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ABSTRACT

A study examined the ability of 16 children in kindergarten, grade 2, and grade 4 to draw inferences based on the content of a narrative passage and to recognize inferences as derived from, rather than given by, text. An inference task, developed to assess the ability to make and recognize appropriate inferences, consisted of four orally presented narrative passages, four recall questions, and two sets of inference questions. Results indicated that from kindergarten to grade 4, children's ability to make and recognize inferences from texts shows marked improvements. Whether or not this improvement in inferencing ability arises as a result of exposure to the written language remains a question for further study. (Graphs of statistics are appended.) (SRT)

Learning to Make and Recognize Inferences in the Early Grades

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Objectives

The experiment reported in this paper is part of a larger study examining the relationship between oral language skills and the development of literacy skills in the early school years. The purpose of this experiment was to examine the ability of 5- to 10-year-old children to draw inferences based on the content of a narrative passage, and further, their ability to recognize inferences as inferred from, rather than given by, text. Finally, we investigated the relationship between making and recognizing inferences, aspects of reading acquisition (decoding and comprehension), and developing verbal reasoning as measured by performance on the Similarities subtests of the WPPSI and WISC-R.

Background

There is a growing interest in the study of developing literacy skills, and a tendency now to regard much of literacy skill as involving particular uses of language rather than merely the acquisition of mechanical procedures of reading (Pattison, 1984). In becoming literate, a child encounters materials, lexicon and ways of using language not encountered otherwise, that is, not found in purely oral cultures (Olson, 1977). One skill necessary for success in schooling is the ability to draw appropriate inferences from passages of text (Mason and Osborn, 1982). Indeed, four out of five reading programs surveyed by Rosenshine (1980) introduced the making of inferences in the first semester of Grade 1. Nevertheless, many teachers believe that the teaching of comprehension strategies should be left until the middle grades when the more mechanical aspects of reading have been acquired (Martin and Chambers, 1974). Given this apparent contradiction between programs and teaching biases, one could reasonably ask whether children in this age range would make appropriate inferences from passages if required to do so.

Further, the ability to recognize inferences as inferences may be an indication of the development of comprehension monitoring ability which may otherwise be difficult to judge (Markman, 1981). For the child, this comprehension monitoring ability becomes a useful skill when one is held accountable for inferences drawn from passages of prose, as is increasingly the case in the classroom. It may, in fact, be the case that in dealing with problems of interpretation and the

justifications for those interpretations, the child will achieve some insights into his or her own levels of understanding, for instance, learning to discriminate given from interpreted information, learning when an inference is justified by the text, and so on. Writing, because it preserves the surface structure or the *given* in text (Olson, 1985) provides a unique opportunity for the child to reflect on his interpretations of the text and see whether or not they can be sustained by the text.

The purpose of this study was to examine the emergence of these abilities in children ranging from Senior Kindergarten to Grade 4, when they are becoming fluent readers and first encounter problems of interpretation in written text. We also set out to examine the relationship between these emerging abilities and other measures of skill with the literate or formal uses of language, such as decoding ability, comprehension of orally-presented texts and verbal reasoning.

A task was therefore developed to assess the ability to make appropriate inferences and to recognize inferences as inferences. Children were asked not only the more standard recall and comprehension questions typical of tests of reading comprehension, but were also asked questions requiring the drawing of inferences on the basis of the text. Finally, they were asked to justify their answers in terms of whether or not the answer was explicitly stated.

Method

Data were collected on 16 children at each of three grade levels, SK, Grade 2 and Grade 4. Measures of oral reading skill, listening comprehension and verbal reasoning were administered along with the inference task. At the SK level, oral reading ability was assessed using a letter naming task. Children in Grades 2 and 4 were evaluated for speed and accuracy using the appropriate passage from the Durrell Analysis of Reading Difficulty. Listening Comprehension from the Durrell was also administered at all three grade levels. As a measure of verbal ability, the Similarities subtest from the WPPSI was administered to children in SK and Similarities from the WISC-R to the children in Grade 2 and 4.

The inference task consisted of four narrative passages which were presented orally followed by four recall questions and two sets of inference questions. Passages were designed to minimize recall differences across grade levels; stories were designed so that even the youngest children had little difficulty remembering the relevant facts. Two types of inference questions, specific and gist, were administered. Specific inferences depended on information from a particular word or phrase. For

example, answering the question "Did the King of Sandwich ask for a sandwich?" relies on the information in the phrase *meat between two pieces of bread*. For specific inferences, the child is first asked the inference question, then an inference recognition question, in this case "Did the story actually say that the king asked for a sandwich?", followed by a justification question, "What did the story say that lets you know the king wanted a sandwich?"

Gist inferences involved putting together information from more than one segment of the text. For example, "How did the sandwich come to get its name?" depends on several facts: that the king asked for meat between two pieces of bread, that it was the first time this was ever done, that his friends followed the king's example and put their meat between bread, and that the king's name was Sandwich. Gist inference questions were followed by inference recognition questions, "Did the story actually say that the sandwich was named after the king?"

For specific inferences then, children's answers were scored for making the inference, recognizing they made the inference, and justifying the inference by recalling the particular word or phrase from the text. For gist inferences, the children were evaluated on making the inference and recognizing it as an inference.

Results

Analyses were carried out on the frequencies of children who scored high (3 or 4 correct) and low (2 or less correct) at each grade level. First consider performance on the recall questions (see figure 1). There was no difference in performance between the SK's and the Grade 2's and no difference between the Grade2's and the Grade 4's. There was, however, a small but significant difference between performance in SK and performance in Grade 4 on the recall questions ($\chi^2 = 4.57, p < .05$). Performance on the recall questions was high for all three grades (75% of the subjects scored high at SK, 87.5% at Grade 2, and 100% at Grade 4). Second consider performance on the specific inference items (see figure 2). There were no significant differences in the ability to simply make the inference between SK and Grade 2 or between SK and Grade 4. However, the difference in performance between the Grade 2's and the Grade 4's approached significance with the Grade 2's making the inferences more often than either the SK's or the Grade 4's. This pattern changes however when measuring the ability not only to make the inference but also to recognize it as an inference and to justify it by appeals to the text. When recognition and justification of the inference are included in the score, the Grade 4 children were significantly better than both the Grade 2 children ($\chi^2 = 3.94, p < .05$) and the SK

children ($\chi^2 = 9.31, p < .01$). Finally consider performance on the gist inference items (see figure 3). For this type of inference performance on the inference questions was similiar to performance on the inference recognition questions at all three grade levels. In other words if the inference was made it was recognized as an inference in almost all instances. Furthermore, children in Grade 4 were significantly better than children in Grade 2 ($\chi^2 = 7.57, p < .01$) and at SK ($\chi^2 = 9.85, p < .01$) at making the gist inferences. Similarly children in Grade 4 were significantly better than children in Grade 2 and in SK at both making and recognizing inferences ($\chi^2 = 9.85, p < .01$) for both comparisions. While making inferences and recognizing inferences is relatively poor for SK's (6.25% scored high) and Grade 2's (12.5%scored high) performance on the recall questions was relatively good for both grades (75% of subjects scored high at SK and 87.5% of subjects at Grade 2 scored high)

In summary then at SK and at Grade 2 children were able to answer the recall questions and make the specific inferences but they were unable to recognize and justify these specific inferences. In addition they were also unable to make the gist inferences. At Grade 4 the subjects made fewer specific inferences than the Grade 2's but when they did make them they could also recognize and justify them. At the point then where children are able recognize the specific inferences and justify them their ability to make and recognize the gist inferences improved significantly.

The relationship between performance on Similarities, Listening Comprehension and Oral Reading increased , some in a positive direction, others in a negative direction, across grades. At SK, all correlations approached zero. By Grade 2, Similarities had small but negative correlations with Listening Comprehension and Oral Reading and the correlation between these two tests was small but positive. By Grade 4, the correlation between Similarities and Listening Comprehension was negative and approached significance, the correlation with Oral Reading was negative and significant and the correlation between Oral Reading and Listening Comprehension was positive and approaching significance. In summary then, by grade 4, although Listening Comprehension and Oral Reading came to be positively correlated, performance on both correlated negatively with performance on Similarities.

The relation between the ability to make both specific and gist inferences and Similarities subtests was analyzed separately for each grade level. The correlation between the Similarities test and making and recognizizing gist inferences reached significance ($r = .596, p < .05$) while the

correlation with making, recognizing, and justifying specific inferences approached significance at the Grade 4 level. At Grade 2 and SK none of the correlations were significant.

The relationship between performance on Listening Comprehension and both inferencing tasks was analyzed. For both specific and gist inference, there is an increasing negative correlation with Listening Comprehension that became significant by Grade 4 ($r=.775, p<.01$ for specific and $r=.576, p<.05$ for gist inferences).

The relationship between Oral Reading performance and the ability to make and recognize inferences was analzed separately. Although none of these correlations reached significance, the correlation with gist inferences was negative and approached significance for the SK's and the Grade 4's.

In summary then, the relationships between these variables at SK and Grade 2 are weak. By Grade 4 however, the children who were proficient at Similarities tended to do well on the inferencing task but to do poorly on the Listening Comprehension and Oral Reading tasks.

Discussion and Educational Significance

We conclude that children's ability to make and recognize inferences from texts shows marked improvements from SK to Grade 4 as they become more fluent readers. This development seem to take place in two stages. First, children make inferences just as they are able to recall across the entire age range studied. Only later does the child develope the ability to recognize these inferences as inferences. At the same time as they begin to recognize these specific inferences as inferences they begin to derive gist inferences. Gist inferences are, apparently, always recognized as inferences.

Whether or not this improvement in inferencing ability arises as a result of exposure to the written language remains a question for further stu' In any case, it has been observed in classroom observations that these kinds of questions are infre ntly asked in the first four grades (Mason and Osburn, 1982; Guzsak, 1967). It could be that good teachers are sensitive to their students' abilities and therefore delay the introduction of these kinds of text comprehension questions until the higher grades when the children are able to make these kinds of judgements. On the other hand, it could be that younger children could learn to make these kinds of judgements if they were explicitly instructed to do so.

Another issue that arises is whether these inference drawing and inference recognition skills

relate to more standard tests of reading. Although the tests are brief and, hence, perhaps of low reliability it appears that these inferencing skills are not closly related to standard reading tests. Inference questions seem to measure a somewhat unique aspect of reading competence. This is indicated in two ways. First, these items correlate negatively with Listening Comprehension and with Oral Reading but positively with Verbal IQ (as measured by Similarities). And secondly, while those correlations between Oral Reading and Listening Comprehension were positive, they too correlated negatively with Similarities. Inferencing it seems has more to do with Verbal IQ than with simple reading skills.

The strategies that work for the Listening Compre. nsion task appear not to be successful strategies in answering the inference questions. Indeed, questions on the Listening Comprehension test do ask for more or less verbatim recall of surface structure details that are not essential for understanding the passage. It may be that students learn to use that strategy because it is a successful one for much of their classroom activities. Perhaps attention to these kinds of details interferes with the higher level strategies for text comprehension involved in the interpretation of written passages, in this case, the ability to makeinferences, recogize them as inferences, and justify inferences on the basis of the information given by the text.

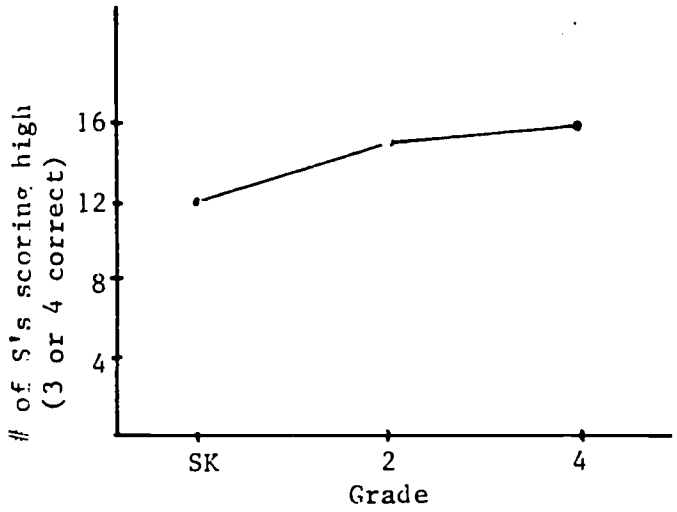

FIGURE 1: PERFORMANCE ON THE RECALL QUESTIONS

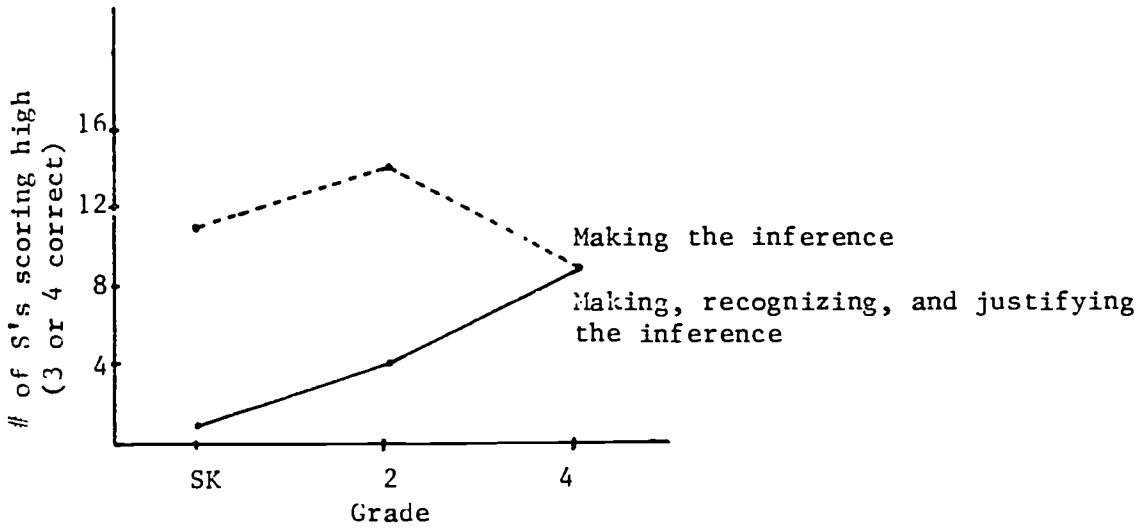

FIGURE 2: PERFORMANCE ON THE SPECIFIC INFERENCE QUESTIONS

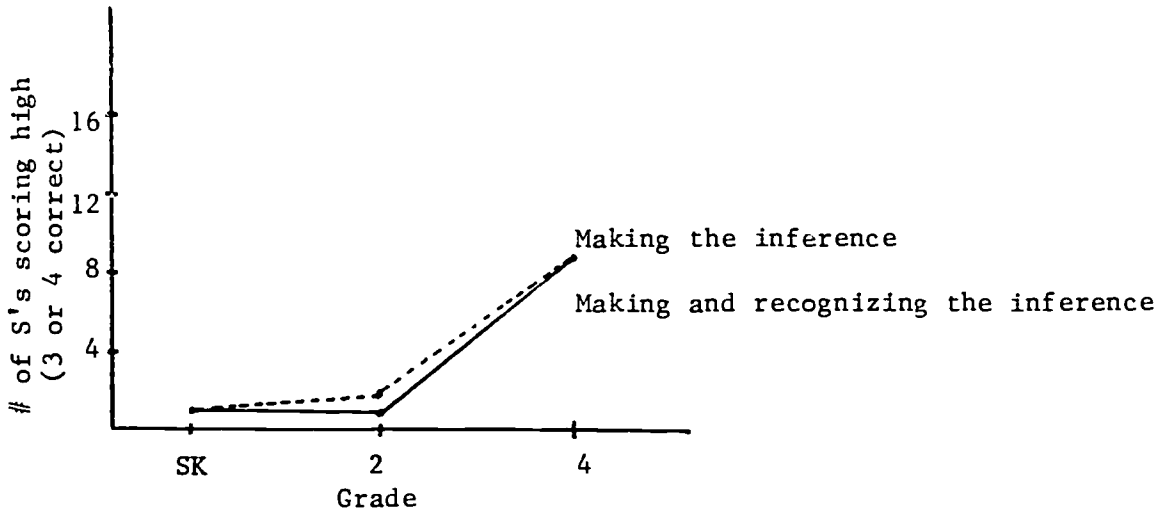

FIGURE 3: PERFORMANCE ON THE GIST INFERENCE QUESTIONS

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