TEXT TYPE AND READER ABILITY: THE EFFECTS ON PARAPHRASE AND TEXT-BASED INFERENCE QUESTIONS

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Abstract

This study investigated good and poor readers' ability to answer text-based inference and paraphrase questions after reading two narrative stories and two expository passages. Subjects were selected that differed only on reading comprehension, not decoding accuracy or language comprehension, and were asked text-based informational and logical inference questions which were classified according to the Warren, Nicholas, and Trabasso (1979) inference taxonomy. Subjects were also asked questions that paraphrased the verbatim information in the text. Dependent measures were researcher-designed questions and reading times for each text. Results indicate that (a) logical text-based inference questions were significantly more difficult to answer than either informational inference questions or paraphrase questions, but only after reading narrative stories; (b) paraphrase questions were as difficult to answer as informational inference questions on both types of text; (c) expository passages were significantly more difficult for the children to understand than narrative stories; (d) good readers answered significantly more text-based inference questions and paraphrase questions than poor readers on both types of text; and (e) good readers read the texts faster than poor readers.

At the heart of the comprehension process is readers' propensity to make inferences. Researchers have investigated the inferential processes of children and adults (Carr, Dewitz, & Patberg, 1983; Goetz, 1977; Hildyard & Olson, 1978; Johnson, Bransford, & Solomon, 1973; Paris & Lindauer, 1976). These
studies are part of a growing body of research on the comprehension of discourse and illustrate an awareness of the central role inferences play in understanding information.

Inferences are propositions not explicitly revealed in the text which readers conjure from their schemata or ferret from ideas stated in the text in order to fully understand and/or recall discourse. In fact, comprehension seems to require readers to make inferences based on both world knowledge and text information (Bartlett, 1932; Frederiksen, 1979; Pearson & Johnson, 1978; Warren, Nicholas, & Trabasso, 1979). This notion may be conceptualized as an inference continuum anchored by world knowledge at one end and text information at the other. Readers may use both information sources; thus we have schema-based inferences and text-based inferences (Frederiksen, 1979).

To study and evaluate specific kinds of inferences that readers/listeners make under various conditions (using both text data and world knowledge), several schemes to classify inferences have been proposed (Clark, 1977; Frederiksen, 1979; Pearson & Johnson, 1978; Warren, Nicholas, & Trabasso, 1979). Warren et al. (1979) developed a taxonomy to classify and describe the inferences that readers of narrative stories make to comprehend a text. According to these authors, readers construct a causal chain representation of the events in the text in memory. In other words, readers process the text in a manner that builds a causal chain between the text propositions. Whenever a portion of the event chain is not explicitly stated, readers make the needed inferences to complete the event chain and thus their understanding of the text. Based on this notion, the taxonomy recognizes three categories of inferences: informational inferences, which determine the people, things, time, place, and general context of an event; logical inferences, which include motivations, causes, and enablements that connect events in the story; and value inferences, which are the readers' judgments on the story. Defined as a “set of mutually exclusive categories for the narrative” (Warren et al., 1979, p. 27), the taxonomy allows researchers to classify inferences more precisely.

Warren et al. argue that readers make informational inferences first, but it is logical inferences that are especially crucial. Trabasso (1980) further argues that this taxonomy might serve as a framework for teachers to guide and to assess reading comprehension via systematic questions.

Results vary as to the relative difficulty of making inferences in the different categories of the proposed taxonomy. Omanson, Warren, and Trabasso (1978) found no significant difference between children's abilities to make informational and logical text-based inferences. On the other hand, Paris and Upton (1976), using different labels, asked verbatim, lexical (infor-
mational) inference, and contextual (logical) inference questions and found logical inference questions most difficult for children to answer. However, in both studies, the children heard, not read, the stories. Under the banner of “syntax,” implicit inter-sentence relations have been found to be difficult for children reading the text to make (Bormuth, Carr, Manning, & Pearson, 1970; Robertson, 1968).

Generally, poor readers find inferential tasks more difficult than good readers (Schreiner & Shannon, 1980; Waller, 1976; Wilson, 1979), but studies do not indicate what category of inferences causes the greatest difficulty for either good or poor readers. Narrative stories are usually easier for readers than expository texts (Berkowitz & Taylor, 1981), although whether both text types prompt the same categories of text-based inferences is not known.

This study used the Warren et al. (1979) inference taxonomy to investigate the categories of text-based inferences good and poor readers make after reading narrative and expository texts. The taxonomy was used to categorize questions as informational or logical inference questions. Questions were also asked that paraphrased the verbatim information in the text. These questions were included in the assessment to comply with the notion that paraphrase questions are a truer measure of comprehension than verbatim questions (Anderson & Biddle, 1975) and to investigate the difficulty level of paraphrase questions in relation to inference questions.

The choice of questions as an assessment tool was made for three reasons. First, question asking in classrooms is a pervasive practice (Durkin, 1978–79). Second, there is some evidence that probes are a better assessment of inferential processing than free recall (Omanson et al., 1978; Schreiner & Shannon, 1980). Third, Trabasso (1980) encouraged investigation of the Warren et al. (1979) taxonomy as a framework to assess reading comprehension via systematic questions.

To increase the ecological validity of the study, materials were selected that were commonly found in classrooms, specifically, two narratives and two expositions from SRA kits.

Theoretical positions vary concerning the relationships among reading comprehension, language comprehension, and decoding. Perfetti and Lesgold (1979) suggest “the relationship between coding and comprehension is one of sharing processing resources” (p. 60). They further posit a comprehension bottleneck occurs if a reader's data handling capacity is overextended. If a procedure, such as decoding, is not automatic, then conscious attention must be directed to that particular procedure; other procedures, such as integrating information, will then be penalized. The bottleneck could be caused by limited access to long-term memory, poor decoding skills, and/or inefficient use of reading strategies that take advantage of language structure. Because this
study focused specifically on the ability of good and poor readers to answer paraphrase and text-based inference questions, great care was taken to locate good and poor readers who had no oral language comprehension problems or decoding problems. That is, both groups of readers were similar on measures of language comprehension and decoding accuracy. While these efforts were taken to establish that the poor readers were adequate oral language processors and accurate decoders, slower word identification times have also been indicative of poor readers (Perfetti, 1977; Perfetti & Hogaboam, 1975). Hence, the reading time for each passage was recorded to determine if reading speed was an identifying characteristic of good and poor readers.

The current study investigated the hypothesis that readers would correctly answer more paraphrase questions than informational inference questions and more informational inference questions than logical inference questions. Paraphrase questions were believed to be easier to answer than inference questions because they concern explicit text information. Warren et al. (1979) argue that logical inferences are harder than informational inferences. If hypothesis one is supported in the present study, their argument receives additional support.

This study also investigated the hypothesis that readers would correctly answer more paraphrase questions than informational inference questions and more informational inference questions than logical inference questions after narrative stories than expository passages and whether the response patterns between the text types would be similar.

Although, overall, we would expect children to answer more questions correctly after reading narrative stories than expository passages, the pattern of correct responses after both text types should follow that described under hypothesis one. If similar patterns are not found, then we could conclude that readers are doing something different with the text types, that text type does differentiate the categories of inferences needed to understand passages.

Finally, this study hypothesized that both good and poor readers would correctly answer paraphrase questions to about the same degree, but good readers would answer more informational and logical inference questions correctly than poor readers. If hypothesis three is supported, results would show an ability by question type interaction.

Method

Subjects

The subjects were third-grade boys and girls in a small, south Texas school district. Approximately 650 third-grade achievement scores from five elementary schools were examined to identify a pool of poor readers who met the
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designated criteria. Forty-three good readers from two elementary schools and 40 poor readers from the same two schools plus two additional elementary schools were selected to participate in this study. Readers were classified as good readers if they scored above grade level on (a) the listening, the letters and sounds, and the comprehension subtests of the SRA Achievement Series, Level B, Form 2 (Science Research Associates, 1978) and (b) the San Diego Quick Assessment (LaPray, 1978) and the graded word list from the Classroom Reading Inventory (Silvaroli, 1976). Readers were considered poor readers if they also scored at or above grade level on (a) the listening and the letters and sounds subtests of the SRA Achievement Series, Level B, Form 2 (Science Research Associates, 1978) and (b) the San Diego Quick Assessment (LaPray, 1978) and the graded word list from the Classroom Reading Inventory (Silvaroli, 1976), but (c) below grade on the reading comprehension subtest of the SRA Achievement Series, Level B, Form 2 (Science Research Associates, 1978).

Because statistical regression effects are usual when subjects are selected for extreme scores (Calfee, Arnold, & Drum, 1976; Campbell & Stanley, 1963), all subjects were administered the reading comprehension subtest of the Iowa Test of Basic Skills, Level 8, Form 6 (Hieronymus & Lindquist, 1972) to insure they were accurately classified as good or poor readers. All good readers' scores remained at or above grade level. However, seven good readers were dropped from the subject pool because two were denied permission to participate and five were absent during testing. Thirty-six good readers remained.

Thirteen poor readers scored at or above grade level on the second comprehension subtest. These readers were dropped, leaving 27 poor readers. The correlation coefficient of the scores from the SRA and Iowa reading comprehension subtests for the remaining good and poor readers was computed \( r = .86 \).

Twenty-seven subjects were then randomly selected from the pool of good readers while the entire group of 27 poor readers was used. One poor reader moved during the experiment. The final groups totaled 27 good readers and 26 poor readers.

Materials

Text passages. Passages were selected from SRA kits 1b and 1c, specifically, two narratives, "A Winter Bouquet" (Parker & Scannell, 1973a) and "Here Comes the Landlord!" (Parker & Scannell, 1973b), and two expositions, "Beware the Plant" and "Where Does the Rain Come From?" (Parker & Scannell, 1973b). An altered version of each selection was written for the preparation of paraphrase questions and is explained below. Three sources of variability in the selections were held constant: readability level, passage
length, and average word frequency. The readability level was 3.0 as indicated in the teacher's manual for the SRA 1b and 1c kits. The passage lengths ranged from 334 to 353 words.

Average word frequency for the four altered and four unaltered text passages was determined by the total word frequency count of Carroll, Davies, and Richman (1971). The eight mean word frequencies for the narrative stories and the expository passages were not significantly different according to a chi square analysis with seven degrees of freedom.

Test questions. A set of 18 questions was constructed for each story, six questions from each of three categories: paraphrase, informational text-based inference, and logical text-based inference. Each text had an altered and unaltered version of the target sentences for the paraphrase questions which were prefaced by who, what, when, or where. Every child read either the altered or unaltered version of each text. If the child read the altered version of the text, the questions that paraphrased the target information matched the wording in the unaltered version of the text. Conversely, if the child read the unaltered version of the text, the questions that paraphrased the target information matched the wording in the altered version of the text. For example, if the child read "In the soil were little flower seeds" in the altered version, he/she received this question, "Where were the tiny violet seeds?". On the other hand, if the child read the unaltered version, "In the soil were tiny violet seeds," he/she received this question, "Where were the little flower seeds?". This procedure was followed to control for the words used in the paraphrases being more or less difficult for the children than the author's original choice of words.

The two types of text-based inference questions were written within the constraints of the Warren et al. (1979) taxonomy. Who, what, when, or where prefaced the informational inference questions which required mostly spatiotemporal (the time or place an event occurred), pronominal (the antecedents of pronouns), and referential (antecedents of given actions or events not pronominally marked) inferences. For example, if the text read "It was brown and empty.,” the question “What was brown and empty?” required a pronominal inference. If the text read "In the spring the garden was so pretty,” the question “When did Amy take flowers to her friends?,” required a spatiotemporal inference. Why or what caused prefaced the logical inference questions which referred to unsignaled causal relations between events. For example, if the text read “But it was winter now. No flowers grew in the garden,” the question “Why were there no flowers in the garden?" required a logical inference. The text structure determined the order of question type; the focus of the question followed the chronology of the text. Tables 1 and 2 present one narrative passage and 18 questions and one expository passage and 18 questions.
Table 1

**Narrative Passage and Questions for “A Winter Bouquet”**

Amy's mother liked flowers. (Amy's mother enjoyed flowers.) Her grandmother liked flowers. So it was no surprise that Amy liked flowers. In the spring the garden was so pretty. It made Amy happy. She liked to take flowers to her friends.

But it was winter now. No flowers grew in the garden. (No flowers were in the yard). The ground was cold and hard. The flower seeds were sleeping. Brrr! It was too cold for them to get up!

Amy was sad. Grandmother was coming for a visit, and there were no flowers. Amy looked at the garden. It was brown and empty. Where had the violets been? Oh yes, under the tree. Grandmother liked the violets best. But there were no violets now. And spring seemed a long way off.

Then mother had an idea. "Let's wake up those lazy violets," she said. She got a big jar with a lid. She sent Amy to bring her spade. (She sent Amy to get her shovel.) They went out and dug where the violets had grown under the tree. The spade dug up the frozen soil. In the soil were tiny violet seeds. (In the soil were little flower seeds.) Into the jar went the soil—seeds and all. Amy made sure that the seeds weren't buried too deep in the soil. Her mother showed her how to add just a few drops of water. They put the lid on tight. They put the jar on the windowsill.

"Don't take the lid off," mother said. "You won't need to. The sunshine will bring up the water from the soil. The lid will keep the water inside, and it will rain back on the seeds. The warm, wet soil will wake up those sleeping violets. This will force them to grow."

Amy looked at the jar each day. (Amy peeked at the bottle each day.) Soon she saw little green sprouts. They grew fast. They grew tall. Up, up toward the jar lid they stretched. A whole jar full of violets! By the time grandmother got there, the violets were blooming.

Amy put a purple ribbon round the jar. (Amy tied a colored ribbon round the jar.) She carried her winter bouquet to her grandmother. Amy was very proud. Grandmother was very surprised. "What a wonderful gardener you are, Amy," she said. "Imagine! Violets in the winter."

* 1a. Who liked flowers?
  1b. Who enjoyed flowers?

*** 2. Why did Amy like flowers?

** 3. What did Amy like to do?

* 4a. What was not in the yard?
  4b. What wasn't growing in the garden?

*** 5. Why were there no flowers in the yard?

*** 6. Why was Amy unhappy?

** 7. What was brown and empty?

** 8. Where had the violets grown?

*** 9. Why did mother tell Amy to get a big jar with a lid?

* 10a. Who brought the spade?
  10b. Who got the shovel?

Table continued on next page.
Table 1 (Continued)

* 11a. Where were the tiny violet seeds?
   11b. Where were the little flower seeds?
*** 12. Why did the flowers grow?
* 13a. When did Amy look at the jar?
   13b. When did Amy peek at the bottle?
** 14. What stretched toward the jar lid?
* 15a. Where did Amy put the purple ribbon?
   15b. Where did the granddaughter tie a colored ribbon?
** 16. What was the winter bouquet?
*** 17. Why was Amy proud?
** 18. Who did Grandmother think was a good gardener?

* Paraphrase Questions
** Informational Inference Questions
*** Logical Inference Questions
(a) questions for altered story
(b) questions for unaltered story

Table 2

Expository Passage and Questions for “Beware the Plant!”

The sundew is a pretty plant. (The sundew is a pretty flower.) Its white flowers and sparkling leaves brighten up the wet marshes where it grows. Insects come flying to it. But watch out, insects! The pretty plant may eat you up!

The sundew gets its name from the way it looks. On its leaves it has many drops of liquid. (On its leaves it has many drops of juice.) These drops sparkle in the sunlight. (This juice sparkles in the daytime.) The plant seems to shine with hundreds of drops of sunny dew.

A flat circle of leaves grows out from the sundew’s stem. These leaves grow close to the ground. The thin stem rises from the middle. At the top of this stem are pretty white blooms. (At the top of this stem are lovely white flowers.)

This plant’s leaves are not like any others you’ve seen. Each leaf has a great number of tiny tentacles, or feelers. These are like small hairs. The tiny drops of juice flow out of the tip of each feeler. This juice attracts insects to the plant. When they walk on its leaves, the plant traps and kills them. Then it uses them as food. That’s why it’s called an insect eater.

When an insect lands on a sundew leaf, it gets stuck. That’s because that shiny juice is sticky. Then the plant’s feelers begin to move. The feelers bend over the insect. (The feelers close over the bug.) They pin it to the leaf. It has drowned in the juices. The plant juices then change the soft parts of the insect’s body into a liquid. Then the plant takes in this liquid as food.

Table continued on next page.
Does this seem strange for a plant? Well, here's something even stranger. The sundew "knows" what it can "eat" and what it can't. Suppose a grain of sand falls on its leaf. Or a piece of dirt. What happens? Nothing. The little feelers don't curl over. The juices don't flow. But these things do happen if you put a bit of egg or meat on the leaf.

Somehow the plant can tell what is food and what isn't. People have attempted to fool the sundew with other things. (People have tried to trick the plant with other things.) But you just can't fool a sundew!

* 1a. What is a lovely flower?
   1b. What is a pretty plant?

** 2. Where does the sundew plant grow?

* 3a. Where are the drops of liquid found?
   3b. Where is the juice found?

* 4a. What do the drops do in the sunlight?
   4b. What does the juice do in the daytime?

* 5a. Where are the pretty white blooms?
   5b. Where are the lovely white flowers?

** 6. What are like small hairs?

*** 7. Why does the plant let drops of juice flow from the feelers?

** 8. Who walks on the leaves of the sundew?

** 9. Who does the plant use for food?

*** 10. Why is the sundew called an insect eater?

*** 11. Why does the insect get stuck?

** 12. When do the feelers begin to move?
   13a. What bends over the insects?
   13b. What closes over the bug?

*** 14. Why does the insect die?

*** 15. Why does the plant's juice change the insect's body into a liquid?

** 16. What seems very strange about the sundew plant?

*** 17. Why don't the little feelers curl over a piece of dirt?

* 18a. Who has tried to trick the plant?
   18b. Who has attempted to fool the sundew?

* Paraphrase Question
** Informational Inference Question
*** Logical Inference Question
   (a) questions for altered story
   (b) questions for unaltered story

Two independent judges who were professors at nearby colleges reached an 85% agreement on the classification of the questions. The researcher rewrote some questions until 100% agreement was reached.

Two eight-year-old children who had not read the selections were asked the 72 questions to determine their passage dependence/independence. Only three questions were answered correctly by both children (4%). Therefore, the questions as a whole were judged to be passage dependent.
The study used a four-factor mixed design with repeated measures across the levels of three of the factors. The between-subjects factor was ability with two levels, good and poor readers. The within-subjects factors were text type with two levels, narrative stories and expository passages; question type with three levels, paraphrase, informational inference, and logical inference; and story number with the four stories, two of each text type nested within story number. The dependent variables were reading time for each passage and number of questions answered correctly.

Procedure

The children were tested individually in an empty conference room in each of the elementary schools. They were asked to read two narrative stories and two expository passages. Four cards were prepared with either “Narrative 1,” “Narrative 2,” “Expository 1,” or “Expository 2” on a card. Each child drew a card to determine the order of passage presentation. A coin toss determined whether the altered or unaltered version of the story or passage was read. The reading time for each story and passage was recorded. Testing sessions varied from 20 to 30 minutes because the children read at different rates.

After each passage, the children were asked 18 questions requiring paraphrases, informational inferences, and logical inferences for a total of 72 questions. Responses were tape-recorded and subsequently transcribed. The responses were scored “0” for incorrect or no answer, “1” for a partial and/or plausible answer, or “2” for a complete, adult-like answer. For example, in the story “Here Comes the Landlord!,” one question was “Why did Maria go out on the fire escape?.” An incorrect answer was “because the house was on fire” and was scored “0.” A partial or plausible answer was “to be outside” or “to drink her lemonade” and was scored “1.” A complete adult-like answer was “to cool off in the breeze” or “because it was hot in the house” and rated a score of “2.”

Two independent raters scored a random sample of 15% of the children’s answers. The agreement between the raters was 96%.

Results

The data were first analyzed for differences in school, using questions correct and reading time as the dependent measures. The results of both ANOVAs indicated that there were no significant differences between schools for the dependent measure of questions correct, $F(1, 42) = .274, p > .05$, nor the
dependent measure of reading time, $F(1, 42) = .628, p > .05$. Therefore, the 43 students in the two schools did not differ significantly in reading time or the number of questions correct. The subsequent analyses omitted school as a factor.

Six planned $t$ tests for differences between means of each question type for the two narrative passages and for the two expository passages were computed (Bruning & Kuntz, 1977) to determine if readers responded differently to narrative one questions versus narrative two questions. None of the $t$ tests reached significance; therefore, question type was collapsed across each text type in subsequent analyses.

An analysis of variance with repeated measures on number correct per type of question was used to test for main effects and interactions. Because of unequal $n$s in the experiment, an unweighted means solution was used (Winer, 1971). The between-subjects factor was ability with two levels, good and poor readers. The within-subjects factors were text type with two levels, narrative passages and expository passages; question type with three levels, paraphrase, informational inference, and logical inference; and story number with two of each text type nested within story number. The analysis yielded a significant main effect for reader ability, $F(1, 51) = 16.40, p < .0001$. Good readers answered more questions correctly than poor readers when averaged across text type and question type, with means of 6.9 versus 5.2, respectively. The main effect for text type also reached significance, $F(1, 51) = 210.00, p < .0001$. For all children, questions about the expository passages were more difficult to answer than questions about the narrative stories. Mean scores for the questions correct when averaged across ability and question type were 7.6 for narrative stories and 4.6 for expository passages.

The analysis further indicated a significant main effect for question type, $F(2, 102) = 4.24, p < .02$. The order of difficulty for the questions was as follows: informational inference, paraphrase, and logical inference, with logical inference being the most difficult.

The text type by question type interaction also reached significance, $F(2, 102) = 3.00, p < .05$, thus indicating that the responses to questions in the different categories were differentially affected by text type. Therefore, the significant main effects for question type and text were interpreted in the context of the interaction (Winer, 1971). A Newman-Keuls multiple comparisons test was computed to compare the various levels of one factor at each separate level of the other factor (Bruning & Kuntz, 1977). Cell means are shown in Table 3. All levels of the questions on expository texts differed significantly from all levels of questions on narrative stories. The interaction occurred because students' responses to logical inference questions were significantly different from responses to paraphrase and informational inference questions.
after reading narrative stories; children answered fewer logical inference questions correctly than either paraphrase or informational inference questions. Conversely, there were no significant differences among the students' responses to question types after reading expository passages. There were no other significant interactions.

The children's average total performance on each text type was considered in the following manner. There were 18 questions per test. Using the rating procedures previously discussed, each child could have a possible score of 36 on each text type. When cell means were collapsed across the question categories, it was observed that neither good nor poor readers did particularly well. Good readers scored an average of 66% correct on the questions following the narrative stories and 43% correct on the questions following the expository passages. Poor readers scored an average of 54% correct on the questions following the narrative stories, but only 29% correct on the questions following the expository passages. Eighteen questions per passage may have been too many for both good and poor readers to answer.

Using reading time as the dependent measure, the only main effect to reach significance was reader ability. Good readers read significantly faster than poor readers, $F(1, 51) = 26.89, p < .001$, on both text types. Mean reading time for good readers was 184.18 seconds, as compared to 333.08 seconds for poor readers. Additionally, good readers read both text types at about the same speed; poor readers performed in a parallel fashion at a much slower rate.

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### Table 3

#### Cell Means and Standard Deviations for Three-way ANOVA*

<table>
<thead>
<tr>
<th></th>
<th>Good readers $(n = 27)$</th>
<th>Poor readers $(n = 26)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Narrative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paraphrase</td>
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<td>1.88</td>
</tr>
<tr>
<td>Information</td>
<td>8.61</td>
<td>1.24</td>
</tr>
<tr>
<td>Logical</td>
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<td>1.69</td>
</tr>
<tr>
<td>Expository</td>
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</tr>
<tr>
<td>Paraphrase</td>
<td>5.31</td>
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</tr>
<tr>
<td>Information</td>
<td>5.67</td>
<td>1.98</td>
</tr>
<tr>
<td>Logical</td>
<td>5.41</td>
<td>2.27</td>
</tr>
</tbody>
</table>

*This table represents the three primary factors of interest. Story number is not reflected on this table since it was a controlling factor and proved to be nonsignificant.
Discussion

Results of this study were expected to indicate that readers would answer significantly more paraphrase questions correctly than informational inference questions than logical inference questions. The children, however, found paraphrase and informational inference questions to be equally difficult. Because paraphrase questions deal with explicit text information, they were hypothesized to be easier than the informational inference questions that require readers to determine when and where who was doing what to whom with what instruments under what conditions.

An explanation for questions from these two categories being equally difficult is offered. The paraphrase questions were formulated with synonyms; consequently, readers had to understand and associate two sets of vocabulary terms, the terms in the passage and the terms in the question. This condition may have been compounded when the children read the expository passages, which contained relatively new information. After those passages, children presumably had to integrate new concepts and knowledge represented by new vocabulary terms as well as process the synonyms used to formulate the paraphrase questions. The children may have found the task to responding to paraphrase questions as difficult as making informational inferences because both tasks required them to process information at a deeper than surface level.

Logical inferences are the causal relations between events specified in the text. The inference taxonomy used in this study was based on the belief that to fully understand a narrative, the reader must link the story events together to form a coherent representation. Trabasso (1980) argued that these inferences are the most difficult. This study supports that position in part. After reading narrative stories, students found logical inference questions were significantly more difficult to answer than informational inference questions.

On the other hand, logical inferences were not significantly more difficult after reading expository texts than the other categories of questions. While inference questions based on the Warren et al. (1979) taxonomy may reflect the processing necessary to understand narratives, questions that reflect the prevailing rhetorical relations of a particular expository passage and/or the relative importance of the information in the text may be more appropriate to ask than the inference questions used in this study. For example, Meyer and Rice (1984) identified five groups of rhetorical relations that reflect expository structure: antecedent/consequence, response, comparison, collection, and description. A question that reflects a response rhetorical relation would be “What problem did the author identify in this passage?”

Hypothesis one, therefore, was partially supported, specifically in terms of informational and logical inference questions pertaining to narrative stories rather than expository texts. Hypothesis two was supported only to the extent
that more questions of all types were answered correctly after narrative stories than expository texts, but the response patterns were not similar.

The third hypothesis argued that good and poor readers would respond equally well to paraphrase questions, but good readers would do better with informational and logical inference questions than poor readers. Results did not fully support hypothesis three because good readers did significantly better than poor readers on the questions in all categories.

In addition to answering fewer questions correctly, the poor readers had slower reading times than the good readers. If their slower reading times reflected slower decoding abilities, poor readers had less time to consider semantic operations. Less processing capacity or attention to devote to comprehension due to slow decoding is thought to penalize poor readers in just this fashion (LaBerge & Samuels, 1974; Perfetti & Lesgold, 1977).

The analysis of reading times indicated no reader by text type interaction. One would hope all readers would recognize difficult material and slow their reading rate. This may indicate a metacognition problem for good and poor readers. Perhaps the children did not realize they did not understand the expository passages very well and, thus, failed to adjust their reading rate. Or, they may not have been aware that readers are recommended to slow their reading speed on difficult texts. Teachers might be wise to begin discussing the importance of varying reading rate when reading difficult material.

Tentative conclusions can be drawn based on the results of this study. First, third graders' skill in answering paraphrase and text-based inference questions was not very good. Second, good and poor readers differed in their ability to answer paraphrase and text-based inference questions. Third, paraphrase questions were as difficult for students to answer as informational inferences.

References


