantly different than zero for taught and untaught vocabulary in the storybook and control groups separately. If the effect was significantly greater than zero, this would indicate that students with higher initial PPVT scores made greater vocabulary gains between pretest and posttest than students with lower initial PPVT scores. If the effect was not significantly different than zero, this would indicate that all students made similar vocabulary gains, regardless of initial PPVT scores.

According to the bivariate SEM model, the PPVT effects on both taught and untaught vocabulary in the control group were significantly greater than zero; respectively, $t(64) = 3.20, p < .01$, and $t(64) = 3.33, p < .01$. In addition, the effects for taught and untaught vocabulary were not significantly different from each other, $t(64) = 0.19, p = .85$. In fact, the coefficients were almost identical. These results indicate that in the control group, students with higher initial PPVT scores made greater gains on both taught and untaught vocabulary than students with lower initial PPVT scores. This can be seen in Figure 2 in the very similar positive slopes for the Open Court group on both taught and untaught vocabulary.

According to the bivariate SEM model, the PPVT effects on both taught and untaught vocabulary in the storybook group were not significantly greater than zero; respectively, $t(64) = 0.37, p = .71$, and $t(64) = 1.42, p = .16$. Similar to the control group, the effects for taught and untaught vocabulary in the storybook group were not significantly different from each other, $t(64) = 0.83, p = .21$. These results indicate that in the storybook group, all students made similar gains irrespective of initial PPVT scores. These results are also visually apparent in Figure 2 where the regression slopes appear much flatter. However, unlike the control group in which the slopes appear almost indistinguishable, the slope for taught vocabulary is noticeably flatter than the slope for untaught vocabulary, although this difference is not statistically significant.

DISCUSSION

We developed our experimental storybook intervention with the goal of decreasing the vocabulary gap among kindergarten students who were at risk of experiencing reading difficulties. Because previous research suggests that traditional storybook reading activities tend to reinforce and widen this gap (Penno et al., 2002; Robbins & Ehri, 1994), we intensified our intervention by explicitly teaching the meanings of specific words in the stories. The purpose of this study was to conduct analyses investigating whether the intensified storybook intervention produced differential effects on measures of vocabulary taught explicitly in the intervention as well as vocabulary in the stories but not targeted directly for instruction.

Primary analyses from our intervention study revealed that students who received the storybook intervention made greater growth than a control group on an experimenter-developed measure of explicitly taught vocabulary (Simmons et al., 2004). Unlike studies evaluating traditional storybook reading activities, results of secondary analyses indicated no evidence of a differential effect favoring students with larger vocabularies. In fact, for words that were taught explicitly in the storybook intervention, we found the opposite effect. Using SEM procedures, we found a statistically significant difference in the effect of initial PPVT scores on taught vocabulary outcomes between the storybook group and the control group. This result is reinforced visually by the clear positive regression slope for taught vocabulary in the control group compared with the nearly flat slope in the storybook group. These findings suggest that students with lower receptive vocabulary skills demonstrated greater gains in taught vocabulary than students with higher receptive vocabulary in comparison to students in the control group.

Conversely, our primary analyses indicated that, overall, students in the storybook intervention did not demonstrate greater growth on untaught vocabulary than students in the control group (Simmons et al., 2004). These findings are inconsistent with the results of previous research suggesting that students do learn the meanings of unknown words through incidental exposure during storybook reading activities (Elley, 1989; Nicholson & Whyte, 1992; Robbins & Ehri, 1994; Senechal & Cornell, 1993).

One possible explanation for these findings is related to the manner in which we measured vocabulary growth. Other studies have typically measured vocabulary growth immediately after exposing students to new words in the context of relatively short storybook reading interventions (i.e., 1–3 weeks). In our study, we measured vocabulary growth in May after a 7-month intervention in which some of the words assessed at posttest had not been read in storybooks for many months. Our measure, therefore, was more similar to a delayed maintenance test rather than a test of immediate effects. Although this made our measure less sensitive to immediate gains, it did make it a more stringent measure of long-term vocabulary growth. Consequently, our results do not indicate whether students learned the meanings of untaught words when they were first read in the stories, only that any differences between groups had disappeared by the posttest.

Secondary analyses reinforced these primary findings by indicating that there were no differential effects qualifying the main effect. The lack of a statistically significant difference in the effect of initial PPVT scores for untaught vocabulary between the storybook group and the control group indicated that students with both higher and lower initial

PPVT scores demonstrated the same growth as students in the control group. This finding can be clarified by examining the pattern of growth demonstrated by students in the control group. Because these students were not intentionally exposed to any of the vocabulary in the stories, any growth should be explained by typical development. The statistically significant positive effect of initial PPVT scores on both outcomes suggests that students with higher vocabularies learned new word meanings at a greater rate than students with lower vocabularies. This conclusion is consistent with research on vocabulary development, especially for students in the early grades (Biemiller & Slonim, 2001; Stanovich, 1986). Apparently then, students in the storybook group learned the meanings of words in the stories, but not words directly targeted for instruction, at a rate similar to what would be expected as the result of typical development. If typical development can be characterized by a gradual increase in the gap between students with higher and lower vocabularies, then the intervention did nothing to counteract this trend.

In summary, the goal of vocabulary interventions for young children at risk of experiencing reading difficulties is to narrow, or at least intercept the widening vocabulary gap among students. To accomplish this goal, interventions must result in comparable or greater word learning for students with smaller initial vocabularies than for students with larger vocabularies. Previous research has demonstrated that listening to storybooks is an effective way to increase students' vocabularies (National Reading Panel, 2000). The results of our analyses, however, suggest that storybook reading activities that rely on incidental exposure to unknown words do nothing to decrease the vocabulary gap.

On the other hand, our analyses indicated that teaching word meanings explicitly within the context of storybook readings resulted in the same amount of vocabulary growth for students with smaller initial vocabularies as for students with larger vocabularies. In addition, the storybook intervention was differentially more effective for students with smaller vocabularies compared to the control group. In other words, direct teaching of vocabulary did not act to widen the vocabulary gap but instead helped to diminish it.

IMPLICATIONS FOR INSTRUCTION

The findings of this study hold promise for improving early intervention efforts for young children at risk of reading difficulties with less developed vocabularies. By intensifying shared book reading activities with direct teaching of specific word meanings, interventions can increase students' knowledge of target vocabulary (see also Wasik & Bond, 2001). Explicit vocabulary instruction that intentionally draws attention to target words within the context of storybooks may also help young students develop a greater overall awareness of words and word meanings. This enhanced word consciousness may then increase the likelihood that students will learn the meanings of unknown words independently and incidentally by attending more closely to words and their use (Baumann et al., 2003).

Despite these positive findings, there remain many critical issues regarding how to accelerate vocabulary growth among children who enter with meaningful differences. Specifically, when time is limited and the differences between entry-level skills of students

are great, how do we optimally alter learning trajectories? In domains such as phonemic awareness and alphabetic understanding, there is general agreement about what to teach and how to teach (National Reading Panel, 2000). In vocabulary, however, there is less empirical evidence to guide our efforts. The current study adds to the literature on how to teach by incorporating principles of explicit vocabulary instruction (e.g., Beck et al., 2002) within storybook reading activities (e.g., Whitehurst et al., 1999).

Yet, the issue of what to teach, or the critical vocabulary that matters most, continues to remain elusive. Although effective interventions can begin to close the vocabulary gap, direct teaching of individual word meanings is extremely time intensive, there is a limited number of words that can be taught explicitly, and the rate of typical vocabulary development is steep. Therefore, to optimize scarce instructional time, it is crucial to teach words that will have the most impact and leverage in decreasing the vocabulary gap. Researchers are beginning to provide some guidance on the critical vocabulary or what to teach (Biemiller, 2003; Biemiller & Slonim, 2001). However, until we have a better understanding of which words to teach deeply, intentionally, and explicitly, closing the vocabulary gap will remain a persistent and consistent challenge.

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REFERENCES

- Adams, M. J., Bereiter, C., Brown, A., Campione, J., Carruthers, I., Case, R., et al. (2000). *Open court reading*. Columbus, OH: SRA.
- Anderson, R. C., & Nagy, W. E. (1992). The vocabulary conundrum. *American Educator*, 16(4), 14–18, 44–47.
- Baker, S. K., Simmons, D. C., & Kame'enui, E. J. (1998). Vocabulary acquisition: Research bases. In D. C. Simmons & E. J. Kame'enui (Eds.), *What reading research tells us about children with diverse learning needs* (pp. 183–218). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Baumann, J. F., Kame'enui, E. J., & Ash, G. E. (2003). Research on vocabulary instruction: Voltaire redux. In J. Flood, J. Jensen, D. Lapp, & J. R. Squire (Eds.), *Handbook of research on teaching the English language arts* (pp. 752–785). New York: Macmillan.
- Beck, I. L., McKeown, M. G., & Kucan, L. (2002). *Bringing words to life: Robust vocabulary instruction*. New York: Guilford.
- Beck, I. L., Perfetti, C. A., & McKeown, M. G. (1982). Effects of long-term vocabulary instruction on lexical access and reading comprehension. *Journal of Educational Psychology*, 74, 506–521.
- Becker, W. C. (1977). Teaching reading and language to the disadvantaged: What we have learned from field research. *Harvard Educational Review*, 47, 518–543.
- Biemiller, A. (2001). Teaching vocabulary: Early, direct, and sequential. *American Educator*, 25(1), 24–28, 47.
- Biemiller, A. (2003). Teaching vocabulary in the primary grades: Vocabulary instruction needed. In J. F. Baumann & E. J. Kame'enui (Eds.), *Vocabulary instruction: Research to practice* (pp. 28–40). New York: Guilford.

- Biemiller, A., & Slonim, N. (2001). Estimating root word vocabulary growth in normative and advantaged populations: Evidence for a common sequence of vocabulary acquisition. *Journal of Educational Psychology*, 93, 498–520.
- Bus, A. G., van Ijzendoorn, M. H., & Pelegrina, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research*, 65, 1–21.
- Coyne, M. D., Kame'enui, E. J., & Simmons, D. C. (2001). Prevention and intervention in beginning reading: Two complex systems. *Learning Disabilities Research & Practice*, 16, 62–72.
- Cunningham, A. E., & Stanovich, K. E. (1998). What reading does for the mind. *American Educator*, 22(1–2), 8–15.
- Dickinson, D. K., & Smith, M. W. (1994). Long-term effects of preschool teachers' book readings on low-income children's vocabulary and story comprehension. *Reading Research Quarterly*, 29, 104–122.
- Dunn, L., & Dunn, L. (1981). *Peabody Picture Vocabulary Test-Revised*. Circle Pines, MN: American Guidance Service.
- Elley, W. B. (1989). Vocabulary acquisition from listening to stories. *Reading Research Quarterly*, 24, 174–187.
- Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology*, 90, 37–55.
- Foorman, B. R., & Torgesen, J. (2001). Critical elements of classroom and small-group instruction promote reading success in all children. *Learning Disabilities Research & Practice*, 16, 203–212.
- Good, R. H., III, Simmons, D. C., & Kame'enui, E. J. (2001). The importance of decision-making utility of a continuum of fluency-based indicators of foundational reading skills for third-grade high-stakes outcomes. *Scientific Studies of Reading*, 5, 257–288.
- Hart, B., & Risley, R. T. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Brookes.
- Hayes, D. P., & Ahrens, M. (1988). Vocabulary simplification for children: A special case of "motherese." *Journal of Child Language*, 15, 395–410.
- Kame'enui, E. J., Carnine, D. W., Dixon, R. C., Simmons, D. C., & Coyne, M. D. (2002). *Effective teaching strategies that accommodate diverse learners* (2nd ed.). Columbus, OH: Merrill.
- Kame'enui, E., Carnine, D., & Freschi, R. (1982). Effects of text construction and instructional procedures for teaching word meanings on comprehension and recall. *Reading Research Quarterly*, 17, 367–388.
- McKeown, M. G., & Beck, I. L. (2003). Direct and rich vocabulary instruction. In J. F. Baumann & E. J. Kame'enui (Eds.), *Vocabulary instruction: Research to practice* (pp. 13–27). New York: Guilford.
- McKeown, M. G., Beck, I. L., Omanson, R. C., & Perfetti, C. A. (1983). The effects of long-term vocabulary instruction on reading comprehension: A replication. *Journal of Reading Behavior*, 15, 3–18.
- Muthén, B., & Muthén, L. (1998). *Mplus user's guide*. Los Angeles: Author.
- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups*. Bethesda, MD: National Institute of Child Health and Human Development.
- National Research Council. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.
- Nicholson, T., & Whyte, B. (1992). Matthew effects in learning new words while listening to stories. In C. K. Kinzer & D. J. Leu (Eds.), *Literacy research, theory, and practice: Views from many perspectives: Forty-First Yearbook of the National Reading Conference* (pp. 499–503). Chicago: National Reading Conference.
- No Child Left Behind. (2002). United States Department of Education. Retrieved April 7, 2002, from <http://www.nclb.gov/index.html>
- Penno, J. F., Wilkinson, I. A. G., & Moore, D. W. (2002). Vocabulary acquisition from teacher explanation and repeated listening to stories: Do they overcome the Matthew effect? *Journal of Educational Psychology*, 94, 23–33.
- Robbins, C., & Ehri, L. C. (1994). Reading storybooks to kindergartners helps them learn new vocabulary words. *Journal of Educational Psychology*, 86, 54–64.
- Senechal, M. (1997). The differential effect of storybook reading on preschoolers' acquisition of expressive and receptive vocabulary. *Journal of Child Language*, 24, 123–138.

- Senechal, M., & Cornell, E. H. (1993). Vocabulary acquisition through shared reading experiences. *Reading Research Quarterly*, 28, 360–374.
- Senechal, M., Thomas, E., & Monker, J. (1995). Individual differences in 4-year-old children's acquisition of vocabulary during storybook reading. *Journal of Educational Psychology*, 87, 218–229.
- Simmons, D. C., Kame'enui, E. J., Harn, B. A., Edwards, L. A., Coyne, M. D., Thomas-Beck, C., et al. (2004). *The effects of instructional emphasis and specificity on early reading and vocabulary development of kindergarten children*. Manuscript submitted for publication.
- Simmons, D. C., Kame'enui, E. J., Stoolmiller, M., Coyne, M. D., & Harn, B. A. (2003). Accelerating growth and maintaining proficiency: A two-year intervention study of kindergarten and first-grade children at risk for reading difficulties. In B. Foorman (Ed.), *Preventing and remediating reading difficulties: Bringing science to scale* (pp. 197–228). Timonium, MD: York Press.
- Snow, C. E. (1991). The theoretical basis for relationships between language and literacy in development. *Journal of Research in Childhood Education*, 6, 5–10.
- Stahl, S. A. (1986). Three principles of effective vocabulary instruction. *Journal of Reading*, 29, 662–668.
- Stahl, S. A., & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research*, 56, 72–110.
- Stahl, S. A., & Shiel, T. G. (1999). Teaching meaning vocabulary: Productive approaches for poor readers. In *Read all about it! Readings to inform the profession* (pp. 291–321). Sacramento: California State Board of Education.
- Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21, 360–406.
- Storch, S. A., & Whitehurst, G. J. (2002). Oral language and code-related precursors to reading: Evidence from a longitudinal structural model. *Developmental Psychology*, 38, 934–947.
- Torgesen, J. K. (2000). Individual differences in response to early interventions in reading: The lingering problem of treatment resisters. *Learning Disabilities Research & Practice*, 15, 55–64.
- Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., et al. (1999). Preventing reading failure in young children with phonological processing disabilities: Group and individual responses to instruction. *Journal of Educational Psychology*, 91, 1–15.
- Wasik, B. A., & Bond, M. A. (2001). Beyond the pages of a book: Interactive book reading and language development in preschool classrooms. *Journal of Educational Psychology*, 93, 243–250.
- Whitehurst, G. J., Arnold, D. H., Epstein, J. N., Angell, A. L., Smith, M., & Fischel, J. E. (1994). A picture book reading intervention in day care and home for children from low-income families. *Developmental Psychology*, 30, 679–689.
- Whitehurst, G. J., Epstein, J. N., Angell, A. L., Payne, A. C., Crone, D. A., & Fischel, J. E. (1994). Outcomes of an emergent literacy intervention in Head Start. *Journal of Educational Psychology*, 86, 542–555.
- Whitehurst, G. J., Zevenbergen, A. A., Crone, D. A., Schultz, M. D., Velting, O. N., & Fischel, J. E. (1999). Outcomes of an emergent literacy intervention from Head Start through second grade. *Journal of Educational Psychology*, 91, 261–272.

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