The differential effect of storybook reading on preschoolers' acquisition of expressive and receptive vocabulary*

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ABSTRACT

The present study was conducted to assess the effect of didactic techniques used during storybook reading on young children's acquisition of new vocabulary introduced in storybooks. Thirty children for each group of three- and four-year-old children were read one storybook individually. The study included three storybook reading conditions: single-reading, repeated-reading and questioning. In both the repeated-reading and the questioning conditions, the storybook was read three times. Children in the questioning condition were asked, during each reading of the storybook, to label target items with the novel words. Listening to multiple readings of a storybook facilitated children's acquisition of expressive and receptive vocabulary, whereas answering questions during the multiple readings was more helpful to the acquisition of expressive than receptive vocabulary. These findings suggest that, under certain conditions, didactic techniques used by adults have differential effects on preschoolers' receptive and expressive vocabulary.

INTRODUCTION

Children acquire vocabulary very rapidly during the preschool years. In fact, it is estimated that by the time they are six years of age, English-speaking children will know approximately 10,000 words (Anglin, 1993). Sénéchal, LeFevre, Hudson & Lawson (1996) have argued that direct teaching cannot account for such rapid growth in word learning. Thus, it becomes of interest

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to document how and where children can learn words incidentally from their environment. Specifically, researchers are examining how children learn new vocabulary from exposure to language-rich experiences such as when parents read aloud to their children. The present study examined how young children can extract word meaning from repeated exposures to book reading events.

Investigations of the relation between storybook reading and children's language development are conducted to address two important and related issues. First, studies have been conducted to assess whether young children learn new vocabulary incidentally from listening to book reading episodes. Correlational studies have generally found that storybook reading is positively associated with vocabulary development (see the recent reviews of Scarborough & Dobrich, 1994; Bus, van IJzendoorn & Pelligrini, 1995). Second, studies are conducted to assess whether children learn more when adults read to them in an interactive manner. The assumption that interactive behaviours used by adults serve a didactic function and foster language acquisition has been supported by experimental evidence (e.g. Pemberton & Watkins, 1987; Eller, Pappas & Brown, 1988; Elley, 1989; Leung & Pikulski, 1990). For example, children whose middle-class parents had been trained to use behaviours such as open-ended questions and praise during book reading made more expressive vocabulary gains than children whose parents had not been trained (Whitehurst, Falco, Lonigan, Fischel, DeBaryshe, Valdez-Menchaca & Caufield, 1988; Arnold, Lonigan, Whitehurst & Epstein, 1994). In general, these studies have demonstrated that variations in adult reading behaviours can affect language development.

A closer examination of the research on the benefits of interactive behaviours during book reading revealed that the results accumulated so far hint at possible differential effects as a function of the outcome variables measured. For example, Whitehurst *et al*. (1988) have found effects of interactive reading for young children's acquisition of expressive but not receptive vocabulary. In contrast, Sénéchal & Cornell (1993) found that children could comprehend novel words but could not produce novel words after a single exposure to a storybook. The present research examined whether different kinds of book reading experiences have differential effects on three- and four-year-olds' acquisition of expressive and receptive vocabulary. As such, this research is an extension of the study by Sénéchal & Cornell (1993) in that it included multiple exposures to storybooks and it included younger participants.

To make predictions about the effect of various book reading behaviours, it is necessary to consider two points; first, how children extract word meanings from listening to book reading episodes, and second, how receptive and expressive vocabulary might make use of different memory processes.

First, Sénéchal (1993) conducted a step-by-step analysis of how children may learn novel words encountered in storybooks. To extract word meanings from context, the child must:

(1) encode and maintain a phonological representation of the novel word; (2) extract clues from the semantic, syntactic, and pictorial contexts to constrain memory search for potential meanings in the case of learning synonyms for known referents and to facilitate the inferential process in the case of novel referents; (3) select or construct a potentially appropriate meaning; (4) associate the inferred meaning with the phonological representation of the novel word; and (5) integrate and store the new knowledge with the existing knowledge base (Sénéchal, Thomas & Monker, 1995: 218).

There is considerable research on one component of this model, that is, how children select potential meanings for novel words. This research points to preferences or biases that constrain or facilitate the selection of potential meanings for novel words. Children, for example, may assume that an odd name must be associated with an unfamiliar object (e.g. Carey, 1978; Markman, 1989); children may also use syntactic information to make inferences about the meaning of verbs (e.g. Gleitman, 1990).

There is also considerable research examining how older children and adults learn vocabulary incidentally when reading texts (e.g. Sternberg & Powell, 1983; McKeown, 1985; Nagy, Anderson & Herman, 1987; Nagy & Scott, 1990). The proposed model, however, makes unique contributions in modelling how a variety of cognitive processes are interrelated to produce learning in young children who cannot read, and how certain processes may be enhanced by adult book reading behaviours.

The model described above highlights the basic memory processes of encoding, storage and retrieval. It is hypothesized that different types of interactions with books may enhance some of these memory processes. For example, repeated exposures to a book presumably facilitate encoding of the contextual information about novel words, providing more opportunities to associate and store the novel word with the appropriate referent. When adults provide children with opportunities to imitate novel information, however, adults may encourage retrieval of the stored information (Cornell, Sénéchal & Broda, 1988). For example, it is well documented that parents make use of questions to encourage labelling behaviours during book reading (e.g. Ninio & Bruner, 1978; Whitehurst *et al.*, 1988; Sénéchal, Cornell & Broda, 1995).

Second, receptive and expressive vocabulary acquisition can be likened to recognition and recall. That is, receptive vocabulary essentially entails a comparison between an external and an internal representation of a word whereas expressive vocabulary entails the additional process of reproducing

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the phonological representation of the word. If one accepts this analogy, then it is possible to make predictions about the impact of the different book reading experiences. Specifically, children's receptive vocabulary should be enhanced by listening to multiple renditions of a book because of the additional opportunities to encode, associate and store novel information. Answering labelling questions during repeated book reading may further facilitate the acquisition of receptive vocabulary because it provides children with the additional practice at retrieving the words. The pattern of results should be different for expressive vocabulary. That is, children may not produce novel words after repeated exposures to a book because the repeated exposures do not provide practice at retrieving the phonological representations of the words – a step considered crucial in expressive vocabulary acquisition. Answering labelling questions, however, should have a powerful effect on expressive vocabulary.

In essence, the labelling questions require children to imitate, that is, reproduce words heard in the narrative. The questions took the form of 'What is … ?' or 'where is … ?' because parents frequently encourage their children to respond in this manner. For example, Sénéchal, Cornell & Broda (1995) observed that what- and where-questions comprised 85 % of all questions posed by parents when reading to their twenty-seven-month-old child. This type of questioning behaviour is also interesting because it may provide some empirical evidence of the role of imitation in vocabulary acquisition. On a theoretical level, imitation has been rejected as an explanatory mechanism in language development (see Bohannon & Stanowicz, 1989 for a complete discussion). Imitation, however, is a ubiquitous behaviour: up to 40 % of children's speech is imitative (e.g. Nelson, Denninger, Bonvillian, Kaplan & Baker, 1983). The present research allowed an exploration of the role of imitation in the acquisition of novel words.

The present research was designed to assess whether specific reading behaviours would have a different impact on receptive and expressive vocabulary, and whether this differential impact changes with age. The present experiment allowed an empirical verification of the assertion by Whitehurst & DeBaryshe (1989) that receptive vocabulary might be more sensitive to variables such as frequency of language exposure, whereas expressive vocabulary might be more sensitive to variables such as imitation. In the present study, active responding was elicited by asking questions during book reading and exposure to novel words was manipulated by reading the book either once or three times.

METHODS

Subjects

Thirty children for each group of three- and four-year-olds completed the experiment. There were 15 boys and 15 girls in each age group, and gender was counterbalanced across reading conditions. The mean age for the three- and four-year-olds was 3;6 (S.D. = 5 mo) and 4;8 (S.D. = 3 mo), respectively. Children were recruited from daycares located in a middle-class neighbourhoods in Ottawa, Canada. Ninety percent of children were Caucasiuan and the remainder were Asian. Parents reported that they read to their children frequently (M = 7·1 times per week). Storybook reading frequency at home did not vary or interact with any of the independent variables ($Fs < 1$). Parents ($N = 32$) who agreed to provide information about socio-economic status were middle-class (M = 48·5 on the Hollingshead Four Factor Index; Hollingshead, 1975).

Picture-book and target words

The storybook used was the same as that used by Sénéchal & Cornell (1993).

> The picture-book, *Just in Passing* (Bonners, 1989), was selected because the story structure consisted of the repetition of a similar episode: a person saw someone yawn, and, in turn, yawned while being observed by still another person. This repetitive structure allowed the introduction of target items at relatively similar levels in the story structure and prevented target words from being differentially memorable because some might be more important to the narrative (Elley, 1989). (Sénéchal & Cornell, 1993: 364)

Ten target words, illustrated in the book, were selected with the assumption that they would not likely be known to preschool children. However, the target words represented concepts known to children. Thus, the learning task was to learn a novel label for a known concept. The target words (and familiar synonyms) were: *angling* (fishing), *fang* (tooth), *fedora* (hat), *gazing* (looking), *goblet* (cup), *infant* (baby), *sash* (window frame), *satchel* (purse), *skiff* (boat) and *vessel* (bucket). Each target word was introduced only once in the narrative.

Vocabulary tests

Learning was measured by tests of receptive and expressive vocabulary because these tests have been shown to be sensitive measures of vocabulary and have been used extensively in past research on learning from storybooks (Pemberton & Watkins, 1987; Elley, 1989; Robbins & Ehri, 1994; Sénéchal, Cornell & Broda, 1995). The receptive vocabulary test was constructed as in

Sénéchal & Cornell (1993). The procedure and the format of the material used for the receptive vocabulary test were similar to those used in the Peabody Picture Vocabulary Test–Revised (PPVT–R; Dunn & Dunn, 1981). That is, the test consisted of one plate for each target item. Each plate consisted of four illustrations, one representing the target item and three representing foils. The foils also represented items pictured in the book. For example, the plate for the label *infant* included a baby, a young girl, a woman and an elderly lady which were all represented in the book.

The illustrations used in the receptive vocabulary tests were different from the ones in the storybook. 'Hence, the children's task was to learn not only the new label but to be able to transfer the newly acquired labels to different representations of the referent' (Sénéchal & Cornell, 1993: 365). For example, the label *angling* was represented in the book by a picture of a man sitting in a dory and fishing, whereas it was represented in the test by a young girl sitting on a rock and fishing. Two versions of the receptive vocabulary test were constructed to minimize interference between the pretest and the post-test. The pretest and post-test version used the same illustrations for the target items, but varied the position of the four illustrations on each plate, the colour of the background cardboard, and the order of presentation of plates. The tests also included nine plates with illustrations of irrelevant but familiar objects (e.g. coat, ball and doll). This was to ensure that children could identify some illustrations during testing and thus maintain a reasonable level of interest in the task. In addition, different irrelevant items were interspersed throughout the pretest and the post-test to minimize interference among the tests. Finally, tests included three plates, representing familiar items, used to familiarize children with the testing procedure. For these three plates, the target items were *sock*, *chair* and *drinking*. In sum, the receptive vocabulary tests for the target items consisted of nineteen plates, that is, ten plates of target items and nine plates of familiar irrelevant items. Scoring was straightforward: a response was either correct or incorrect.

The expressive vocabulary test consisted of asking children to label the target items pictured in the storybook. The use of book illustrations as retrieved cues for recall was used successfully by Cornell *et al.* (1988). Book illustrations, instead of the drawings from the receptive vocabulary tests, were used as cues because Sénéchal & Cornell (1993) revealed that children used familiar synonyms instead of novel target words when asked to label the receptive vocabulary test pictures. It appears that children needed the context of the book to use the newly acquired words. Moreover, children were not pretested with an expressive vocabulary test because results of the pilot study revealed that none of the 14 four-year-old children tested used the target words in pretest, but these children labelled target items with familiar synonyms (even after being prompted to use another name). Children's use of target words during the expressive vocabulary test was scored with a

liberal criterion. For example, such mispronunciations as *fegara* for *fedora* and *shash* for *sash* were scored as correct responses.

Design

The present study included three experimental conditions: a single-reading, a repeated-reading, and a questioning condition. In the repeated-reading and the questioning conditions, the storybook was read three times. Children in the questioning condition were asked to label target items with novel words introduced during the reading of the storybook. The use of questions was not evaluated in a single-reading condition because Sénéchal & Cornell (1993) failed to find benefits due to questioning when the storybook was read only once.

The predictions for receptive and expressive vocabulary were tested with two planned orthogonal comparisons. First, performance in the single-reading condition was compared to performance in the two repeated-reading conditions (i.e. repeated-reading and questioning) to provide a test of the impact of multiple exposures on learning. Second, performance in the repeated-reading condition was compared to performance in the questioning condition to provide a test of the impact of active responding.

Procedure

All children were pretested for knowledge of target words, were then read the storybook and were finally post-tested for expressive and receptive knowledge. During each reading of the book, the experimenter pointed to the illustrations corresponding to each target word. Pointing, however, was not limited to target items – the experimenter could point to other illustrations in the course of reading the book. The book reading episodes were audio-recorded.

Children in the single-reading condition were tested individually in a single session lasting approximately 25 minutes. The activities occurred in the following order: the experimenter pretested children for receptive knowledge of target words, then read the text as presented in the storybook, and finally, post-tested children for expressive and receptive knowledge of targets. The procedure for the questioning and the repetitive conditions consisted of two sessions. In the first session, lasting 20 minutes, children were pretested for knowledge of target words with the receptive vocabulary test. Following pretesting, the experimenter read the storybook twice. The second reading was introduced by the experimenter saying that this was such a nice book that they should read it again. Children were asked whether they wanted to hear the story again: none of the children declined. In the repeated-reading condition, the experimenter read the text as presented. In

the questioning condition, the experimenter asked a what- or where-question after reading each target word in the narrative. For example, after reading the target item *angling*, the experimenter asked 'What is Arthur doing?' If children responded with the target word then the experimenter said 'O.K.' and continued reading the book. If children failed to use the target word, the experimenter requested 'Can you tell me the word I used when I was reading the book?' If children still did not use the target word, the experimenter labelled the target word. The questions were interspersed during the reading narrative (see Ninio & Bruner, 1978; Goodsitt, Raitan & Perlmutter, 1988; and Sénéchal, Thomas & Monker, 1995 for observational data showing that parents use labelling questions frequently). All children in the repeated-reading and the questioning conditions participated in a second session that occurred the following day. Children were read the story in the same manner as in the first session, and then were post-tested for expressive and receptive vocabulary. In all reading conditions, the experimenter listened attentively to children's comments. Moreover, children's queries, if any, were answered with variations of the prompt: 'That's interesting, what do you think?' Thus, although children's comments and queries were not directly encouraged, they were not discouraged.

In the expressive vocabulary test, children were asked to label the target items. If children answered with a synonym or with an irrelevant response, the experimenter asked 'What did I call this when I was reading the book?' The expressive vocabulary test was administered before the receptive vocabulary post-test to prevent children from hearing the experimenter name the target words. The procedure for the receptive vocabulary tests was the same as the PPVT–R, that is, children were asked to point to a named item. If children hesitated to respond or said that they did not know the word, the experimenter said that some of the words were hard but to try just the same. The experimenter did not proceed to the next plate until children made a selection. If children changed their selection, the experimenter recorded the children's last choice. Children were familiarized with the testing procedure with three plates representing familiar items.

RESULTS

Preliminary analyses indicated that there were no significant effects of gender on any of the dependent variables nor did gender interact with the independent variables, all ps > 0·14. Thus, further analyses were conducted without including this variable.

Children's correct answers on the receptive vocabulary pretest (M = 2·9, S.D. = 1·3) was slightly higher than chance performance (2·5 words), $t(59) = 2·55$, $p < 0·01$. Pretest performance, however, did not vary with age, reading condition, or interact with the two, all ps > 0·36, and pretest

performance was not related to post-test performance, $r = 0.21$, $p = 0.11$. Children's correct answers on the receptive vocabulary post-test (M = 4.5, s.d. = 1.9) was significantly superior to chance performance, $t(59) = 7.87$, $p < 0.01$. The analysis of covariance with the pretest scores as a covariate revealed a significant reading condition main effect for the receptive vocabulary post-test, $F(2, 53) = 11.83$, $MS_e = 2.50$, $p < 0.001$, but children's performance did not vary significantly with age or interact with age and reading condition, all ps > 0.08 (see Table 1). Two planned orthogonal

TABLE 1. *Mean number of words correct (and standard deviations) on the vocabulary tests for each reading condition*

	Vocabulary test		
	Receptive		
Reading condition	Pretest	Post-test	Expressive
Single reading	2.8 (1.3)	3.2 (1.5)	0.1 (0.5)
Repeated reading	3.3 (1.1)	4.6 (1.6)	0.9 (0.9)
Questioning	2.7 (1.4)	5.6 (1.9)	3.3 (1.9)

Note: The maximum number of words was 10.

comparisons were conducted on the means for post-test to assess the predicted effects of reading practice. As expected, children's performance in the repeated reading conditions (averaged over the repeated-reading and questioning conditions) was superior to children's performance in the single-reading condition, $F(1, 53) = 18.02$, $p < 0.001$. This comparison corresponded to a large effect size (ES) of 1.06. Children also learned more from answering questions during the three readings than from listening to three readings of the narrative, $F(1, 53) = 5.41$, $p < 0.02$. This comparison corresponded to a moderate ES of 0.54.

Children were asked to label book illustrations representing the ten target words; their mean scores on this expressive vocabulary post-test are reported in Table 1. The analysis of variance revealed significant age and reading condition main effects, Fs(1 and 2, 54) = 3.94 and 36.67, $MS_e = 1.53$, ps < 0.05 and 0.001, respectively. The four-year-olds (M = 1.7, s.d. = 1.9) produced more words than the three-year-olds (M = 1.1, s.d. = 1.8). Age and reading condition, however, did not interact. The two planned orthogonal contrasts were conducted to assess the impact of reading conditions. Children produced more words after three readings of the book than after a single reading, $F(1, 54) = 34.04$, $p < 0.001$, and ES = 1.50. In fact, very few words were produced after a single reading. As predicted, children produced

TABLE 2. *Proportion* (*and frequency*) *of words correctly identified as a function of vocabulary test*

| | Vocabulary test | | |
| | Receptive | | |
Word	Pretest	Post-test	Expressive
angling	0·030 (18)	0·047 (28)	0·010 (6)
fang	0·025 (15)	0·047 (28)	0·017 (10)
fedora	0·023 (14)	0·038 (23)	0·015 (9)
gazing	0·035 (21)	0·038 (23)	0·032 (19)
goblet	0·038 (23)	0·043 (26)	0·022 (13)
infant	0·053 (32)	0·060 (36)	0·015 (9)
sash	0·015 (9)	0·045 (27)	0·017 (10)
satchel	0·018 (11)	0·045 (27)	0·012 (7)
skiff	0·032 (19)	0·047 (28)	0·002 (1)
vessel	0·024 (13)	0·036 (22)	0·002 (1)

Note: Proportions were computed by dividing the frequency of correct identification for that word by the total number of words (10 words × 60 children = 600 words for the sample).

more words in the questioning than in the repeated-readings condition, $F(1, 54) = 39·29$, $p < 0·001$, and ES $= 1·75$.

The results of the planned comparisons show that repeated readings as well as questioning during reading are beneficial for both receptive and expressive vocabulary. To test whether the magnitude of the effects varied across language measures, the effect sizes for the comparisons were compared. This analysis revealed that repeated readings produced similar effects for both receptive and expressive vocabulary, $t(57) = 1·16$, $p > 0·05$, but that asking questions during the repeated readings was more beneficial to expressive vocabulary than to receptive vocabulary, $t(37) = 2·53$, $p < 0·05$. Children's expressive vocabulary performance in the questioning condition was 3·7 times superior to that of children in the repeated reading condition whereas children's receptive vocabulary performance was 1·2 times superior. These results support the general predictions of the theoretical model.

Overall, children's performance on the receptive vocabulary post-test was superior to performance on the expressive vocabulary post-test (see Table 1). For example, children correctly identified 56 % and produced 33 % of the novel words after three readings of the book. It becomes of interest to examine whether words produced were also comprehended. This analysis revealed that 60 % of the words produced were also comprehended and suggests that receptive vocabulary may often, but not always, precede expressive vocabulary.

It is also of interest to examine the performance on each word even though the acquisition of specific form classes (e.g. verbs vs. nouns) was not the

purpose of the present experiment. Examination of the data reported in Table 2 revealed little variation in performance in terms of word forms on any of the vocabulary tests.

Active responding

It is important to analyse children's responses in the questioning condition to provide necessary evidence about its efficacy. The questioning condition was effective presumably because it provided opportunities for children to retrieve the target words during the book reading. Thus, it is necessary to examine children's acquisition of novel words as a function of the number of times they spoke the words in response to questioning during the book readings. The total number of novel words for the entire sample of children in the questioning condition (10 novel words × 20 children = 200 novel words for the sample) was analysed in order to assess the impact of speaking the novel words in response to questioning during book reading. The proportion of words correctly identified on each test broken down by frequency of the words being spoken by the child during reading are reported in Table 3. Three findings are clear from this analysis. First, the children as

TABLE 3. *Proportion of words for receptive and expressive vocabulary tests as a function of the frequency with which children spoke the words during book readings in the questioning condition*

Test[a]		Frequency of speaking words			
Pretest	Post-test	0	1	2	3
Receptive vocabulary					
1	1	0·035	0·005	0·065	0·065
1	0	0·035	0·015	0·015	0·030
0	1	0·070	0·060	0·085	0·175
0	0	0·055	0·055	0·090	0·145
Expressive vocabulary					
	1	0·035	0·035	0·075	0·180
	0	0·160	0·100	0·180	0·235

[a] The status of a target word is indicated by a 0 or 1; 0 indicates incorrect responses, a 1 indicates a correct response. There was no pretest for the expressive vocabulary.

a group overwhelmingly spoke the target words when questioned during the book readings. That is, the children said 42·2 % of the target words three times, said 25·5 % of the target words twice, said 13·5 % of the target words once, and failed to say 19·5 % of the target words. Second, the probability of correctly identifying a word on the receptive vocabulary post-test given an incorrect identification on pretest did not vary much as a

function of times the child spoke the words. The obtained percentages show that on the receptive vocabulary post-tests, children correctly identified 42·2 % (0·175/0·415) of the words they had spoken three times, 33·3 % (0·085/0·255) of the words they had spoken twice, 44·4 % (0·06/0·135) of the words they had spoken once, and 35·9 % (0·07/0·195) of the words they had failed to speak during the book readings. This finding provided additional support for the hypothesis that retrieval practice was not necessary for the acquisition of receptive vocabulary. Third, the percentages for expressive vocabulary show that children produced 43·4 % (0·180/0·415) of the words they had spoken three times, 29·4 % (0·075/0·255) of the words they had spoken twice, 25·9 % (0·035/0·135) of the words they had spoken once, and only 17·9 % (0·035/0·195) of the words they had failed to speak during the book reading. These data generally support the notion that the questioning condition is most effective for expressive vocabulary acquisition when children practised retrieving novel words. The data also indicate that retrieval practice is not sufficient for acquisition; that is, children did not learn all the words they had spoken during the book reading events (on average, children had spoken eight out of the ten words at least once during the book readings).

DISCUSSION

The present study demonstrated that specific types of book reading events had a different impact on the acquisition of receptive and expressive vocabulary: increased exposure to book reading events enhanced children's receptive and expressive vocabulary similarly whereas active responding during repeated book reading events enhanced children's expressive vocabulary more than their receptive vocabulary, The present findings extend those of previous studies in three ways. First, this is one of the first experimental studies in which both expressive and receptive vocabulary was measured (cf. Eller *et al*., 1988; Elley, 1989). Second, the present experiment included appropriate control groups (cf. Pemberton & Watkins, 1987). Third, the findings extend to our knowledge of how school and kindergarten children learn from book contexts to how preschool children learn from listening to storybooks (cf. Nagy *et al*., 1987; Sénéchal & Cornell, 1993; Robbins & Ehri, 1994).

Children made more gains in vocabulary after three readings of a book than after a single reading. This finding supports the notion that, with repeated exposure, young children can make use of storybooks as a rich context for word learning. That is, the three- and four-year-olds in the experiment were able to extract clues from the narrative and pictorial contexts which presumably constrained their memory search for potential meanings of the novel labels. Moreover, children were able to associate the inferred meaning with the phonological representation of the novel label in

such a manner that they were able to select the appropriate referent during the receptive vocabulary post-test. In general, their constructed representation was sufficiently flexible to allow them to transfer the book exemplar of the referent to uninstructed exemplars of the words. That is, children might have associated *angling* with the picture of a man fishing while sitting in a dory but were able to transfer the associated meaning to a girl fishing while sitting on a rock.

This notion of flexible representation may be useful to explain a somewhat puzzling finding: some children produced words correctly that they failed to correctly identify on the receptive vocabulary test. It is possible that in these instances, the novel words were represented in a very narrow fashion (i.e. as the book exemplar) such that it impeded the correct identification of uninstructed exemplars of the referent (in the receptive vocabulary post-test).

As predicted by the theoretial model, asking labelling questions during repeated readings of the storybook was a particularly powerful didactic technique for the acquisition of expressive vocabulary. This finding suggests that asking children questions requiring them to produce novel words is an important element in word acquisition during storybook reading. This finding corroborates the results of Whitehurst *et al*. (1988) who found that children whose parents engaged them more verbally during book reading made greater gains in expressive vocabulary than children whose parents engaged them less.

The questioning manipulation used in the present study was such that words that children failed to produce during the book reading were produced by the experimenter. In those cases the experimenter provided feedback to the children, but this manipulation may have created a confound in that children received an additional exposure to the label. The analysis of children's correct responses as a function of whether they or the experimenter had spoken the words during the readings revealed that this manipulation affected the acquisition of expressive and receptive vocabulary differently. Children tended to produce words on post-test that they themselves had spoken during the reading, thus supporting the role of retrieval practice in the acquisition of expressive vocabulary. In contrast, children comprehended words on post-test regardless of whether they or the experimenter had spoken them during the book reading. This latter finding supports the notion that retrieval practice is not crucial to the acquisition of receptive vocabulary. Future research should be conducted to provide clear evidence concerning the potential role of feedback provided by the reader during questioning.

Two issues remain unresolved. First, the task used in the present experiment was one in which children learned synonyms for referents already known. The next step is to assess whether the pattern of learning is the same when children learn novel labels for novel referents. Second, children had

not learned all the novel words after three readings of the book. The obtained levels of performance, however, are slightly higher than those of Sénéchal, Thomas & Monker (1995) who assessed children's performance after two readings of a book. The issue that remains unresolved is whether children would continue to learn new words had they heard additional readings.

The obtained results may be limited in three ways. First, the results need to be replicated with other reading materials before stronger conclusions are drawn. Recent findings tend to support the conclusion of the present study. For example, Sénéchal, Thomas & Monker (1995) conducted a study using more than one book and showed that four-year-olds who differed in prior knowledge benefited from active responding. Second, the presence of a pretest may have sensitized children to the to-be-learned words. Pretest sensitization may have inflated children's scores. This may have been the case for all children, but, especially, children in the single-reading condition. That is, these children participated in a single session in which they were pretested, listened to the book reading, and were immediately post-tested. The data, however, do not support this possibility. Post-test performance for this condition was poor, and, as such, argues against pretest sensitization. Moreover, the lack of correlation between pretest and post-test performance also argues against this possibility. Third, the repeated reading manipulation occurred over two days whereas children in the single-reading were pretested, read to and post-tested on the same day. Thus, it is possible that repeated readings occurring during the same testing sessions may not produce the same results. That is, children may benefit more from repeated readings that occur over multiple days compared to repeated readings that occur on the same day. Future research should be conducted to clarify the potential impact of the pretest and the occurrence of the repeated readings.

In conclusion, the findings of the present study are important in light of Scarborough & Dobrich's (1994) recent review of the research on the effect of book reading in which they concluded that the impact of book reading may be more modest than anticipated. The findings of the present study suggest that children do learn from exposure to book reading, and that adult reading behaviours may have different effects on children's receptive and expressive vocabulary. The obtained findings may be pertinent for intervention programmes designed to foster language development from listening to storybooks. Specifically, parents and preschool teachers should realise that young children need more than one exposure to a storybook in order to learn novel words. Moreover, asking simple questions requiring children to produce the novel words introduced in books is a technique that can be incorporated easily in read aloud events. Our past findings have shown that parents often include what- and where- questions, but that parents use the questions to reinforce information that children already know (Sénéchal, Cornell & Broda, 1995). The present results suggest that parents could extend their use

of this simple didactic technique to facilitate the acquisition of novel information.

REFERENCES

Anglin, J. M. (1993). Vocabulary development: a morphological analysis. *Monograph of the Society for Research in Child Development* **58** (10).

Arnold, D. H., Lonigan, C. J., Whitehurst, G. J. & Epstein, J. N. (1994). Accelerating language development through picture book reading: replication and extension to a videotape training format. *Journal of Educational Psychology* **86**, 235–43.

Bohannon, J. N. & Stanowicz, L. (1989). Bidirectional effects of imitation and repetition in conversation: a synthesis within a cognitive model. In G. E. Spiedel & K. E. Nelson (eds), *The many faces of imitation in language learning*. New York: Springer Verlag.

Bonners, S. (1989). *Just in passing*. New York: Lothrop, Lee & Shepard.

Bus, A. G., van IJzendoorn, M. H. & Pellegrini, 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.

Carey, S. (1978). The child as word learner. In M. Halle, J. Bresnan & G. A. Miller (eds), *Linguistic Theory and Psychological Reality*. Cambridge, MA: MIT Press.

Cornell, E. H., Sénéchal, M. & Broda, L. S. (1988). Recall of picture books by 3-year-old children: testing and repetition effects in joint reading activities. *Journal of Educational Psychology* **80**, 537–42.

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**, 105–22.

Dunn, L. & Dunn, L. (1981). *Peabody picture vocabulary test-revised*. Circle Pines, MN: American Guidance Services.

Eller, R. G., Pappas, C. C. & Brown, E. (1988). The lexical development of kindergartners: learning from written context. *Journal of Reading Behaviour* **20**, 5–23.

Elley, W. B. (1989). Vocabulary acquisition from listening to stories. *Reading Research Quarterly* **24**, 174–87.

Gleitman, L. (1990). The structural sources of verb meanings. *Language Acquisition* **1**, 3–55.

Goodsitt, J., Raitan, J. G. & Perlmutter, M. (1988). Interaction between mothers and preschool children when reading a novel and familiar book. *International Journal of Behavioral Development* **11**, 489–505.

Hollingshead, A. B. (1975). Four factor index of social status. Unpublished manuscript, Yale University, Department of Sociology, New Haven.

Leung, C. B. & Pikulski, J. J. (1990). Incidental learning of word meanings by kindergarten and first-grade children through repeated read aloud events. In J. Zutell & S. McCormick (eds), *Literacy theory and research : analyses from multiple paradigms*. Chicago, IL: National Reading Conference.

Markman, E. M. (1989). *Categorization and naming in children*. Cambridge, MA: MIT Press.

McKeown, M. G. (1985). The acquisition of word meaning from context by children of high and low ability. *Reading Research Quarterly* **20**, 482–96.

Nagy, W. E., Anderson, R. C. & Herman, P. A. (1987). Learning word meaning from context during normal reading. *American Educational Research Journal* **24**, 237–70.

Nagy, W. E. & Scott, J. A. (1990). Word schemas: expectations about the form and meaning of new words. *Cognition and Instruction* **7**, 105–27.

Nelson, K. E., Denninger, M., Bonvillian, J., Kaplan, B. & Baker, N. (1983). Maternal input adjustments and non-adjustments as related to children's linguistic advances and the language acquisition theories. In A. Pellegrini & T. Yawkey (eds), *The development of oral and written languages : readings in developmental and applied linguistics*. Norwood, NJ: Ablex.

Ninio, A. & Bruner, J. S. (1978). The achievement and antecedents of labelling. *Journal of Child Language* **5**, 1–15.

Pemberton, E. F. & Watkins, R. V. (1987). Language facilitation through stories: recasting and modeling. *First Language* **7**, 79–89.

Robbins, C. & Ehri, L. C. (1994). Reading storybooks to kindergartners helps them learn new vocabulary words. *Journal of Educational Psychology* **86**, 54–64.

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

Sénéchal, M. (1993). Preschoolers' production and comprehension vocabulary acquisition. Poster presented at the March 1993 biennial meeting of the Society for Research in Child Development, New Orleans.

Sénéchal, M. & Cornell, E. H. (1993). Vocabulary acquisition through shared reading experiences. *Reading Research Quarterly* **28**, 360–74.

Sénéchal, M., Cornell, E. H. & Broda, L. (1995). Age-related changes in the organization of parent–infant interactions during picture-book reading. *Early Childhood Research Quarterly* **27**, 317–37.

Sénéchal, LeFevre, Hudson & Lawson (1996). Knowledge of picture-books as a predictor of young children's vocabulary. *Journal of Educational Psychology* **88**, 520–36.

Sénéchal, M., Thomas, E. & Monker, J.-A. (1995). Individual differences in 4-year-olds' ability to learn new vocabulary. *Journal of Educational Psychology* **87**, 218–29.

Sternberg, R. & Powell, J. (1983). Comprehending verbal comprehension. *American Psychologist* **38**, 878–93.

Whitehurst, G. J. & DeBaryshe, B. D. (1989). Observational learning and language acquisition: principles of learning, systems, and tasks. In G. E. Spiedel & K. E. Nelson (eds), *The many faces of imitation in language learning*. New York: Springer Verlag.

Whitehurst, G. J., Falco, F. L., Lonigan, C. J., Fischel, J. E., DeBaryshe, B. D., Valdez-Menchaca, M. C. & Caufield, M. (1988). Accelerating language development through picture book reading. *Developmental Psychology* **24**, 552–9.