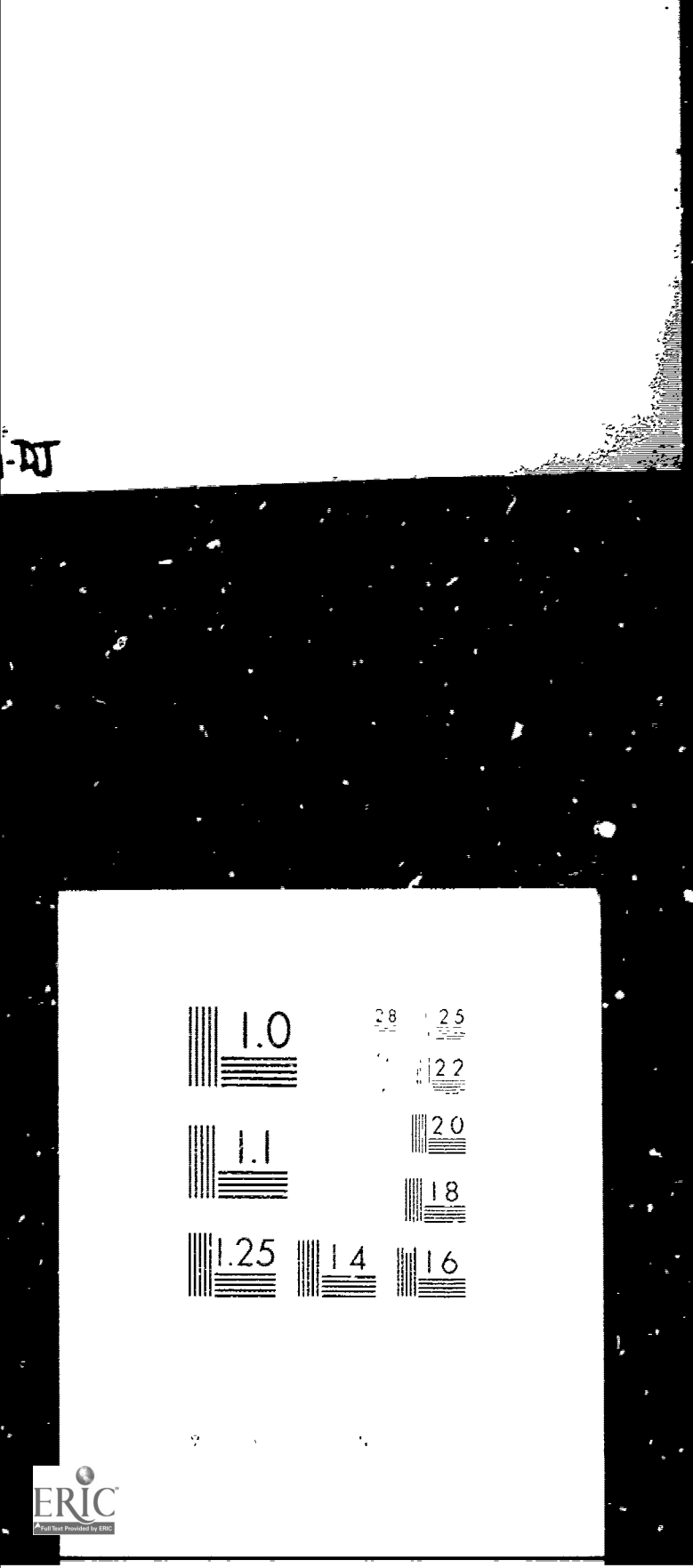
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ABSTRACT

In a study of the effects of pictorial stimuli on story recall, 64 second graders were randomly assigned to two experimental groups and two control groups. The learning materials consisted of two orally presented ten-sentence stories. The experimental subjects viewed pictures while the stories were read, and the control groups followed the printed text. Recall of the passages was tested by both verbatim and paraphrase questions posed immediately after the learning experience and/or three days later. Because the picture types were markedly superior on both occasions and on both question types, the results support the notion of the positive and long-term, as well as short-term, advantages of pictures on children's story recall. (Author/MAI)

Longer Term Effects of Pictures on Children's Story Recall

CHAO-YING PENG and JOEL R. LEVIN
University of Wisconsin

Chao-Ying Peng
c/o Joel R. Levin
Research and Development Center
1025 West Johnson Street
Madison, Wisconsin 53706

Several recent investigations have demonstrated that the provision of relevant pictures greatly improves young children's recall of narrative stories, even when rigorous double-exposure control conditions are employed (for a brief review, see Levin & Lesgold, 1977). The present study was conducted to delineate some of the practical (educationally relevant) boundary conditions associated with the picture facilitation phenomenon.

One of the most important constraints on this research to date, is that measures of performance have been taken immediately following story presentations. In order to have educational relevance, it must be demonstrated that the effects obtained on an immediate test hold up over time. In this study, a time interval of three days was employed as a modest assessment of long-term effects. Further, long-term effects were studied in two complementary ways, among subjects who had been previously tested and among those who had not. Although picture effects have been shown to persist under similar conditions with simple learning tasks (e.g., Kerst & Levin, 1973), whether or not they would for the more ecologically valid prose-learning task had yet to be determined.

Story recall was assessed in two ways, by questions that were verbatim rearrangements of the original information (verbatim questions) and by those based on substitutions of synonyms for most of the substantive words (paraphrase questions). Anderson (1972) has argued that in comparison to verbatim questions, paraphrase questions are more likely to tap subjects' "comprehension" of the previous material, inasmuch as the former can be correctly answered by recalling surface (e.g., orthographic and acoustic) information, whereas the latter must be responded to at a deeper semantic level (see Craik & Lockhart, 1972). In the present experiment, the question was asked: Would picture effects persist even for the presumed more comprehension-demanding paraphrase questions? If so, then the effect cannot be as easily dismissed as a simple rote or surface-level phenomenon.

Method

Subject and Design

Sixty-four second graders from two schools located in a middle-class neighborhood in Wisconsin served as subjects. There were equal number of male and female students. The children ranged in age from 6 years, 11 months to 8 years, 3 months, with an average of 7 years, 5 months.

Subjects were randomly assigned to four groups, two picture and two control. In the picture groups, subjects were shown relevant colored pictures while they listened to a tape-recorded story. In the control groups, subjects read each sentence of the story concurrent with its presentation. Listen + Print control groups were selected for the Listen + Pictures experimental groups since they afford a convenient equation of the kind of input modalities (verbal and visual) engaged during the task. That is, it cannot be argued that control subjects processed the material in only one modality, whereas picture subjects processed it in two (see also Rohwer & Harris, 1975). The two variations of each group were differentiated simply in terms of the manner of testing, to be described below.

Materials

The learning materials consisted of two ten-sentence narrative stories developed by Guttmann, Levin, & Pressley (in press). These stories were recorded on tape by a male speaker. Subjects in the control conditions were played the stories, along with a typewritten version of them presented sentence by sentence on 5" x 8" index cards. Subjects in the picture conditions heard the stories along with a series of colored line drawings, each picture capturing the contents of each sentence. In both conditions, the dual listen-look modalities were simultaneous for all subjects. Paraphrase versions of each of the original Guttmann et al. (in press) verbatim questions were constructed by Ruch & Levin (in press) according to Anderson's (1972) rules, and both the verbatim and paraphrase question versions were adopted in the present study.

Procedure

The actual experiment was conducted in two phases. The first phase consisted of the presentation of two stories, followed by either a test for cued recall of the stories (Picture 1 and Control 1) or a drawing activity which took approximately the same amount of time as answering the test questions (Picture 2 and Control 2). The second phase took place three days later in which all the subjects were tested (Picture 2 and Control 2 for the first time and Picture 1 and Control 1 for the second time).

The immediate test as well as the delayed test had two forms, with paraphrase and verbatim questions randomly mixed together in blocks of two. For subjects tested on both occasions, verbatim questions one time were asked as paraphrase questions the other. All questions were short-answer "Wh" questions, one about each sentence of the story. As with the stories themselves, the questions were also on tape.

Results and Discussion

The amount of story recall was determined in terms of the number of correct responses (out of 10 for each question type). "Correctness" was evaluated at the level of synonym with half-point credit awarded for partially correct responses. All scoring decisions were made "blindly" with respect to experimental conditions.

For subjects tested immediately, the usual picture effect emerged: Subjects in the picture condition correctly recalled an average of 78%, whereas control subjects averaged only 59%. The difference was statistically significant for both verbatim and paraphrase questions, thereby replicating Ruch & Levin (in press). For subjects tested for the first time three days later, performance was expectedly lower, but conditions differences paralleled exactly those on the immediate test. Picture subjects' average was 54% and that of control subjects was 35%, and comparisons on verbatim and paraphrase questions were both statistically significant. Thus, as far as the picture effect is concerned, it makes no difference when the time of initial testing occurs (at least up to three days); the magnitude of the difference is quite comparable.

A second way in which the durability of the effect can be assessed is on the basis of subjects who were tested on both occasions. For these subjects, delayed test performance was higher in comparison to subjects who did not experience an initial test (see Kulhavy, 1977, for relevant discussion of this phenomenon). The performance of picture subjects averaged 72%, and

that of control subjects was 56% -- a similar difference to the previously discussed ones. In contrast, however, when the amount of information lost relative to the first testing (actually, a "percent loss" measure) was examined, no statistical difference between the two conditions emerged. Picture subjects lost on the average about 7 1/2% of what they previously recalled, and control subjects averaged about a 3 1/2% loss -- a very small and nonsignificant difference. From these data it may be concluded that: (1) much of what is remembered previously is also remembered later (this conclusion is further supported by conditional probability analyses); and (2) because of this, the initial advantage of picture subjects holds up over time. This is true even though the difference is not reflected by a percent loss measure, which is more akin to an index of "forgetting" than it is to an index of "amount learned".

From an educational standpoint, the results are encouraging and warrant further investigations into the boundary conditions associated with picture effects. In this experiment, children given pictures along with stories recalled more of what they had heard up to a period of three days. Moreover, the effect was not restricted to surface-level verbatim questions, but was revealed on the deeper paraphrase questions as well. Findings such as these constitute relevant ammunition against those who have argued against the utility of pictures in prose-comprehension situations (e.g., Samuels, 1970).

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