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Vocabulary acquisition from listening to stories

IN TWO EXPERIMENTS, classroom teachers in New Zealand read stories aloud to elementary school children, and administered pretests and posttests to measure the extent of the new vocabulary the children acquired from the reading. Results showed that oral story reading constitutes a significant source of vocabulary acquisition, whether or not the reading is accompanied by teacher explanation of word meanings. In the first study, seven classes of 7-year-olds showed vocabulary gains of 15 percent from one story, without any teacher explanation. In the second study, after hearing one story, three classes of 8-year-olds who received no teacher explanation showed gains of 15 percent, and three classes that did receive explanation showed gains of 40 percent. By contrast, the same groups produced gains of less than half these figures on a second story with different characteristics. Follow-up tests showed that this incidental vocabulary learning was relatively permanent, and that low-scoring children gained as much as high-scoring children. In addition, the features that best predicted whether a particular word would be learned were frequency of the word in the text, depiction of the word in illustrations, and the amount of redundancy in the surrounding context. The author recommends future studies to investigate further the benefits from stories read aloud, and to clarify the factors that yield differences in children's interest in stories.

Apprendre du vocabulaire en écoutant des histoires

LES DEUX EXPÉRIENCES rapportées se sont déroulées en Nouvelle-Zélande. Les professeurs ont lu à voix haute des histoires à des élèves du primaire. Un pré-test et un post-test ont permis d'évaluer le vocabulaire acquis à la suite des lectures. Les résultats confirmèrent que la lecture d'histoires contribue de façon significative à accroître le vocabulaire des enfants, que la lecture soit ou non complétée par des explications. Dans la première étude, sept classes de deuxième année primaire montrèrent des gains de 15% suite à l'écoute d'une des histoires et ce, sans explication supplémentaire. Dans une seconde étude, après écoute d'une histoire, sans explication, trois classes de troisième année affichèrent une augmentation du vocabulaire de 15%, alors que trois autres classes qui avaient reçu des explications complémentaires montrèrent une amélioration de 40%. Par contre, les mêmes groupes obtinrent des résultats 50% inférieurs à la lecture d'une seconde histoire présentant des caractéristiques différentes. Des post-tests passés plus tard, ont permis de vérifier la stabilité des résultats dans le temps et de montrer que les gains des enfants faibles ont été aussi importants que ceux des enfants forts. De plus, certains facteurs d'apprentissage ont pu être isolés tel la fréquence d'apparition du mot dans le texte, la représentation du mot par l'image, et la redondance du contexte environnant. Les auteurs recommandent que des recherches

complémentaires soient menées pour approfondir l'effet de la lecture à voix haute sur l'acquisition de vocabulaire et pour cerner les facteurs responsables de cet apprentissage.

Cómo se adquiere vocabulario de escuchar historias

EN DOS EXPERIMENTOS llevados a cabo por maestras de primaria en Nueva Zelandia se leyeron historias en voz alta a niños de escuela elemental. Se administraron pruebas de pretest y postest para medir la extensión del nuevo vocabulario que los niños adquirieron de la lectura. Los resultados mostraron que la lectura en voz alta de las historias constituye una fuente significativa de adquisición de vocabulario, ya sea que la lectura vaya acompañada o no de explicaciones por parte de la maestra. En el primer estudio, siete maestras leyeron una historia en voz alta a sus clases de niños de 7 años, sin dar explicación ninguna, y los niños mostraron ganancias del vocabulario de 15%. En el segundo estudio, después de escuchar un cuento, tres clases de niños de 8 años que no recibieron explicación de la maestra, mostraron ganancias de 15%, y tres clases que recibieron explicación mostraron ganancias del 40%. En contraste, los mismos grupos tuvieron aumentos de menos de la mitad de estos números en una segunda historia con características diferentes. Una prueba de seguimiento demostró que este aprendizaje incidental de vocabulario fue relativamente permanente, y que los niños con bajo rendimiento tuvieron un aumento tan grande como el de los niños de alto rendimiento. Además, las características que predijeron mejor si una palabra en particular sería aprendida o no fueron: la frecuencia de la palabra en el texto, la frecuencia de la representación de la palabra en las ilustraciones, y la cantidad de redundancia en el texto circundante. El autor recomienda estudios futuros para investigar con más detalle los beneficios obtenidos de historias leídas en voz alta, y para hacer más claros los factores que rinden diferencias en el interés de los niños por las historias.

Wortschatzerwerb durch Geschichtenhören

IN ZWEI EXPERIMENTEN lasen Klassenlehrer aus Neuseeland Vorschulkindern Geschichten vor und führten vorher und nachher Tests durch, um den Umfang des Wortschatzes zu messen, den die Kinder sich anhand des Vorlesens angeeignet hatten. Die Resultate zeigten, daß das Vorlesen von Geschichten einen beträchtlichen Anteil am Wortschatzerwerb ausmachte—ungeachtet dessen, ob während des Vorlesens seitens der Lehrer Erklärungen gegeben wurden oder nicht. In der ersten Studie zeigten sieben Unterrichtsklassen mit Kindern im Alter von sieben Jahren nach dem Vorlesen einer Geschichte einen Wortschatzzuwachs von 15%, ohne daß Erklärungen seitens der Lehrer erfolgten. In der zweiten Studie wurde gleichfalls eine Geschichte vorgelesen. Drei Klassen Achtjähriger, denen keine Erklärungen gegeben wurden, zeigten einen Zuwachs von 15%, und drei Klassen, denen Erklärungen gegeben wurden, zeigten einen Zuwachs von 40%. Im Vergleich dazu zeigten dieselben Gruppen einen Zuwachs von weniger als 50% dieser Werte beim Vorlesen einer zweiten Geschichte, die unterschiedliche Eigenschaften besaß. Eine nachfolgende Untersuchung zeigte, daß dieses einmalige Vokabellernen von relativer Beständigkeit war, und daß Kinder mit niedrigen Ergebnissen genauso viel lernten wie Kinder mit hohen Ergebnissen. Des weiteren waren die Eigenschaften, die am besten vorhersagten, ob ein bestimmtes Wort erlernt würde, folgende: Häufigkeit des Wortes in der Geschichte, Darstellung des Wortes in Bildern und die Höhe der Redundanz im wortumgebenden Kontext. Der Verfasser schlägt vor, daß zusätzliche Studien durchgeführt werden, um die Vorteile des Geschichtenlesens weiter zu untersuchen und um die Faktoren, die bei den Kindern ein unterschiedlich starkes Interesse für verschiedenartige Geschichten hervorrufen, klar herauszustellen.

Story reading to children is almost universally praised as an activity, but rarely researched beyond the age of 6. Studies of early readers (Chomsky, 1979; Clark, 1976; Durkin, 1966; Teale, 1978; Wells, 1986) have consistently shown that children who have been read to regularly in their preschool years make rapid strides in their reading and language development at school. A few studies (Cohen, 1968; Elley, 1980; Elley & Mangubhai, 1983; Feitelson, Kita, & Goldstein, 1986; Ricketts, 1982) have shown that reading aloud regularly to students at the elementary school level, in a context of shared reading or recreational reading, also produces measurable and sometimes dramatic gains in reading and listening skills. However, few studies have attempted to demonstrate the specific language that children learn from listening to particular stories read aloud. The two studies presented here were designed to assess one of the potential benefits of stories, the acquisition of new vocabulary.

Those who have observed children listening to an absorbing story have often been impressed with the quality and persistence of their attention, surely an important ingredient in any learning context. Reading stories aloud is not yet a domain where theorists have promoted elegant models, but a little speculation could lead to productive links with existing theories. For instance, typical stories are characterized by such factors as novelty, humor, conflict, and surprise. And these are precisely the variables that are calculated to raise arousal levels (Berlyne, 1960) and to produce enough intrinsic motivation for children to maintain attention and to learn readily from context. Alternatively, a levels-of-processing model (Cermak & Craik, 1979) would predict that children will process the language at deeper levels if they focus on meaning, rather than form. Thus, children will learn more and retain more from an activity like hearing entertaining stories read aloud than from working at contrived exercises. In fact, Murphy and Brown (1975) showed that for 4- and 5-year-old children memory is a function of the depth of their comprehension. They learn

incidental information readily when processing is deep, but have difficulty with deliberate memorizing tasks.

Whereas the research on story reading aloud is thin, and theoretical frameworks hard to find, there is much didactic literature on the benefits of stories when read by children themselves. Researchers have claimed that from stories children learn concepts about print, and extend their knowledge of their world; they develop high expectations about print, a more vivid imagination, and a lasting appreciation of literature; they learn the language of books, and acquire greater understanding of the syntax of their language; and they gain valuable practice at handling decontextualized language (Butler, 1979; Harris & Sipay, 1975; Holdaway, 1979). Some of these claims are harder to demonstrate empirically than others, particularly in contexts in which children are exposed to a wide variety of strong linguistic influences outside the school. However, one potential benefit of story reading that does lend itself to empirical study is the extent of children's gains in vocabulary, from single or multiple readings of particular stories read aloud. The current studies were designed to assess such gains in vocabulary with 7- and 8-year-old children.

Following a series of long-term evaluation studies in the South Pacific Islands (Elley, 1980; Elley & Mangubhai, 1983), which showed rapid growth in the English language by elementary school students exposed to many storybooks, I set out to clarify the factors which brought about these desirable changes. As a start, I conducted a series of three experimental pilot projects, using a single book: *Three Ducks Went Wandering* (Roy, 1979). This book was read aloud to 9- to 11-year-old children, in intact classes, under deliberately varied conditions. The subjects were all Pacific Islands children who were learning English as their second language, after having achieved initial literacy in their home language.

Their understanding of words likely to be unfamiliar was tested before and after the readings using multiple-choice questions, which

placed the target words in contexts different from the story context. Gains in children's knowledge of word meanings from pretest to posttest were calculated for each word. In all cases, the gain in word knowledge was surprisingly large. Given *three* readings of the story over a week, *without* any explanation of the target words, the first class showed a mean gain of 19 percent in their understanding of words; given *one* reading, *with* brief explanation of target words as they were read, the second class produced a mean gain of 20 percent; and given *three* readings, *as well as* brief explanations, the third class achieved a mean gain of 33 percent. By contrast, on control words inserted in the tests, but not encountered in the stories, the children showed no gain at all.

Clearly, much language was being learned incidentally as the children listened. However, these pilot studies were all conducted by one researcher, with one book, with small samples, and with children learning a second language. Obviously, further study was warranted under different and more controlled conditions. Therefore, two larger investigations were conducted in New Zealand schools, as described below.

EXPERIMENT 1

The purpose of the first study was to replicate with a large sample of New Zealand children the small pilot investigations carried out on Pacific Islands children. A new book was selected, and the readings were conducted by the students' own teachers. The guiding hypothesis was that children would learn the meanings of many new words that they heard in stories read aloud—without explanation of such words. Each story was read three times, over 7 days, as it is quite common for popular stories to be read several times at this age level. Moreover, there would be more likelihood of obtaining measurable effects using a repeated reading strategy. If such effects were found, an additional purpose of the study was to attempt to identify word-related and subject-related variables that correlated with vocabulary gain.

Method

Subjects

One hundred sixty-eight 7-year-old pupils from seven classrooms in seven schools in Christchurch, New Zealand, participated in the study. The children spoke English as their first language, and came from a cross-section of urban and suburban backgrounds. All teachers followed the same experimental procedures, and read to the children in their own classrooms. Due to absence on one testing occasion, 11 children were dropped from the study, leaving a total of 157.

Materials

All seven participating teachers had at least 7 years' teaching experience. These teachers were not the children's regular classroom teachers, but were teachers at the same schools. They assisted in planning the project, in the selection of a suitable storybook, and in the designing and pilot testing of the vocabulary test. The book chosen to be read to the classes, *Gumdrop at Sea* by Val Biro (1983), was considered appropriate because it had been published recently, it had an appealing story and many attractive pictures, and it used at least 20 words thought to be unknown by the target population. The story took approximately 9 minutes to read at a normal pace.

To assess the pupils' understanding of the difficult words in the story, we prepared a multiple-choice vocabulary test and pilot-tested it on 7- and 8-year-olds. Half the words were presented as picture vocabulary items, in which the teacher read the word aloud and pupils were to select, out of four pictures presented, the one that matched most closely the meaning of the target word. The other half of the words were tested by word synonym items. Examples of both types are given in Appendix 1. Although the test focused on key words in the story, it did require students to decontextualize their knowledge, as the story context was not used in testing knowledge of the words.

Results of the pilot testing showed that several of the target words were widely known by

children of this age group. Therefore, to ensure that there were enough difficult words, 4 of the initially selected target words in the story were replaced with synonyms of lower word frequency, which were less likely to be familiar to these children: *Direct*, *impatient*, *squeezed*, and *disaster* were replaced with *regulate*, *irritated*, *crammed*, and *calamity*. The final test contained 20 vocabulary items, 10 picture items and 10 verbal synonym items, with 4 options for each item.

Procedure

After pilot testing was completed, all seven teachers agreed on standardized procedures for testing and for reading the story aloud. The test was administered initially as a pretest, 7 days before the first reading. The story was then read three times to each class over a period of 1 week, the first time by the participating teachers, the second time by the regular class teachers, and the third time by the participating teachers again. In the first reading, the teacher led an initial discussion of the title, cover picture, and main characters. No definition or explanation was given of any target word during the reading, or at any time. The pictures in the book were shown briefly as the story progressed. The second reading, 3 days later, was conducted by the pupils' own classroom teacher, following the same pattern. The third reading, on the 7th day, was given by the first teacher, who again showed the pictures, but also allowed some time for predictions and remarks by the children. The same 20-item test was given again as a posttest, without warning, 2 days after the third reading. No control group was used in this study, as the earlier pilot projects had shown no effects attributable to the administration of a pretest.

Data analysis

Additional analyses were carried out to see whether certain word-related and subject-related factors would correlate with any vocabulary gain that was found. First, the data were analyzed for six word-related variables hypothesized to affect vocabulary gain. Research with silent reading has shown that the number of ex-

posures to a word is a strong variable in vocabulary acquisition (Jenkins, Stein, & Wysocki, 1984; Mezynski, 1983; Stahl and Fairbanks, 1986). Therefore, the first variable predicted to explain some of the variance in this study was the *number of text occurrences*. Likewise, most research on vocabulary acquisition suggests the importance of the pictorial and verbal contexts in providing cues to lead the student to a reasonable hypothesis about the meaning of an unfamiliar word (Carnine, Kameenui, & Coyle, 1984; Sternberg, Powell, & Kaye, 1983). Thus, the second variable analyzed was the *number of times each word was pictured* in the story. Third, the *helpfulness of the verbal meaning cues* was estimated, by having three teachers not participating in the study rate on a 6-point scale the extent to which the meaning of each target word could be inferred from its context in the story. In addition, each word was rated by the same teachers for three more variables: *importance to the development of the plot*, *vividness* (how vividly the word could be visualized), and the likely *familiarity of the concept* for the subject population.

In addition, for the purpose of an analysis by subjects' ability level, the sample was categorized into four groups of equal size on the basis of their pretest scores. The mean gain for pupils in each ability group was calculated in order to discover whether those who started with low vocabulary knowledge improved as much as those who started from a higher baseline ability. To reduce any possible ceiling effects, the five pupils who scored more than 75 percent correct on the pretest were excluded from these groups.

Results

Table 1 shows that the children scored higher on most target words on the posttest than on the pretest, for a mean increase of 15.4 percent overall. Interestingly, a closer analysis showed that the pattern for each class was very similar, with a mean gain of between 13 percent and 21 percent in each class. On a few words, such as *regulated*, *parasol*, *muffled*, and *May Day*, they achieved gains of more than 30 per-

Table 1 Number and percentage of 7-year-old children who acquired knowledge of vocabulary from *Gumdrop at Sea* story

Word	Pretest		Posttest		Gain %
	No.	%	No.	%	
regulated	37	23.6	87	55.4	31.8
parasol	57	36.3	117	74.5	38.2
tilted	75	47.8	107	68.2	20.4
crammed	82	52.2	100	63.7	11.5
anguish	74	47.1	81	51.6	4.5
calamity	110	70.1	133	84.7	14.6
irritated	84	53.5	120	76.4	22.9
disintegrated	52	33.1	75	47.8	14.7
scan the horizon	88	56.1	112	71.3	15.2
plunged	75	47.8	101	64.3	16.5
hesitate	57	36.3	65	41.4	5.1
muffled	33	21.0	87	55.4	34.4
May Day	50	31.8	115	73.2	41.4
decided	123	78.3	129	82.2	3.9
probably	96	61.1	98	62.4	1.3
frequently	27	17.2	56	35.7	18.5
flowing	73	46.5	73	46.5	0.0
unfortunately	51	32.5	70	44.6	12.1
dismayed	100	63.7	88	56.1	-7.6
big end	78	49.7	112	71.3	21.6
Mean		45.9		61.3	15.4

Note. $N = 157$.

cent, whereas on others, such as *anguish*, *probably*, *flowing*, and *dismayed*, they showed little or no gain. These differences between words were examined next.

The six word-related variables hypothesized to affect vocabulary gain were entered into a multiple regression analysis, using mean percentage gain as the criterion variable. Table 2 shows that three of the six hypothesized factors showed significant positive correlations with the subjects' mean gain for each word, and the correlations for all six were positive. The multiple correlation, which included the first four variables (in the order in which they are presented in Table 2), was .73 (or 53% of the variance accounted for). Apparently, the words that were most readily learned in this story were those for which the surrounding context was helpful, those that occurred more than once in the story, and those that were illustrated in at least one picture. Of course, because of the

small sample of words involved, these results are somewhat tentative.

Finally, the vocabulary gain was calculated for the four ability groups. Table 3 shows that the low group showed the most gain, and there was little difference between the three highest groups. No tests of significance were undertaken, as the influence of regression effects and a lingering ceiling effect could not be discounted. Nevertheless, the apparent reversal of the rich-get-richer syndrome was encouraging: The low-scoring students gained at least as much in vocabulary knowledge as their more knowledgeable peers.

Discussion

The results of Experiment 1 confirm the findings of the first pilot study conducted in Fiji with a different book and different children,

Table 2 Pearson correlations between vocabulary gain score for each word and word-related variables for *Gumdrop at Sea* story

Variable	Simple <i>r</i>	<i>M</i>	<i>SD</i>
No. of text occurrences	.43*	1.30	0.56
No. of pictorial occurrences	.38*	0.65	0.83
Helpfulness of meaning cues	.68**	4.45	1.34
Importance to plot	.35	3.30	1.73
Vividness	.32	3.65	2.10
Familiarity of concept	.10	2.15	0.79
Multiple <i>R</i>	.73**		

Note. *N* = 20 words. **p* < .05 ***p* < .01 (one-tailed test)

who were of a different age and a different language background (English). In both this study and the earlier one, the net gain in words learned, after three readings over 1 week, was between 15 percent and 20 percent. Of course, there may well have been learning of other words not included in the tests. However, of the 20 words tested, the typical child learned about 3 that were not known before, without any attempted explanation by the teachers. Many cases of partial learning also undoubtedly occurred.

Stories read aloud in this way thus appear to offer a potential source for ready vocabulary acquisition. The analysis of what kinds of words were most likely to be learned tends to confirm the finding of silent reading studies that repeated exposure and helpful context are significant factors in vocabulary acquisition.

There are a number of basic limitations in this study. No control group was used, as the Pacific Islands pilot studies indicated that the pretests did not affect children's performance on the posttests. Nevertheless, the design would have been tighter if control groups had been used. Generalizability was limited because of the use of only one book, and the permanence of the new learning was not assessed, as the study took place too late in the school year. Therefore, a second study was undertaken to address these limitations by using different books, under different teaching conditions, with a more elaborate design.

EXPERIMENT 2

The purposes of the second investigation were fourfold: First, I wanted to confirm the phenomenon of incidental vocabulary learning found in Experiment 1 with two different storybooks. The second purpose was to estimate the effects of teacher explanation of unfamiliar words, over and above the effects of story reading alone. The third purpose was to clarify further the contribution of the word-related and subject-related variables investigated in Experiment 1 to incidental learning from context. Fourth, I wanted to investigate the permanence of any learning that occurred.

Method

Subjects

Six classes of 8-year-old children from a cross-section of six schools in Christchurch (New Zealand) participated in the second study. The six teachers of these classes were all experienced teachers, and were teaching 8-year-old children at the time of the study. The project began with 140 children in the two experimental groups, but 13 were omitted due to absence, either for a test or for one reading of a story. This left a sample of 127 pupils in the two experimental groups. In addition, 51 children of similar age and background, from two of the schools, were included as a control group. In

Table 3 Percentage gain scores by students' ability for vocabulary from *Gumdrop at Sea* story

Ability group	Pretest <i>M</i>	Posttest <i>M</i>	Gain <i>M</i>
High	66.2	81.2	15.0
High medium	51.0	66.8	15.8
Low medium	39.8	55.2	15.4
Low	26.2	48.8	22.6

Note. $n = 38$ in each group.

Group A there were 72 children in three classes, in Group B there were 55 children in three classes, and in Group C (the control group) there were 51 children in two classes.

Materials

Two contrasting storybooks were selected by the teachers, in consultation with me. The first, *Rapscallion Jones*, was a frivolous animal story by James Marshall (1983). The second book, *The White Crane*, was a translated Japanese folk tale adapted by Helen Smith (1983). This book had a more serious tone, and was particularly well illustrated, with large, attractive pictures. Both were newly published, were unfamiliar to the pupils, and included enough difficult words for the purposes of the experiment. No adjustments were made to the text of either book.

A 36-item multiple-choice vocabulary pretest was prepared to test knowledge of difficult words from both stories. In addition, 5 control words that did not occur in either story were scattered through the test to provide an additional check on the possibility of learning from the pretest. As in Experiment 1, the items were a mixture of pictorial items (23) and verbal synonym items (18). And, as in the first study, the words were presented on the test in contexts different from those of the stories. The same 41 items were administered after the reading, but as two separate posttests, one for each story. Each posttest was administered 1 week after the respective book was read to the experimental

groups. Finally, the same two posttests were again administered as the delayed posttests, 3 months later.

Procedure

An experimental design was devised to compare the effects of reading the stories aloud with and without explanation of unfamiliar words. In the first treatment, *reading with explanation*, the teachers read the stories and explained the meanings of target words as they occurred. The teachers were given guidelines in which they were directed to explain each target word in one of three ways as they read. First, the teacher could use a synonymous phrase. For example, the teacher might explain *pressing engagements* by giving the synonym *important things to do*. Second, the teacher could explain a word by role-playing; for example, he or she might read the word *pizzazz* with an appropriate tone of voice and demeanor to help connote the meaning. Third, the teacher could explain a word by pointing to a picture; for example, the word *roadster* was explained and illustrated by pointing to the picture of the car in the book.

The second treatment was *reading without explanation*. This treatment consisted of a straight, unembellished reading of the story.

These two treatments were crossed with the two stories for the two experimental groups. Group A first heard *Rapscallion Jones* read three times over a period of 7 days, with explanation of vocabulary. Group B heard the same story read three times over the same week, but without any explanation of the target words. Pictures were shown briefly as the story unfolded in both groups. One week later, all groups took the posttest for *Rapscallion Jones*. For the second story, *The White Crane*, the pattern was reversed: Group A heard it without explanation, and Group B heard it with explanation. Again, it was read three times, and the posttest occurred 7 days after the last reading.

Group C (the control group) took all tests at the same times as Groups A and B but heard neither story. After 3 months, during which time none of the classes heard either story, the delayed posttests were given, without warning, to one class in Group A and one class in Group

B, in order to check the permanence of the learning. The Group A class received the posttest on *Rapscallion Jones*; the Group B class received the posttest on *The White Crane*.

Data analysis

As in Experiment 1, additional analyses were carried out to see whether certain word-related and subject-related factors would correlate with any vocabulary gain that was found. First, the data were analyzed for the same six word-related variables that were measured in Experiment 1: the number of text occurrences, the number of times each word was pictured in the story, the helpfulness of the verbal meaning cues, the importance of the word to the development of the plot, the vividness of the word, and the likely familiarity of the concept for the subject population. For the first two variables, a simple count was made. All six participating teachers rated each word, on a 3-point scale, on each of the last four variables, and the mean of their ratings was used in the analysis. A check on the reliability of the teachers' ratings showed that of the 168 ratings made of the helpfulness of the meaning cues, there was complete consensus in 66 percent of the cases; the remainder differed by 1 point from the modal rating on the 3-point scale. Expressed another way, the mean of the standard deviations for each of the 24 words rated was only 0.39 on the 3-point scale. For example, the raters reached complete consensus on the helpfulness of the following sentence context, which was given a rating of 1 (low):

They were enjoying their *meagre* meal.

They also reached close consensus on the following sentence context, which was given a mean rating of 2.8 (high):

“Lend an ear, lads, while I tell you a tale”

In addition, as in Experiment 1, the vocabulary gains were examined by baseline ability level of the children. This analysis included all the children in the two experimental groups, minus the 4 top scorers (to reduce ceiling effects).

The 124 children remaining were divided according to their pretest scores into 4 equal groups of 31, and the mean vocabulary gain was calculated for each group.

Results

The analysis of results was conducted separately for each story. For *Rapscallion Jones*, the reading without explanation produced findings very similar to those of Experiment 1 (see Table 4). The mean vocabulary gain from pretest to posttest after three readings without explanation (Group B) was 14.8 percent, a figure which was almost identical to that for *Gumdrop at Sea* (Experiment 1). For the group that heard the reading with explanation (Group A), however, the overall gain was much larger, 39.9 percent. Moreover, for 7 of the 20 target words in the story, over 85 percent of the children in Group A achieved the correct answer on the posttest. By contrast, the control group, Group C, showed an improvement of less than 2 percent. Finally, the mean gain on the 5 control words was close to zero for all groups.

Results for the second story, *The White Crane*, were much less impressive. For the group that heard the reading without explanation, the overall vocabulary gain was only 4.4 percent, although on 3 of the 16 words they did show a gain of more than 15 percent (*abundance*, *framed*, and *gasp*). Group B, which heard the reading with explanation, showed a gain in vocabulary of only 17.1 percent. The pattern of results was thus similar to the findings for the first story, but the actual gains in vocabulary were less than half.

Next, the six word-related variables hypothesized to affect vocabulary gain were entered into a multiple regression analysis with mean percentage gain for each word on *Rapscallion Jones*. Table 5 shows the results. All six variables showed a significant positive correlation with the mean vocabulary gain for each word, and together produced a multiple correlation of .74. The table shows that the number of occurrences in the text and in pictures produced

Table 4 Percentage of 8-year-old children who acquired knowledge of vocabulary from *Rapscallion Jones* story

Word	Group A (with explanation)			Group B (no explanation)		
	Pretest	Posttest	Gain	Pretest	Posttest	Gain
Picture vocabulary items						
roadster	42	89	47	38	70	32
dingy	57	88	31	64	82	18
lolling	40	76	36	39	54	15
strewn	14	35	21	7	7	0
debonair	21	74	53	43	46	3
scheming	33	57	24	45	50	5
Verbal synonym items						
summoned	15	47	32	32	41	9
pressing engagements	44	88	44	39	64	25
in his prime	46	67	21	43	48	5
ne'er-do-wells	14	93	79	5	59	54
spin	49	81	32	61	82	21
outsmarted	53	79	37	61	68	7
redistribute	0	40	40	7	4	-3
lend an ear	72	85	13	64	88	24
goner	43	82	39	52	66	14
pizzazz	24	92	68	25	79	54
reform	50	63	13	57	61	4
rapscallion	22	86	64	34	39	5
startling	19	72	53	34	29	-5
over-indulged	7	58	51	48	55	7
Mean	33	73	40	40	55	15

Note. Group A, $n = 72$; Group B, $n = 55$.

the two highest correlations (.60, .55), and the importance to the plot and the helpfulness of the meaning cues produced the next highest. These findings are somewhat similar to those of Experiment 1: The multiple R differs by only .01 from that for Experiment 1, and the same three variables were among the four largest sources of variance in each study: strength of meaning cues, number of occurrences, and number of times illustrated.

Post hoc analysis also showed a tendency for children to achieve the highest gains on nouns, and less improvement on adjectives and verbs. From the reading without discussion, the children improved by an average of 24.2 percent on the nouns from either book, whereas on the adjectives and verbs they showed a mean gain of only 5.9 percent. For example, on the nouns

roadster, *pizzazz*, and *ne'er-do-wells* they showed mean gains of more than 30 percent; whereas on the adjectives and verbs *remote*, *strewn*, and *melancholy* they showed no gain at all.

The vocabulary gain was also analyzed by subjects' baseline ability. The mean scores on the pretest and posttest and mean gain for each of the four ability groups are given in Table 6. As in Experiment 1, the lowest group improved more than the other three groups, and the highest group improved the least. Once again, it is possible that regression effects and ceiling effects might have contributed to this trend, but as there was ample room for improvement on the posttest for all students in the three higher groups, these effects were not large enough to alter the conclusion that the low-scoring students profited at least as much as the others.

Table 5 Pearson correlations between vocabulary gain score for each word and word-related variables for *Rapscallion Jones* story, read without explanation

Variable	Simple <i>r</i>	<i>M</i>	<i>SD</i>
No. of text occurrences	.60**	1.32	0.57
No. of pictorial occurrences	.55**	0.63	1.13
Helpfulness of meaning cues	.41*	6.89	1.71
Importance to plot	.42*	3.37	1.63
Vividness	.39*	3.79	1.54
Familiarity of concept	.39*	1.95	0.69
Multiple <i>R</i>	.74**		

Note. *N* = 19 words. **p* < .05 ***p* < .01 (one-tailed test)

Table 6 Percentage gain scores by students' ability for vocabulary from *Rapscallion Jones* story

Ability group	Pretest <i>M</i>	Posttest <i>M</i>	Gain <i>M</i>
High	63.9	79.3	15.4
High medium	51.6	70.6	19.0
Low medium	44.7	64.1	19.4
Low	34.8	57.7	22.9

Note. *n* = 31 in each group.

The delayed posttests were administered to one class in Group A and one class in Group B. The class that was retested on *Rapscallion Jones* showed a raw score mean of 13.55 on the delayed posttest, a drop of only 0.70 points from the mean score on the posttest (14.25). The other class, tested on *The White Crane*, received a mean score of 12.93 on the delayed posttest, a drop of only 0.40 of a raw score point from the mean posttest score (13.33). Thus, the decline in each case was an almost negligible 2-3 percent.

GENERAL DISCUSSION

The findings from both experiments support the assumption that young children can learn new vocabulary incidentally from having illustrated storybooks read to them. As in previous studies, teachers' additional explanations of unknown words as they are encountered can more than double such vocabulary gains. Furthermore, the evidence from these studies indicates that students who start out with less vocabulary knowledge gain at least as much from the readings as the other students, and that

the learning is relatively permanent. Both studies also suggest several identifiable features in the stories that appear to account for a large portion of variance in the likelihood that children will learn a certain word: the frequency of occurrence of the word in the story, the helpfulness of the context, and the frequency of occurrence of the word in pictorial representation.

However, several questions remain unanswered. The contrasting results obtained for the two stories in Experiment 2 raises the specter of story specificity, a problem that has also confused interpretation of the findings from research on vocabulary learning during silent reading (Nagy, Herman, & Anderson, 1985). Other than the order in which they were presented, the two stories in Experiment 2 were read under identical conditions. Apparently, some features of stories are critical in determining whether they produce effective language learning. Which are the critical story features?

Clearly, for new learning to occur, the text must contain some vocabulary beyond the pupils' present understanding. Moreover, the unfamiliar words should be supported by a helpful verbal or pictorial context, and there should normally be more than one exposure to each word. As each story in the current investigation was read three times, over 1 week, it is not possible to generalize about other levels of frequency. However, the number of occurrences of a word within the story correlated well with the gain score in each experiment (.43 and .60), suggesting that frequency of exposure is a key

variable (see also Stahl & Fairbanks, 1986; Sternberg, 1984). Thus, one possible reason children learned less vocabulary from *The White Crane* may have been that only 2 of the target words occurred more than once in the story. However, in the other story in Experiment 2, only 4 words occurred more than once, so the contrast is not very great. Thus, explanations must be sought elsewhere.

One distinguishing feature of *The White Crane* mentioned by several participating teachers was the "lack of involvement" of their children with this story. The setting of the story was a severe winter in a distant place, Japan; the lifestyle was foreign; the main characters were probably not easy for children to identify with; and there was little action and no humor. Certainly there were elements of suspense and surprise, but the plot might have been too incredible for many pupils to follow, and these elements may also have lost their force in repeated readings.

A general hypothesis that would explain the differences between the results for these stories requires a motivational theory more sophisticated than those currently in existence. Of the constructs cited in the literature, the arousal theory of Berlyne (1960) may well prove most useful. For children to derive new word meanings from context surely requires persistent attention to the meaning of the stories. It is conceivable, as Berlyne maintains, that attention levels are greatest when they are aroused by such "collative variables" as novelty, humor, conflict, suspense, incongruity, vividness, and the like. Stories like *Gumdrop at Sea* and *Rapscallion Jones* were well endowed with such features, and these stories certainly kept the children's attention. For instance, in the first story, the engine of Gumdrop (a car) exploded, a yacht capsized, everyone fell in the water, Gumdrop was caught in the rising tide, and the story ended happily as a new engine was fortuitously discovered for Gumdrop. *Rapscallion Jones* was similarly entertaining. Rapscallion, a fox, was portrayed as a figure of fun, too proud to work for his living. He told far-fetched stories, pretended to be a doctor, and had a sick crocodile jumping on his bed while he (Raps-

callion) rifled the refrigerator. However, he had his come-uppance when he nearly died of a fever, and he then confessed his sins to the minister. Again, there was a pleasing resolution to the story. Thus, both stories had many features to attract and hold children's attention.

What we need is a model that could relate such sources of attention in stories to the child's depth of processing, extent of elaboration, and incidental learning, and to contextual variables. Such a model might help clarify the conditions under which students will benefit from particular storybook experiences. One suspects, for instance, that the pictures in these stories may have provoked children to generate more elaborated networks of meaning, which would enhance learning and retention of the content of the story (Anderson & Reder, 1979). Some support for such a model might be found in the tradition of research that has postulated intensity of affect as a key influence in verbal retention (Dutta & Kanungo, 1975; Weiner, 1966) and from studies of the newly defined concept of text-based interest, or interestingness, in discourse processing (Hidi & Baird, 1986).

Implications

The two experiments outlined above provide evidence that reading stories aloud to children is a significant source of vocabulary acquisition, that teachers' additional explanation of words as they are read can more than double such gains, that the new learning is relatively permanent, and that students who score low on vocabulary at the outset can gain at least as much as students who score higher. Each of these findings has significant implications. School systems, teachers, and parents vary considerably in the emphasis they place on story reading to children. New Zealand elementary school teachers spend approximately 30 minutes each day reading aloud (Elley, 1985). But a recent survey of Singapore schools (Ng, 1983) showed that virtually no teachers in the first three grades ever did so, and pupils in the South Pacific islands rarely heard stories read aloud until recently (Elley & Mangubhai, 1983). The pattern in U.S. schools and kindergartens is variable (Mason & Allen, 1986). If an appeal-

ing 8- to 10-minute story, read three times, with only brief explanation of word meanings, can produce 40% gains in vocabulary for typical children, there are clearly good linguistic grounds for increasing this activity, over and above the recreational and cultural reasons for doing so.

These two studies have also highlighted a fruitful field for further research. There is potential for numerous related studies on language acquisition from story reading, at varying age levels, with different kinds of stories, with and without pictures, and with varied numbers and forms of presentation. Follow-up interviews would be helpful in probing children's misconceptions and their level of understanding, and measures of comprehension and syntax should be used as dependent variables to assess the degree of transfer of the new knowledge gained in this way.

Many teachers and parents have known intuitively of the numerous benefits of story reading. It is reassuring to discover empirical evidence of one of the advantages of story reading, the expansion of children's vocabulary. To maximize such benefits, more research is needed to help determine which characteristics of stories are critical in contributing to children's learning.

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APPENDIX

Sample questions used in pretests and posttests

I. Picture-type questions

Put a cross on the picture that shows *chopping*.



Put a cross on the picture that shows *dingy*.



Put a cross on the picture that shows *parasol*.



II. Verbal synonyms

Make a circle around the word that means the same as the underlined word.

Example: The horse was very fast: quick slow huge tiny

1. We summoned the teacher. called told stared at clapped

2. Have you any pressing engagements?

important
things
to do

close
friends

clean
clothes

physical
exercises
to do