DOCUMENT RESUME

ED 195 953 CS 005 765

AUTHOR Hayes, David A.; Tierney, Robert J.
TITLE Increasing Background Knowledge through Analogy: Its Effects upon Comprehension and Learning. Technical Report No. 186.
INSTITUTION Bolt, Beranek and Newman, Inc., Cambridge, Mass.; Illinois Univ., Urbana. Center for the Study of Reading.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE Oct 80
CONTRACT 400-76-0116
NOTE 81p.

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Content Area Reading; *Discourse Analysis; Grade 11; Grade 12; *Knowledge Level; *Learning Processes; Reading Interests; Reading Materials; *Reading Research; *Recall (Psychology); Secondary Education
IDENTIFIERS *Analogy

ABSTRACT

One hundred eleventh and twelfth grade students were grouped according to their knowledge of and interest in baseball and were then tested for their recall of information presented with varying levels and amounts of background information and analogy. The information was presented in the following ways: (1) analogy embedded in text, (2) analogy given as the topic of an antecedent text, (3) analogy embedded in text in conjunction with an analogous-antecedent text, and (4) information presented on a topic without explicit analogies. The data suggested that attempts to increase background knowledge were more beneficial than a control condition in which no attempt was made, but the overall measures revealed no unique effects related to analogy. Analyses across passages suggested that the more information subjects were given about the unfamiliar topic, the more text reproductions they produced. The group given analogies both in an antecedent text and embedded in the instructional text generated more text reproductions than the other groups. All of the groups given some information in antecedent texts generated more than the control group, which was not given such texts. Student background knowledge seemed to influence recall regardless of treatment condition. (RI)

CENTER FOR THE STUDY OF READING

Technical Report No. 186

INCREASING BACKGROUND KNOWLEDGE THROUGH ANALOGY: ITS EFFECTS UPON COMPREHENSION AND LEARNING

David A. Hayes
University of Georgia

Robert J. Tierney
University of Illinois at Urbana-Champaign

October 1980

University of Illinois
at Urbana-Champaign
51 Gerty Drive
Champaign, Illinois 61820

Bolt Beranek and Newman Inc.
50 Moulton Street
Cambridge, Massachusetts 02138

The preparation of this manuscript was supported primarily by the National Institute of Education under Contract No. HEW-NIE-C-400-76-0116. We would like to acknowledge and thank Wilbur S. Ames and Patricia L. Anders for their assistance in the development of the study.

Increasing Background Knowledge through Analogy: Its Effects upon Comprehension and Learning

Much of what is expected to be learned in school must be learned through reading and studying text. What can actually be learned from text depends largely on the facility with which learners deal with the way it presents information and on the way it is augmented by teachers. Accordingly, teachers must attend to the way in which text is presented to learners if the thought processes to be elicited are to result in desired learning outcomes. Among other things, teachers must take account of students' existing knowledge as they prepare instructional activities to facilitate the learning of new information. In situations where students may lack the particular background knowledge necessary for reading unfamiliar material, teachers must somehow address the issue of providing it. Teachers have long claimed that an effective way to do this is to provide a bridge between the knowledge the learners do have and unfamiliar information with analogy. They have argued that analogy gives students a familiar interpretative framework for holding together novel information until it is learned. The purpose of the present study was to explore this claim. Specifically, the present study attempted to verify whether attempts to increase background knowledge through analogy would have an impact upon readers' comprehension and learning, and more specifically, whether varying

the presentation of analogy would differentially affect comprehension and learning from unfamiliar prose.

Background to the Study

The purpose of analogy is to explain. Analogy does this by isolating for comparison a set of relations held in common by two sets of complex entities--complex entities being those which comprise two or more interrelated elements. The correspondence between the elements being compared may vary in precision and detail. In some analogies there is not an isomorphic correspondence between the features of the entities under comparison. But those features may be similar enough to enhance understanding without being exactly alike. Or there may be correspondence between some but not all of the features. In stricter kinds of analogies, there is a one-to-one correspondence between the features of the items being compared and the relations presented within each of them. It is the provision of explicit terms common to the entities under comparison which originally gave rise to the notion of analogy in formal thought.

Used as a teaching aid, analogy provides a comparison which can explain something difficult to understand by pointing out its similarities to something easy to understand. Once new material is learned, it in turn may serve as an analogous referent for comparison with still other material to be learned.

In accord with these claims, educational writers advocating the instructional use of analogy maintain that it can increase the speed and efficiency of the learning process. They also claim that analogy facilitates an increased understanding of the old subject material, as well as

enthusiasm for new subject matter. Kahn (1978) and Swick and Miller (1975) assert that in reading instruction, analogies illustrate the necessity for following certain steps to achieve a desired goal and for taking different approaches and attitudes toward different kinds of textual materials. Nelson (1975) posits that analogy is useful in teaching technical vocabulary, forming hypotheses, and discovering concepts. Science educators Weller (1970) and Smith and Wilson (1974) argue that analogies aid in bringing about an initial understanding of scientific concepts and that students are enabled by those analogies to build on the ideas thus acquired. Capps (1979) suggests that the use of analogies which are taken from the language arts can be useful in teaching mathematics. Similarly, Oliphant (1972) advocates the use of analogies from the language arts for explaining certain musical concepts to children.

Educators also appear to be aware of the limitations of analogy and emphasize that care should be taken in its application. If the resemblance between the terms of an analogy is slight, the analogy may be misleading. Because subjects are analogous in many respects, students may have difficulty accepting those respects in which subjects are not analogous. Similarly, students with insufficient background knowledge may think of the analogous model as the concept to be learned rather than an illustration of some other concept.

Philosophers interested in the theoretical and practical aspects of learning and thinking maintain that analogy facilitates comprehension of complex concepts by making them intellectually satisfying. Campbell (1920)

and Black (1962), for example, assert that analogies are important not only in formulating and illustrating concepts but also in extending them to deal with new phenomena and new domains of phenomena. Black, for instance, advocates the use of analogy for comprehending complex theories. He believes that analogies are useful for making properties of a theoretical model better known, arguing that if learners are sufficiently familiar with the realm of knowledge to which the analogy is drawn, they can become versatile in its application and draw inferences from it.

In recent years a number of cognitive psychologists have specified the important role played by background knowledge in comprehension and alluded to the possible benefits of analogy. Within a theoretic framework which derives form the notion of schematism conceived by Kant (1781/1966), developed notably by Bartlett (1932) and Spearman (1923), and recently given prominence by Anderson, Spiro, and Anderson (1978), Neisser (1976), Rumelhart and Ortony (1977), and others, the function and power of analogy for providing a bridge from existing knowledge to new knowledge has been highlighted. Characterizing knowledge as residing within structured thought processes, these writers have hypothesized that learning involves the generalization of knowledge to incorporate new content which is analogously structured. New content is structured to fit within the existing knowledge system, and the knowledge structure is modified through certain mental events to accommodate the new content. Analogy accesses this process by presenting unfamiliar content structured in such a way as to directly engage knowledge which is correspondingly structured (Rumelhart, Note 1).

Despite the practical utility of analogy claimed by educators, and despite the accounting for why it should work by philosophers and psychological theorists, the experimental literature in education and psychology provides little empirical basis for issuing favorable statements about the instructional value of analogy nor, in fact, any attempts to increase background knowledge. Research on the pedagogical application of analogy has been reported by only a few investigators, and the investigations they report have not produced strong evidence to support the instructional use of analogy.

The strongest empirical evidence of the instructional value of analogy has been offered by Ausubel and Fitzgerald (1961), who found that giving readers an advance expository passage on a familiar topic analogous to an unfamiliar topic to be learned from another expository passage resulted in superior learning. Other research has not offered such positive findings. Royer and Cable (1975, 1976) studied the effect of advance presentation of analogous material which was either concrete or abstract, but they did not directly address questions related to the instructional efficacy of analogy. Mayer (1975) found that analogies as well as illustrations and examples appear to elicit relevant knowledge structures for learning, but he drew no conclusions about the effects of analogy per se. Investigations by Dowell (1968) and Drugge (1977) found no significant effects stemming from the instructional use of analogy with high school students. Of the investigations conducted to date, only the Ausubel and Fitzgerald study

has attempted to weigh the effect of prior knowledge of analogous materials. None of the studies has attempted to account for interest related to the analogous materials. Furthermore, all studies have worked from a rather restricted definition of comprehension, and few studies have systematically examined the effects of analogies per se.

Research on analogy also seems especially warranted on theoretical grounds. Of particular interest is the unique role analogy is thought to play in bringing to bear learners' existing knowledge in order to render new knowledge accessible. By studying analogy from a theoretical perspective recently revived in cognitive psychology, schema theory, it may be possible to explore the cognitive processes involved in learning by analogy. Since schema theory suggests that what a person already knows directs the processes by which new information is acquired and used, such a theoretical perspective appears to lend itself well to the study of learning by analogy. In its current stage of development, schema theory is limited to accounting for the processes of comprehension and memory retrieval. As several theorists (Norman, Genter, & Stevens, 1976; Rumelhart & Ortony, 1977; Thorndyke & Yekovich, in press) have emphasized, schema theory needs further development if it is to adequately explain how learning takes place. Rumelhart and Ortony suggested in their paper based upon a composite of schema theoretical notions:

> We have postulated no mechanisms whereby new schemata can grow and old ones evolve. Indeed, this is a central problem for schema theorists and very little work has been done on it. Nevertheless, the nature of schemata suggests a number of plausible mechanisms whereby new schemata can be produced. (Rumelhart & Ortony, 1977, p. 123)

The mechanisms they go on to describe are the processes of schema specialization and schema generalization.[1]

Purpose

The purpose of this study was to examine the effects of attempts to increase background knowledge by having students learn from prose material which was augmented by analogy, and to use this examination to probe theoretical and practical questions of relevance to learning from text. To this end, the study examined (a) the effects of different modes of presenting unfamiliar information--especially through the use of analogy--upon the type of information generated by students of varying levels of relevant background knowledge; as well as (b) the effects of these modes of presentation of information upon the ability of these same students to answer questions developed in accordance with schema-theoretic notions of knowledge generalization and specialization. The different modes of presentation of information were: (a) analogy embedded in text, (b) analogy given as the topic of an antecedent text, (c) analogy embedded in text in conjunction with an analogous-antecedent text, and (d) information presented on a topic without explicit analogies. It was with this purpose in mind that the research question was formulated:

> When a text on an unfamiliar topic is given to students with different levels of knowledge of an analogous topic, how will learning from the text be influenced by (a) analogy embedded in a text, (b) analogous information given as the topic of an antecedent text, (c) analogy embedded in text in conjunction with an analogous antecedent text, and (d) information presented on a topic without explicit analogies?

The topic chosen to be learned from the prose materials was the game of cricket. Where analogies were used, they were drawn to the game of baseball. It was decided that the game of cricket would serve as a satisfactory topic for the instructional texts since American high school students could be assumed to be unfamiliar with cricket (Abramson, 1979). Alternatively, the familiarity of one of its analogs, the game of baseball, could reasonably be assumed.

The research question was addressed by probing a number of subsidiary questions. These subsidiary questions tested analogy's influence on the transfer of learning from prose materials to recalling other, topically related, text and to making appropriate predictions and discriminations on a multiple-choice test.

Questions concerning the recall of topically related text focused on the amount and type of information generated on recall tasks. It was assumed that a person's written recall performance would be affected by the extent of knowledge related to the topic of the text and, further, that inferences could be drawn about the character of a person's cognitive processing on the basis of the amount and generality level of the information recalled. Based upon the notion (Kintsch & van Dijk, 1978; Drum, Note 2) that generality of a person's memory for text reflects extent to which its information has been assimilated, three types of information were identified in subjects' recall protocols: Explicit text reproductions, text-entailed inferences, and text-evoked inferences.

Other questions subsidiary to the research question dealt with analogy's effect on the ability of the subjects to predict appropriate outcomes to open-ended situations related to the topic of the unfamiliar text and to discriminate between instances which were and were not related to the topic of the unfamiliar text. These tasks were developed as a means of approaching an assessment of the learning mechanism of knowledge generalization and knowledge specialization.

Procedures

Subjects

Subjects were eleventh and twelfth graders of average and above-average reading ability from a rural suburban high school in Northern California. Eleventh and twelfth graders were selected from this school for the following reasons: (a) Two previous studies related to the instructional use of analogy (Dowell, 1968; Drugge, 1977) had involved high school students; (b) the student population represented a wide and typical range of social and economic backgrounds. The elimination of students of below-average reading proficiency was prompted by our desire to eliminate subjects who might have difficulty responding to the text. Teacher judgment and standardized reading test results were used as criteria for selecting students.

On the basis of responses given on the surveys of interest and prior knowledge assessment, students from the subject pool were grouped according to three levels of baseball knowledge (high, moderate, low) and three levels of baseball interest (consistently high, mixed, consistently low). Levels

of baseball knowledge were included in the analysis in order to determine the effects of the different experimental treatments relative to level of prior analogous knowledge. Data on levels of interest in sports and baseball were not included in the analysis; rather, they were used to comparably distribute subjects across treatment groups according to levels of interest in sports and baseball.

From these strata, subjects were proportionately assigned to five treatment groups at random. Each treatment group consisted of 21 subjects. The number of subjects in each treatment group actually participating in the experiment ranged from 19 to 21 subjects due to absenteeism on the day of the experiment.

Experimental Materials

A number of materials were developed in order to examine the effects of attempts to increase background knowledge for unfamiliar topics with passages excluding and including analogies. These materials included: a pretest survey of general interest in sports and specific interest in baseball, a pretest to assess background knowledge for baseball, a knowledge-evoking text on the game of baseball, two instructional texts on the game of cricket, two control texts, two passages for recall tasks, and a discrimination-prediction survey for posttest purposes.

General interest in sports was estimated from subjects' responses to a multiple-choice sentence item of the form, "My general feeling about sports is. . . ." Possible responses ranged from "like sports very much" to

"dislike sports very much." The data obtained suggested that all subjects involved in the study had a similar interest in sports and, therefore, general interest in sports would not confound specific interest in baseball.

Levels of specific interest in baseball was ascertained through a rating scale and ranking procedure (Kerlinger, 1973). The first of these measures presented subjects with a list of ten team sports, one of which was baseball, and asked for an indication of interest in each one independent of interest in the others. Students rated interest in each sport along a continuum for "strongly like" to "strongly dislike." The ranking scale included the same list of ten team sports. Students ranked (1-10) the sports from most to least favorite separately for playing and for watching them.

In order to assess subjects' prior knowledge of baseball, a 22-item Likert-type survey was devised. Knowledge of baseball was assessed in order to determine the extent to which it systematically interacted with the treatment variables. The content of the baseball knowledge survey included baseball terms, rules, and situations of play that persons knowledgeable about baseball would know. Salient points of information presented in the expository text on baseball were included as well as points of baseball information to which analogical reference was made in the instructional text on cricket. For example, terms such as ground rule double, batter's box, and leading off were included because reference was made to them in presenting their respective cricket analogs, boundary-four, popping crease, and backing up. Items on the scale required students to select a

response ranging from "definitely true" to "definitely false." To check on the scale's validity, the performance of assumed experts was compared with that of assumed novices. The expert population comprised students who had played interscholastic baseball; the novice population consisted of recently arrived foreign students. The difference between the expert mean (42.8) and the novice (1.7) provided strong support for the validity of the scale. As indicated by a split-half reliability coefficient of .92, the survey reliably discriminated a variety of levels of baseball knowledge.

The knowledge-evoking text was included in the experiment in order to examine the effect of advance presentation of information analogous to the topic of the instructional texts. It described the game of baseball, the topic which served as the familiar analog for explaining the game of cricket in one of the instructional texts. In accordance with Ausubel's (1960) notion that "the most important factor in influencing learning is the quantity, clarity, and organization of the learner's present knowledge" (p. 50), the knowledge-evoking text devoted ample discussion to those subsuming concepts in the baseball text that would be useful for learning the analogous content of the cricket text. Those subsuming concepts provided the organizational framework for presenting the content of the knowledge-evoking text on baseball as well as the instructional texts on cricket. The subsuming concepts included in the knowledge-evoking text in the order given were: an overview of the game and its purpose; the playing field; scoring; the infield as the center of the game's activity; the role of the

pitcher; the role of the batters and base runners; putting out batters and base runners; turns at bat; and completing the game. (Throughout the paper the knowledge-evoking text is referred to as the analogous-antecedent text.)

The instructional texts were based on an article on cricket in Webster's Sports Dictionary (1976). First, an informational text strictly about the game of cricket was written to parallel the knowledge-evoking baseball text. It included an overview of the game, the playing field, scoring, the centerfield, the role of the bowler, the role of batsmen, dismissal of batsmen, turns at bat and completing the game. To create the instructional text, including analogies, selected target structures were rewritten to provide direct feature comparisons with baseball. Portions of these texts appear in Figure 1.

Insert Figure 1 about here.

Two control texts were constructed. The first paralleled the structure of the knowledge-evoking text on baseball; the second, the instructional text on cricket. Neither contained any analogies. The first text was about weather (based upon material from Weather by Lehr, Burnett, Zin, & McNaught, 1965, pp. 10-11, 53-56); the second addressed the topic of film-making (based upon material taken from Young Filmmakers by Larson, 1969).

The two test passages were composites of newspaper articles about cricket taken from the sports section of The Australian (December 1978), a daily newspaper published in Sydney, Australia. Providing two such instances of text for evaluating subjects' comprehension was an attempt

to increase the generalizability of the study's findings by replication. Different cricket match situations were presented within two different idea structures. This permitted identification of subjects who appeared to be more versatile in dealing with information about cricket, that is, who could use the structure of the information to their advantage (Meyer, 1977; Meyer, Brandt, & Bluth, Note 3). An example of one of these texts is presented in Figure 2.

Insert Figure 2 about here.

As a check on the readability of the experimental materials, all texts were reviewed by classroom teachers, all of whom had taught at an eleventh-grade level, and qualified university personnel. They deemed all texts appropriate for the subjects for whom they were intended. As determined by the Fry Readability Graph (1968), all texts were assessed as being at either the sixth- or seventh-grade level.

A discrimination-prediction survey was developed to appraise the extent to which subjects learned the topic of the instructional texts. The survey presented ten cricket match situations and asked subjects to choose the most likely result of that situation from a group of five results for each situation. Twenty-two out of 50 items were not cricket items. In addition to choosing the most likely result to the cricket match situation, subjects were to identify those items that were not within the scope of the game of cricket. As a check on the appropriateness of the test,

educators of Australian and British nationality who reviewed the instrument agreed the scale accurately depicted aspects of cricket.

Data Collection Procedures

Data for the study were collected on two separate occasions. On the first occasion, pre-experimental data were collected on some 150 eleventh- and twelth-grade students in order to assess their prior knowledge and interests. From these data, students were grouped according to three levels of baseball knowledge (high, moderate, low) and three levels of baseball interest (consistently high, mixed, consistently low) and proportionately assigned to five treatment groups at random. The number of subjects in each treatment group ranged from 19 to 21. On the second occasion, data were collected on 100 of these students during the experiment conducted as an activity in the subjects' regular classes. In the experiment each of the five groups of subjects read a different sequence of passages corresponding to the five treatment conditions and then responded to the test passages as well as the discrimination-prediction survey. In accordance with the sequence of passages read by each group, these treatment groups were labelled: B + C(A), X + C(A), B + C, X + C, and X + X.

Group 1 (B + C(A)) read a baseball passage (B), then an instructional cricket passage with analogies (C(A)).

Group 2 (X + C(A)) read an unrelated passage (X), then an instructional cricket passage with analogies (C(A)).

Group 3 (B + C) read a baseball passage (B), then an instructional cricket passage without analogies (C).

Group 4 (X + C) read an unrelated passage (X), then an instructional cricket passage without analogies (C).

Group 5 (X + X) read two unrelated passages.

All subjects followed the same procedure in reading the passages and responding to the comprehension and learning tasks. Following the introduction to the experiment and some practice exercises, subjects were directed by their teachers to read the first two passages. The directions given by the teacher were to read and study the selection very carefully in order to learn as much as they could about the subject of the passage. They were allowed to mark the passages if they cared to do so and were told to regard the activity as a class assignment. Following the reading of the first and second passages, subjects were directed to read the first test passage and try to remember everything they could. Upon completion, they were instructed to write down everything they could remember. They were given similar directions for the second test passage and were then directed to complete the discrimination prediction survey.

Dependent Measures

With a system of text analysis proposed by Kintsch (1974) and codified by Turner and Green (1977), template text bases of the test passages and protocol text bases of subjects' written recalls were obtained. Protocol text bases were scored by comparing them to their corresponding template text bases according to a procedure suggested by Drum (Note 2). First, a template text base for each test passage was prepared as described above.

Then, referring to the template text base, propositions of each protocol text base were identified as either repeating propositions of the template text base or representing two levels of inferences drawn from the test passages.

Propositions of the protocol text base identified as repeating propositions of the template text base were designated text reproductions. It was not necessary that a protocol proposition be recalled verbatim to be counted as a text reproduction. A protocol proposition was counted as a text reproduction if the content words used to represent its arguments and relations were synonymous with the words so used in the template proposition. A protocol proposition which omitted arguments of a text base proposition was still counted as a text reproduction if the relation and at least one other argument remained intact.

Protocol propositions representing deviations from the text were of two broad categories: propositions which could be directly linked with template propositions and propositions that could not be directly linked with template propositions.

Protocol propositions that could be directly linked to the text base were designated text entailments. Three types of text-entailed propositions were identified during scoring. The first type of text entailment was a proposition which served to summarize certain propositions of the text base. This type of proposition generalized the arguments and relations of two or more specific text base propositions in such a way as to preserve their common meaning at the expense of the specific meanings represented

by each in the text base. The second type of text entailment was a proposition directly related to a single proposition of the text base. It was a text base proposition whose arguments and relations had been generalized to the extent that similarity to the meaning of the text base proposition was not preserved. A third type of text entailment added case-related information to the text base. This type of text entailment was a modifier proposition complementing a predicate proposition of the text base. Since these types of text entailments were not always discrete, the three types were collapsed into a single count of text entailments for purposes of analyzing the data.

Protocol propositions that could not be directly linked to specific propositions of the text base were designated text-evoked propositions. Text-evoked propositions were thematically related to the content of the text base. They were generalizations drawn from the text without any connection to specific propositions of the text base. Drum (Note 2) provides a fourth category of recalls to include implausible, irrelevant, non-text-related propositions. In this study such recalls were not scored. The text-evoked category in this study included only plausible and relevant units of information.

These three types of protocol propositions (text reproductions, text entailments, and text-evoked propositions) were tabulated for each subject's recall for each test passage with interrater agreement of .92 on approximately 10% of the sample. These three scores provided the raw data for the analysis of the recall protocols.

Responses to the discrimination-prediction survey were scored in such a way as to yield three measures. First, an accuracy of prediction score was determined from the number of correct selections of most-likely outcomes to specific cricket match situations. A second measure was derived by counting the number of such outcomes which were within the scope of cricket regardless of their likelihood. This was similar to a context-bound discrimination. A third measure was generated by assessing whether the subjects were able to discriminate cricket from noncricket outcomes without being given a specific cricket match situation. This was similar to a less context-bound discrimination.

Analysis

The data for each dependent variable and each passage were subjected to a number of separate two-way analyses of variance. By examining the data for each passage separately we were able to assess whether the findings would remain stable across different but similar passages; by examining the data for each variable separately, we were able to study any differences which resulted for a measure independently. Specifically, these examinations enabled the following questions to be addressed:

> Was the impact resulting from attempts to increase background knowledge consistent across passages?
>
> Did variations in the impact of attempts to increase background knowledge upon selected variables coincide with schema-theoretic notions of knowledge acquisition and other theoretical notions of reader involvement?

Where significant differences were found, the Scheffé S-method (Scheffé, 1959) was used to examine various comparisons of the groups pairwise and in combination. These comparisons were directed toward answering the following:

> Did any attempts to increase background knowledge influence comprehension and learning?
>
> Did attempts to increase background knowledge using alternative modes of analogy influence comprehension and learning differentially?
>
> Did readers with varying background knowledge of the analogous material respond differentially to these separate comprehension and learning tasks?

Results

The results of the two-way ANOVA's (three levels of background knowledge and five levels of treatment) as well as the results of the Scheffé follow-up tests are reported separetely for each variable and passage.

Total Number of Units Recalled

The means and standard deviations of the total units of information recalled from the first and second test passage are reported in Tables 1 and 2, respectively. The ANOVA for the first test passage revealed no significant differences due to an interaction effect, $F(4,85) = .892$, $p > .05$, nor were there differences across levels of text-analogous

---

Insert Tables 1 and 2 about here.

---

information, $F(2,85) = .759$, $p > .05$. Significant differences were observed across levels of treatment, $F(4,85) = 5.810$, $p < .001$. Pairwise and combination post hoc comparisons by Scheffé's S-method indicated that the control group significantly differed from each and all other groups. Otherwise, there were no significant differences between or among groups.

For the second test passage, the results of the ANOVA showed no significant differences due to interaction effects, $F(8,85) = .742$, $p > .05$. Nor were there differences across levels of text-analogous knowledge, $F(2,85) = 1.946$, $p > .05$. Significant differences were observed across levels of treatment, $F(4,85) = 4.44$, $p < .01$. Pairwise and combination post hoc comparisons by Scheffé's S-method indicated that the control group significantly differed from each and all other groups. Otherwise, there were no significant differences between or among groups.

Across both passages these data suggested that attempts to increase background knowledge were more beneficial than a control condition in which no attempt was made. Otherwise, reminiscent of the Royer and Cable (1976) study, the overall measure of the present study revealed no unique effects related to analogy. Just as the Royer and Cable study was limited by its overall recall score, so this particular measure in the present study provided little or no differential information about subjects' recalls. The total recall score reflected recall performance in a general way. As the sum of all the information given in a recall, it did not indicate the kind of information generated.

Number of Text Reproductions

The means and standard deviations for the number of text reproductions contained in the recalls of subjects are reported in Tables 3 and 4 for passages 1 and 2, respectively. Analysis of the data of the first recall task revealed no significant interaction effect for the number of text reproductions, $F(8,85) = 1.55$, $p > .05$. Nor were significant differences revealed across levels of text-analogous knowledge, $F(2,85) = 1.07$, $p > .05$. However, significant differences were noted across treatment groups' recalls of the first test passages, $F(4,85) = 2.77$, $p < .05$. Scheffé post hoc pairwise comparisons indicated that, on the first test passage, the group given analogy embedded in the instructional text in conjunction with the analogous antecedent text (B + C(A)) produced significantly more text-reproduced information than the group given analogy embedded in the instructional text in conjunction with the unrelated antecedent text (X + C(A)). Otherwise, there were no significant differences on the first test passage between groups given instructional texts. On the first passage, the control group differed significantly from groups given instructional texts in number of text reproductions generated.

Insert Table 3 about here.

Analysis of the data of the second recall task yielded similar results. There was no significant interaction effect for the number of text reproductions given by subjects, $F(8,85) = 1.118$, $p > .05$. In other words, no method of presenting the texts on cricket in this investigation seemed to

hold any better effect than any of the others for promoting the recall of topically related passages by subjects with particular levels of knowledge about baseball. Nor were significant differences revealed across levels of text-analogous knowledge, $F(2,85) = .150$, $p > .05$. However, significant differences were noted across treatment groups' recalls of the second test passage, $F(4,85) = 3.492$, $p < .05$. Scheffé post hoc pairwise comparisons indicated that, on both test passages, the group given analogy embedded in the instructional text in conjunction with the analogous antecedent text (B + C(A)) produced significantly more text-reproduced information than the group given only analogy embedded in the instructional text (X + C(A)). Otherwise, there were no significant differences on the second test passage between groups given instructional texts. Scheffé post hoc pairwise, as well as combined, comparisons showed that on the second test passage, the control group produced significantly less text reproduced information than each and all groups given instructional texts.

Insert Table 4 about here.

In general, these analyses across passages suggest that the more information subjects were given about the unfamiliar topic the more text reproductions they produced. The group given analogy both in the antecedent text and embedded in the instructional text (B + C(A)) generated more text reproductions than the other groups. Furthermore, all of the groups given some information in antecedent texts generated more than the control group, which was not given such texts.

Number or Text Entailments

The means and standard deviations derived for the total number of text entailments in the students' written recalls for test passages 1 and 2 are reported in Tables 5 and 6, respectively. The analysis for the first recall task showed no significant interaction between levels of text-analogous knowledge and treatment, $F(8,85) = .864$, $p > .05$. Nor were there significant differences across levels of text-analogous knowledge, $F(2,85) = 2.697$, $p > .05$. Significant differences in the mean number of text entailments were observed across the treatment groups, $F(4,85) = 7.431$, $p < .001$. Scheffé post hoc comparisons indicated that the control group produced significantly less text-entailed information than the groups given the instructional texts. The groups given antecedent instructional texts dealing with the analogous topic (B + C(A), B + C combined) produced significantly more text-entailed information than did groups which were given the non analogous antecedent texts (X + C(A), X + C combined). Among the groups given instructional texts with analogy, the group given analogies embedded in the instructional text with the unrelated antecedent text (X + C(A)) produced significantly less entailed information than the other two groups given texts with analogy (B + C(A), B + C).

Insert Table 5 about here.

The analysis of variance for the second recall task showed no significant interactions between levels of text-analogous knowledge and levels of treatment, $F(8,85) = 1.127$, $p > .05$. No significant differences were

found across levels of text-analogous knowledge, $F(2,85) = 1.008$, $p > .05$. And no significant differences were found across treatment groups, $F(4,85) = 2.264$, $p > .05$.

---

insert Table 6 about here.

The results of these analyses were consistent with the research assumption that reader interaction with text results in modified recollections of the text. Antecedent instructional texts dealing with the analogous topic apparently promoted reader-text engagement on the first test passage at a level which resulted in a greater number of text entailments than would have been produced otherwise, assuming that the recall of the control group and the group not given analogy represent the frequency of text-entailed information that would have otherwise been produced.

That the treatment group differences on the first recall task did not hold for the second recall task may be explained by the data as possibly resulting from a combination of two factors. The first contributing factor may have been that the control group learned enough from the first passage to generalize the propositions of the second test passage. The control group's mean text entailment recall improved by 45% on the second test passage. A second possible explanation is that the second recall task appears to have neutralized the beneficial effect of the analogy. The analogy groups' mean recall diminished, altogether by about 30%, while the mean recall of the instructional group without analogy remained about the same.

Number of Text-Evoked Units

The means and standard deviations derived for the total number of text-evoked units in the students' written recalls for test passages 1 and 2 are reported in Tables 7 and 8, respectively. The results of this ANOVA did not reveal a significant interaction effect in the number of text-evoked units of information given by subjects across levels of text-analogous knowledge across treatment groups, $F(8,85) = 1.317$, $p > .05$. Nor were there significant differences across levels of text-analogous knowledge on the first test passage, $F(2,85) = .889$, $p > .05$. Significant differences were found in the number of text-evoked units of information given by subjects across treatment groups, $F(4,85) = 3.26$, $p < .05$.

Insert Table 7 about here.

Scheffé post hoc combination comparisons showed that the groups given analogy (B + C(A), X + C(A), B + C combined) produced significantly more text-evoked information than the other groups (X + C, X + X combined), and that the group given analogy embedded in the instructional text in conjunction with the unrelated antecedent text (X + C(A)) produced significantly more text-evoked information than the other groups. In terms of the latter, pairwise comparisons showed that the group given analogies embedded in the instructional text with the unrelated antecedent text (X + C(A)) produced significantly more text-evoked information than the group given no analogy and the group given analogy both embedded in the instructional text and with the antecedent text.

For the second passage, the number of text-evoked units of information given by subjects across levels of knowledge across treatment groups were not significantly different, $F(8,85) = 1.861$, $p > .05$. Nor were significant differences found across treatment groups, $F(4,85) = 1.912$, $p > .05$. Significant differences were found in the number of text-evoked units of information given by subjects across levels of text-analogous knowledge, $F(2,85) = 3.673$, $p < .05$.

Insert Table 8 about here.

Pairwise as well as combination post hoc comparisons by the Scheffé method showed that subjects with a high level of text-analogous knowledge produced significantly more text-evoked information on the second recall task than did subjects at either of the other two levels of text-analogous knowledge. Subjects with moderate and low levels of text-analogous knowledge did not significantly differ in the number of units of text-evoked information they produced. This finding suggested that students' background knowledge had an influence on the extent to which their recall included text-evoked recall units, or was reader-based, regardless of the treatment condition received.

Responses to Prediction Task

The means and standard deviations based upon the subjects' responses to the prediction task (selection of appropriate outcomes to cricket-match situations) are presented in Table 9. Analyses of the subjects' performance

on this task revealed that the interaction effect was not significant. There were no significant differences across levels of text-analogous knowledge across treatment groups, $F(8,85) = 2.016$, $p > .05$. Nor were there differences across levels of text-analogous knowledge, $F(2,85) = 2.117$, $p > .05$. Significant differences across treatment groups were indicated, $F(4,85) = 43.185$, $p < .001$. In pairwise as well as combination post hoc comparisons, the control group made significantly fewer correct predictions than did the other treatment groups. There were no significant differences across treatment groups given instructional texts. In other words, by itself this measure indicated that subjects given background information on the game of cricket were better able to predict appropriate outcomes to open-ended cricket match situations; no differences in the ability to generalize that background information could be attributed to different modes of analogy.

Insert Table 9 about here.

Responses to Discrimination Tasks

The means and standard deviations derived for the discrimination tasks are presented in Tables 10 and 11. Analyses of subjects' performance on the discrimination tasks suggested that there were differences on the first measure (the number of irrelevant predictions when students were asked to specify the most-likely outcome) but not on the second (the number of topically inconsistent items of information specified by students).

On neither measure was there a significant interaction effect, $F(8,85) = 1.505$, $p > .05$, $F(8,85) = .319$, $p > .05$; nor were there significant differences across levels of text-analogous knowledge, $F(2,85) = 2.398$, $p > .05$, $F(2,85) = .649$, $p > .05$. There were no significant differences across treatment groups in number of items identified as not belonging within the domain of the topic to be learned, $F(4,85) = 1.547$, $p < .05$. Significant differences were noted, however, across treatment groups in the selection of items related to the analog rather than to the topic itself in the prediction task, $F(4,85) = 7.090$, $p < .001$.

Insert Tables 10 and 11 about here.

Pairwise as well as combination post hoc comparisons revealed that the group given analogies in the instructional text in conjunction with the analogous antecedent text (B + C(A)) selected significantly fewer items related to the analog than the other groups given instructional texts or the control group. In general, the data showed that subjects given some background information on the game of cricket were better able to discriminate between instances which were and which were not related to the game of cricket if discriminations were made in direct connection with a particular cricket match situation. Knowledge of cricket, however, was not so firmly established and finely differentiated that discriminations could reliably be made without reference to a particular cricket match situation. That is, there was a significant difference in the ability of subjects to discriminate when given a cricket match situation; outside the context of a specific cricket match

situation to which instances could be tied, subjects did not significantly vary in making discriminations.

Discussion

At the outset, it was suggested that the central purpose of the present study was to investigate whether attempts to increase background knowledge, especially through analogy, would have an impact upon a reader's comprehension and learning. Of particular interest were answers to the following questions:

Did any attempt to increase background knowledge influence comprehension and learning?

Did attempts to increase background knowledge using alternative modes of analogy influence comprehension and learning differentially?

Did readers with varying amounts of background knowledge of the analogous material respond differentially to the various comprehension and learning tasks?

Did the impact resulting from attempts to increase background knowledge remain stable across the passages which were recalled?

Did the comprehension and learning resulting from attempts to increase background knowledge coincide with schema-theoretic notions of comprehension and knowledge acquisition as well as other theoretic notions of reader involvement?

For purposes of discussion, the results of the study are related to each of these questions.

Did any attempt to increase background knowledge influence comprehension and learning? Across almost all analyses the data suggested that the more information subjects were given about the unfamiliar topic, the better was

their performance on the written recall task as well as prediction-discrimination tasks. On the written recall tasks, all of the subjects given instructional texts (treatment conditions B + C(A), X + C(A), B + C, X + C) produced significantly more information at all levels of generality than the control subjects (X + X), who were not given such texts. For the first recall task, the findings with respect to the total number of units, the number of text reproductions, text entailments and text evocations consistently favored those subjects given information for the unfamiliar topic; for the second recall task, this trend was consistent for the total number of units recalled and for text reproductions alone. In terms of performance on the prediction and discrimination tasks, subjects given background information were better able to make accurate predictions and to discriminate information consistent with a specific instance of the unfamiliar topic. In terms of the latter, subjects given information on the unfamiliar topic were better than control subjects in being able to make discriminations if the information was connected to a specific instance of the topic. In light of the dearth of support from similar empirical endeavors, the present results should be viewed as being far from trivial. Unlike most other studies in which attempts have been made to increase background knowledge, the present data provide strong support for the efficacy of the treatment conditions over the control condition. In this regard, the data provide some clarification of the nature of the effects of increasing background knowledge upon comprehension and learning.

Did attempts to increase background knowledge using alternative modes of analogy influence comprehension and learning differentially? Pairwise and combination comparisons indicated that differences observed in the subjects' performance on three of the recall measures as well as on one of the prediction-discrimination tasks varied according to the method by which analogy was presented in text. Differences in the number of text reproductions produced in response to the first recall task favored the use of analogy embedded in the instructional text together with the analogical antecedent text (B + C(A)); differences in the number of text entailments favored the use of the analogical antecedent text (B + C(A), B + C); differences in the number of text evocations favored the use of the analogies either embedded or as an antecedent text [(X + C(A)) + (B + C) + (B + C(A))] over the presentation of information without analogical qualities. On the prediction and discrimination tasks, subjects given analogy were not distinguished from subjects given texts without analogy in predicting appropriate outcomes to the given cricket match situations. Nor were they distinguished from the non-analogy subjects in their ability to identify irrelevant information independently of a particular context. However, the group given analogy both in the advance text and embedded in the instructional text (B + C(A)) were better able to discriminate between cricket and non-cricket information if the discriminations were made within the context of a particular cricket match situation. In general, then, the use of these alternative modes of presenting information did have a

differential impact which tended to favor the use of analogy over the presentation of information without analogical qualities. This was especially the case with respect to the extent to which readers' recalls were integrated. Specifically, alternative modes of presenting analogy prompted recalls which were more reader-based--that is, more text evocations were produced--and they prompted learning which was reflected in certain types of discrimination and not others.

Did readers with varying amounts of background knowledge respond differentially to the various comprehension and learning tasks? The data revealed scant, if any, association between treatment effects and subjects' level or prior background knowledge of the analogous material. The only indication of a differential response related to the background knowledge was given by high knowledge subjects on the second recall task, where they produced significantly more text evocations than other control subjects. That result by itself can at best only hint that those subjects had been cued by the first recall task to turn to their store of relevant analogous knowledge for application in reading and recalling the second passage.

The failure of the present study to find other differences across levels of analogous background knowledge may well have resulted from design limitations. On the pre-experimental baseball knowledge survey, very few of the subjects scored as low as the highest-scoring baseball-naive person who completed the survey in the validation procedures.

Within the range obtained, an attempt was made to segment subjects into three levels of knowledge--high, moderate, and low. It seems doubtful, however, that the three groups represented discrete levels of knowledge, since there was a limited interval separating the scores of the low and moderate groups and the moderate and high groups. That several of the differences across levels of text-analogous knowledge in the present study approached significance suggests that if there had been more separation between levels of knowledge, significant differences might have been obtained.

Did the impact resulting from attempts to increase background knowledge remain stable across the passages which were recalled? Significant differences between treatment groups persisted across both recall tasks on only one measure of recall, that of text reproduction. Differences between the groups on text-entailed and text-evoked recall measures on the first written recall task faded on the second recall task. Perhaps the subjects learned enough from the first recall task itself to neutralize treatment effects on the second recall task. Perhaps subjects were cued during the first task to independently resort to their own store of analogous knowledge for use in the second task. Perhaps subjects learned to cope with the novel demands of the recall task during their first attempt. Without controlling time on task we had no way to ensure that on-line processing remained constant. A hypothesis which was not pursued was the effects of attempts to increase background knowledge upon the behavior of readers during comprehending. Any of these possibilities point to the limitations not only of the present study, but comprehension and learning research in general; they emphasize

the need to address research on learning from text with a great deal of suppleness. Procedures for delineating individual differences need to be carefully operationalized; methods of measuring on-line processing as well as other aspects of comprehension and learning need to be included.

Did the comprehension and learning which resulted from attempts to increase background knowledge coincide with schema-theoretic notions of comprehension and knowledge acquisition as well as other theoretic notions of reader involvement? The data collected in the present study were examined from theoretical perspectives that explain the amount of information recalled (Kintsch, Kozminsky, Sterky, McKoon, & Keenan 1975; Marshall, 1976) as well as the inverse relationship between explicit recall and generalized recall (Kintsch & van Dijk, 1978; Spiro, 1977). According to these perspectives, the more the involvement of the reader, the more information recalled and the greater the integration of text information with reader knowledge. The data provided substantial support for these perspectives; further, they emphasize one reason for involvement or noninvolvement with text: degree of knowledge about the topic of the text. Indeed, it would appear that subjects given texts with analogy recalled more total units of recall and interacted with text to a greater extent than subjects who were given texts without analogy and that they gained a better sense of the texts' meaning. Further, the advance presentation of analogy in the form of an antecedent text seemed to provide for retention of explicitly stated information, but analogy embedded in text seemed to provide for more generalized treatment of the text. Where two modes of presenting analogy were combined

(B + C(A)), significantly more text-based information was generated on both passages than by the group given analogy by text embedding only (X + C(A)), but significantly less reader-based information than generated by the latter group at least on the first passage. Although the measures devised to address schema specialization and generalization were neither discrete nor comparable, the performance of the subjects on the prediction and discrimination tasks suggested that knowledge gained from the instructional texts had begun to form some other transfer values of relevance to these notions. Subjects given background information related to the tasks were better able to make predictions for the open-ended text-related situations. Also, they were better able to discriminate information consistent with the topic if that information was connected to a specific instance of the topic. Subjects given background information related to the tasks were not more able than control group subjects to make discriminations between topic-consistent and topic-inconsistent information when that information was not presented in some particular context. Subjects given analogy both in the advance text and embedded in the instructional text appeared to make the best context-related discriminations between instances and non-instances of the topic. In terms of the notions of schema specialization and generalization, the data from the present study did suggest knowledge appeared first to generalize to specific instances on the novel content and then to specialize within the context of those specific instances. The data indicated that independent generalization of knowledge, that is, generalization within specific applicative contexts, did not appear to be achieved by the subjects in this investigation.

Implications for Research

What implications can be drawn for further research which examines attempts to increase background knowledge? The present study raised more questions about increasing background knowledge than it answered. For example, the present study investigated only four ways of presenting unfamiliar information. The differential effects of other modes of presenting information need to be investigated in order to determine their instructional efficacy for meeting specific instructional goals. With respect to presenting information through analogy, examples of other modes which might be investigated include analogical annotation, analogical questions, analogous and vicarious experiences, self-generated and selected analogies, concurrent reading on analogous topics, and analogical study guides. Comparison might also be made with other aids to textual instruction such as illustrations, as well as concrete and abstract examples. Increasing background knowledge has been studied in connection with some of these other aids to instruction, but conclusive findings as to their effectiveness are lacking. What is significant about the present study is that it confirms the worth of such endeavors and suggests some guidelines for future research studies.

What guidelines for conducting similar research are prompted? In terms of design considerations, the present study raised several important issues. Differences were noted across levels of treatment and prior analogous knowledge that could not have been detected by the overall measure of recall typically used in previous studies. Analysis of text recalls by levels of generality appeared to afford the detection of such differences in recalled information not obtainable by an overall measure of text recall. If suggested

that differential information on the responses of readers to question types may help researchers specify how and what other learning takes place. Alternatively, the pre-study failed to adequately address several important variables. First, the extent to which the treatment conditions as employed in the present study focused attention on the more important information of the text was not ascertained from the recall data. Recalled information by level in the idea structure of the passages could not be clearly interpreted since text reproductions could not be analyzed together with text entailments at each level. For example, text entailment that summarized propositions variously located in a passage's idea structure could not be assigned a single level in the ideational structure.

Second, subjects responded to experimental texts immediately following their presentation; neither delayed posttest nor on-line processing measures were used. Furthermore, given the findings that there were differences in text-based and reader-based information across the recall tasks, the issue of the stability of background differences might have been pursued further.

Third, readers' interest in the analogous material was considered in this study only to the extent of controlling its potential influence on the dependent measures. The interactive effects of analogy with subjects' interest in the analog were not investigated. From a practical standpoint such investigation appears to be warranted.

Fourth, subjects involved in the present study did not represent extreme levels of background knowledge and no attempt was made to assess

individual differences in background knowledge after the introduction of the instructional texts. Given this limitation and the fact that many of the differences in measures approached significance, it might have been worthwhile to have sought subjects who represented a greater separation in knowledge about baseball.

Concluding Remarks

In general, the findings of the present study should be considered encouraging. They support assertions by educators, philosophers, and psychologists that attempts to increase background knowledge facilitate learning unfamiliar material. The present attempts using alternative modes of analogy did promote learning from text. That the different ways in which attempts were made to increase knowledge differentially influenced learning indicates a need to move from broad notions about the instructional utility of strategies directed toward increasing background knowledge toward more refined and differential concepts about their application. Of theoretical and practical relevance, then, the use of analogies and other methods for increasing background knowledge appear to offer promise as a means of examining issues of relevance for dealing with unfamiliar information.

Reference Notes

1. Rumelhart, D. Analogical processes and procedural representations (CHIP Rep. No. 81). San Diego: University of California, Center for Human Information Processing, 1978.

2. Drum, P. A. Structural and thematic variations on fourth graders types of recall. Paper presented at the meeting of the American Educational Research Association, San Francisco, April 1979.

3. Meyer, B. J. F., Brandt, D. M., & Bluth, G. J. Use of author's textual schema: Key for ninth graders' comprehension. Paper presented at the meeting of the American Educational Research Association, Toronto, March 1978.

References

Abramson, M. But is it cricket? Ambassador, 1979, 12, 36-39, 84-86.

Anderson, R. C., Spiro, R. J., & Anderson, M. Schemata as scaffolding for the representation of information in connected discourse. American Educational Research Journal, 1978, 15, 433-440.

Ausubel, D. P. The use of advance organizers in the learning and retention of meaningful verbal material. Journal of Educational Psychology, 1960, 51, 267-272.

Ausubel, D. P., & Fitzgerald, D. The role of discriminability in meaningful verbal learning and retention. Journal of Educational Psychology, 1961, 52, 266-274.

Bartlett, F. C. Remembering. Cambridge: Cambridge University Press, 1932.

Black, M. Models and metaphors: Studies in language and philosophy. Ithaca, N.Y.: Cornell University Press, 1962.

Campbell, N. R. Physics, the elements. Cambridge: Cambridge University Press, 1920.

Capps, L. R. Teaching mathematical concepts using language arts analogies. The Arithmetic Teacher, 1979, 17, 329-331.

Dowell, R. E. The relation between the use of analogies and their effects on student achievement on teaching a selected concept in high school biology. Unpublished doctoral dissertation, Indiana University, 1968.

Drugge, N. L. The facilitating effect of selected analogies on understanding of scientific explanations. Unpublished doctoral dissertation, University of Alberta, 1977.

Fry, E. A readability formula that saves time. Journal of Reading, 1968, 11(7), 513-516.

Kahn, N. B. Using analogies to help students become more versatile readers. The Clearing House, 1978, 51, 329-334.

Kant, I. [Critique of pure reason] (F. M. Muller, trans.). Garden City, N.Y.: Anchor Books, 1966. (Originally published, 1781.)

Kerlinger, F. N. Foundations of behavioral research (2nd ed.). New York: Holt, Rinehart & Winston, 1973.

Kintsch, W. The representation of meaning in memory. Hillsdale, N.J.: Erlbaum, 1974.

Kintsch, W., Kozminsky, E., Sterky, W. J., McKoon, G., & Keenan, J. M. Comprehension and recall of text as a function of content variables. Journal of Verbal Learning and Verbal Behavior, 1975, 14, 196-214.

Kintsch, W., & van Dijk, T. A. Toward a model of text comprehension and production. Psychological Review, 1978, 85, 363-394.

Larson, R. Young filmmakers. New York: Avon Books, 1969.

Lehr, P. E., Burnett, R., Zin, S., & McNaught, H. Weather. New York: Golden Press, 1965.

Marshall, N. The structure of semantic memory for text. Unpublished doctoral dissertation, Cornell University, 1976.

Mayer, R. E. Different problem-solving competencies established in learning computer programming with and without meaningful models. Journal of Educational Psychology, 1975, 67, 725-734.

Meyer, B. J. F. The structure of prose: Effects on learning and memory and implications for educational practice. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Neisser, U. Cognition and reality: Principles and implications of cognitive psychology. San Francisco: Freeman, 1976.

Nelson, R. F. Use of analogy as a learning-teaching tool, Journal of Geography, 1975, 74, 83-86.

Norman, D. A., Gentner, D. R., & Stevens, A. L. Comments on learning, schemata, and memory representation. In D. Klahr (Ed.), Cognition and instruction. Hillsdale, N.J.: Erlbaum, 1976.

Oliphant, R. Music and language: A new look at an old analogy. Music Education Journal, 1972, 58, 60-63.

Royer, J. M., & Cable, G. W. Facilitated learning in connected discourse. Journal of Educational Psychology, 1975, 67, 116-123.

Royer, J. M., & Cable, G. W. Illustrations, analogies and facilitative transfer of prose learning. Journal of Educational Psychology, 1976, 68, 205-209.

Rumelhart, D. E., & Ortony, A. The representation of knowledge in memory. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Scheffé, H. A. The analysis of variance. New York: Wiley, 1959.

Smith, F. A., & Wilson, J. D. Electrical circuits and water analogies. The Physics Teacher, 1974, 12, 396-399.

Spearman, C. The nature of intelligence and the principles of cognition. London: Macmillan, 1923.

Spiro, R. J. Remembering information from text: The "state of schema" approach. In R. C. Anderson, R. J. Spiro, & W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, N.J.: Erlbaum, 1977.

Swick, K. J., & Miller, H. C. Utilization of analogies to teach critical thinking skills. The Clearing House, 1975, 48, 180-182.

Thorndyke, P. W., & Yekovich, F. R. A critique of schemata as a theory of human story memory. Poetics, in press.

Turner, A., & Greene, E. The construction and use of propositional text base (Tech. Rep. No. 63). Boulder: University of Colorado, Institute for the Study of Intellectual Behavior, April 1977.

Webster's Sports Dictionary (R. Copeland, Ed.). Springfield, Mass.: Merriam, 1976.

Weller, C. M. The role of analogy in teaching science. Journal of Research in Science Teaching, 1970, 7, 113-119.

Footnotes

[1]Schema specialization, as Rumelhart and Ortony describe it, means constraining schema variables so as to reduce the possible values that may be assigned to yield a representation of information; reducing assignable values specializes the schema so that it yields more highly differentiated representations. Schema generalization, conversely, means extending the possible values that schemata may assign to yield a representation of information; relaxing the constraints on schematic variables results in a representation which is more abstract or generalized.

Table 1

Summary of Means and Standard Deviations of Total Units of Information Recalled:

First Test Passage

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	15.43	8.07	(9)	17.44	6.69	(6)	12.33	7.28	(6)	15.50	10.80
2 (X + C(A))	(20)	12.85	6.01	(8)	14.38	5.78	(6)	15.00	5.93	(6)	8.67	5.01
3 (B + C)	(20)	15.25	3.88	(10)	15.90	3.14	(4)	14.25	1.71	(6)	14.83	5.98
4 (X + C)	(19)	14.11	4.58	(8)	13.13	6.10	(6)	15.33	3.14	(6)	14.20	3.56
5 (X + X)	(20)	8.10	3.95	(9)	8.11	3.10	(6)	8.33	3.01	(5)	7.80	6.57
					13.84	5.87		12.96	5.24		12.29	7.23

Note. Overall Mean = 13.16; Standard Deviation = 6.09; n = 100.

Table 2

Summary of Means and Standard Deviations of Total Units of Information Recalled:

Second Test Passage

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	22.81	7.24	(9)	24.44	6.09	(6)	20.50	7.82	(6)	22.67	8.82
2 (X + C(A))	(20)	20.85	7.95	(8)	22.38	7.96	(6)	21.50	7.18	(6)	18.17	9.23
3 (B + C)	(20)	21.50	5.41	(10)	22.30	4.90	(4)	20.50	8.81	(6)	20.83	4.36
4 (X + C)	(19)	22.26	6.38	(8)	24.25	3.28	(6)	19.17	8.61	(5)	22.80	6.98
5 (X + X)	(20)	14.95	6.53	(9)	16.44	7.00	(6)	17.17	5.04	(5)	9.60	4.98
					21.91	6.47		19.71	7.10		19.00	8.24

Note. Overall Mean = 20.48; Standard Deviation = 7.22; n = 100.

Table 3

Summary of Means and Standard Deviations of Number of Text Reproductions;

First Test Passage

	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
)	(21)	9.76	6.03	(9)	11.56	4.69	(6)	6.67	4.92	(6)	10.17	8.28
)	(20)	6.85	4.45	(8)	6.75	3.15	(6)	9.67	5.68	(6)	4.17	3.31
	(20)	8.40	3.50	(10)	7.60	3.06	(4)	8.00	1.63	(6)	10.00	4.86
	(19)	8.84	3.39	(8)	7.63	4.44	(6)	10.67	1.63	(5)	8.60	2.41
	(20)	5.80	3.74	(9)	5.56	2.92	(6)	6.00	2.61	(5)	6.00	6.36
					7.84	4.09		8.21	3.99		7.82	5.65

Overall Mean = 7.94; Standard Deviation = 4.51; n = 100.

Table 4

Summary of Means and Standard Deviations of Number of Text Reproductions:

Second Test Passage

	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
A))	(21)	17.43	6.10	(9)	18.67	5.32	(6)	15.67	6.68	(6)	17.33	7.26
A))	(20)	14.30	7.13	(8)	16.50	7.52	(6)	14.50	6.95	(6)	11.17	6.79
	(20)	15.65	5.34	(10)	14.10	4.48	(4)	18.00	9.02	(6)	16.67	3.61
	(20)	16.05	5.83	(8)	15.13	4.97	(6)	14.50	6.66	(5)	19.40	5.90
	(20)	10.75	5.96	(9)	11.56	6.86	(6)	12.50	5.47	(5)	7.20	3.96
					15.14	6.11		14.82	6.55		14.43	6.91

. Overall Mean = 14.85; Standard Deviation = 6.41; n = 100.

Table 5

Summary of Means and Standard Deviations of Number of Text Entailments:

First Test Passage

	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
A))	(21)	4.19	2.46	(9)	4.67	2.45	(6)	3.50	1.52	(6)	4.17	3.37
A))	(20)	3.35	2.23	(8)	3.75	2.71	(6)	4.00	1.90	(6)	2.17	1.60
	(20)	4.50	1.91	(10)	5.20	1.48	(4)	4.75	0.96	(6)	2.17	2.48
	(19)	3.89	1.91	(8)	4.25	2.49	(6)	2.83	0.75	(5)	4.60	1.52
	(20)	1.45	1.32	(9)	2.00	1.50	(6)	1.67	1.17	(5)	0.80	0.84
					4.00	2.34		3.14	1.74		3.00	2.45

Overall Mean = 3.48; Standard Deviation = 2.25; n = 100.

Table 6

Summary of Means and Standard Deviations of Number of Text Entailments:

Second Test Passage

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	3.43	2.62	(9)	4.33	2.60	(6)	3.00	2.83	(6)	2.50	2.43
2 (X + C(A))	(20)	3.15	3.13	(8)	2.63	2.20	(6)	2.67	2.42	(6)	4.33	4.72
3 (B + C)	(20)	2.05	1.93	(10)	2.40	2.32	(4)	1.50	1.29	(5)	1.83	1.72
4 (X + C)	(19)	3.79	2.39	(8)	5.00	2.00	(6)	3.17	2.71	(5)	2.60	2.07
5 (X + X)	(20)	2.10	1.55	(9)	2.00	1.22	(6)	3.17	1.72	(5)	1.00	1.22
					3.23	2.34		2.79	2.23		2.50	2.81

Note. Overall Mean = 2.90; Standard Deviation = 2.45; n = 100.

Table 7

Summary of Means and Standard Deviations of Number of Text Evoked Propositions:

First Test Passage

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	1.48	1.72	(9)	1.22	0.97	(6)	2.17	2.93	(6)	1.17	0.98
2 (X + C(A))	(20)	2.65	2.23	(8)	3.88	1.81	(6)	1.33	1.97	(6)	2.33	2.42
3 (B + C)	(20)	2.35	2.35	(10)	3.10	2.81	(4)	1.50	1.29	(6)	1.67	1.86
4 (X + C)	(19)	1.37	1.74	(8)	1.25	1.28	(6)	1.83	2.79	(5)	1.00	0.71
5 (X + X)	(20)	0.85	0.99	(9)	0.56	0.53	(6)	1.17	1.60	(5)	1.00	0.71
					2.00	2.07		1.61	2.13		1.46	1.52

Note. Overall Mean = 1.74; Standard Deviation = 1.95; n = 100.

Table 8

Summary of Means and Standard Deviations of Number of Text Evoked Propositions:

Second Test Passage

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	1.95	1.83	(9)	1.44	1.67	(6)	1.83	2.14	(6)	2.83	1.72
2 (X + C(A))	(20)	3.40	2.87	(8)	3.25	3.20	(6)	4.33	3.08	(6)	2.67	2.42
3 (B + C)	(20)	3.80	3.75	(10)	5.80	4.37	(4)	1.00	0.00	(6)	2.33	1.51
4 (X + C)	(19)	2.42	2.78	(8)	4.13	3.32	(6)	1.50	1.64	(5)	0.80	1.30
5 (X + X)	(20)	2.10	2.31	(9)	2.89	3.05	(6)	1.50	1.22	(5)	1.46	1.52
					3.55	3.46		2.11	2.20		2.07	1.80

Note. Overall Mean = 2.73; Standard Deviation = 2.82; n = 100.

Table 9

Summary of Means and Standard Deviations of Number of Correct Predictions

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	5.81	2.36	(9)	7.00	2.12	(6)	4.33	1.86	(6)	5.50	2.51
2 (X + C(A))	(20)	6.10	2.00	(8)	6.38	2.00	(6)	7.33	1.37	(6)	4.50	1.64
3 (B + C)	(20)	6.25	1.52	(10)	6.30	1.64	(4)	6.75	1.89	(6)	5.83	1.17
4 (X + C)	(19)	6.05	1.18	(8)	5.88	0.64	(6)	5.83	1.60	(5)	6.60	1.34
5 (X + X)	(20)	2.80	1.58	(9)	3.22	1.92	(6)	2.50	1.52	(5)	2.40	0.89
					5.81	2.36		6.10	2.00		6.25	1.52

Note. Overall Mean = 5.40; Standard Deviation = 2.19; n = 100.

Table 10

Summary of Means and Standard Deviations of Number of Irrelevant Predictions

(Context-bound Discrimination)

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	0.76	1.04	(9)	0.44	0.73	(6)	0.83	0.75	(6)	1.17	1.60
2 (X + C(A))	(20)	1.35	1.57	(8)	1.13	1.25	(6)	0.67	0.82	(6)	2.33	2.16
3 (B + C)	(20)	1.85	3.05	(10)	1.20	1.03	(4)	4.50	6.35	(6)	1.17	1.47
4 (X + C)	(19)	1.21	1.08	(8)	0.75	1.04	(6)	1.50	1.05	(5)	1.60	1.14
5 (X + X)	(20)	3.45	1.67	(9)	3.00	1.87	(6)	4.00	1.79	(5)	3.60	1.14
					2.91	1.46		2.79	1.37		2.96	1.40

Note. Overall Mean = 2.89; Standard Deviation = 1.41; n = 100.

Table 11

Summary of Means and Standard Deviations of Number of Correctly Identified Topically Inconsistent Items of Information (Context-Free Discrimination)

Treatment Group	Total			Level of Text-Analogous Knowledge								
				1			2			3		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
1 (B + C(A))	(21)	13.76	4.66	(9)	13.11	5.16	(6)	13.50	4.23	(6)	15.00	4.86
2 (X + C(A))	(20)	10.80	5.85	(8)	10.75	5.20	(6)	10.83	6.49	(6)	10.83	7.08
3 (B + C)	(20)	14.65	4.63	(10)	13.40	5.06	(4)	15.50	3.51	(6)	16.17	4.62
4 (X + C)	(19)	12.79	3.54	(8)	13.00	2.62	(6)	10.83	4.96	(5)	14.80	1.64
5 (X + X)	(20)	11.80	4.43	(9)	12.00	3.94	(6)	11.83	5.74	(5)	11.40	4.56
					12.50	4.43		12.29	5.10		13.63	5.08

Note. Overall Mean = 12.77; Standard Deviation = 4.80; n = 100.

Figure Captions

Figure 1. Portions of instructional texts with and without embedded analogies. (It should be noted that underlining was not used in the text during the experiment.)

Figure 2. Test Passage One (based on "Wood's 100 helps to restore self-respect," The Australian, December 30, 1978).

Cricket is a bat and ball game played between two teams of 11 players each on a large grassy field. It is from cricket that the American game of baseball developed. In a cricket match, the teams take turns at bat. While one team bats the other team defends the field. The object of the batting team is to score runs, while the object of the fielding team is to dismiss batsmen. Unlike baseball, there are always two batsmen in play at the same time. Batsmen score runs by exchanging positions on the field.

The center of activity is an area in the middle of the field called the pitch, which corresponds to the infield in baseball. At both ends of the pitch stands a wicket consisting of three vertical sticks, called stumps, with two horizontal sticks, called bails, resting across the top. Wickets are a bit like home plate in baseball. They provide a target for . . .

Cricket is a bat and ball game played between two teams of 11 players each on a large grassy field. It is one of the most popular games in England and several other British Commonwealth countries. In a cricket match, the teams take turns at bat. While one team bats the other team defends the field. The object of the batting team is to score runs, while the object of the fielding team is to dismiss batsmen. In cricket there are always two batsmen in play at the same time. Batsmen score runs by exchanging positions on the field.

The center of activity is an area in the middle of the field called the pitch, which measures 10 feet wide by 66 feet long. At both ends of the pitch stands a wicket consisting of three vertical sticks, called stumps, with two horizontal sticks, called bails, resting across the top. Wickets are 28 inches high and nine inches wide. They provide a target for . . .

A hair raising century by Australian opener Graeme Wood on Friday set England back on its heels in the third test at the Melbourne Cricket Ground. Unfortunately, living dangerously eventually cost the Australians the match. Wood was caught out of his crease on the first over after lunch. Within ten more overs, the Australians were dismissed. Four were dismissed by dangerous running between creases. Two were dismissed when the English bowlers lifted the bails from the batsmen's wickets. The three remaining batsmen were caught by English fieldsmen. One was caught as he tried for a six. When the innings were complete the Australians had fallen short of the runs scored by the English.

CENTER FOR THE STUDY OF READING

READING EDUCATION REPORTS

No. 1: Durkin, D. ***Comprehension Instruction—Where are You?***, October 1977. (ERIC Document Reproduction Service No. ED 146 566, 14p., PC-$1.82, MF-$.83)

No. 2: Asher, S. R. ***Sex Differences in Reading Achievement***, October 1977. (ERIC Document Reproduction Service No. ED 146 567, 30p., PC-$3.32, MF-$.83)

No. 3: Adams, M. J., Anderson, R. C., & Durkin, D. ***Beginning Reading: Theory and Practice***, November 1977. (ERIC Document Reproduction Service No. ED 151 722, 15p., PC-$1.82, MF-$.83)

No. 4: Jenkins, J. R., & Pany, D. ***Teaching Reading Comprehension in the Middle Grades***, January 1978. (ERIC Document Reproduction Service No. ED 151 756, 36p., PC-$3.32, MF-$.83)

No. 5: Bruce, B. ***What Makes a Good Story?***, June 1978. (ERIC Document Reproduction Service No. ED 158 222, 16p., PC-$1.82, MF-$.83)

No. 6: Anderson, T. H. ***Another Look at the Self-Questioning Study Technique***, September 1978. (ERIC Document Reproduction Service No. ED 163 441, 19p., PC-$1.82, MF-$.83)

No. 7: Pearson, P. D., & Kamil, M. L. ***Basic Processes and Instructional Practices in Teaching Reading***, December 1978. (ERIC Document Reproduction Service No. ED 165 118, 29p., PC-$3.32, MF-$.83)

No. 8: Collins, A., & Haviland, S. E. ***Children's Reading Problems***, June 1979. (ERIC Document Reproduction Service No. ED 172 188, 19p., PC-$1.82, MF-$.83)

No. 9: Schallert, D. L., & Kleiman, G. M. ***Some Reasons Why Teachers are Easier to Understand than Textbooks***, June 1979. (ERIC Document Reproduction Service No. ED 172 189, 17p., PC-$1.82, MF-$.83)

No. 10: Baker, L. ***Do I Understand or Do I not Understand: That is the Question***, July 1979. (ERIC Document Reproduction Service No. ED 174 948, 27p., PC-$3.32, MF-$.83)

No. 11: Anderson, R. C., & Freebody, P. ***Vocabulary Knowledge and Reading***, August 1979. (ERIC Document Reproduction Service No. ED 177 470, 52p., PC-$4.82, MF-$.83)

No. 12: Joag-dev, C., & Steffensen, M. S. ***Studies of the Bicultural Reader: Implications for Teachers and Librarians***, January 1980. (ERIC Document Reproduction Service No. ED 181 430, 28p., PC-$3.32, MF-$.83)

No. 13: Adams, M., & Bruce, B. ***Background Knowledge and Reading Comprehension***, January 1980. (ERIC Document Reproduction Service No. ED 181 431, 48p., PC-$3.32, MF-$.83)

No. 14: Rubin, A. ***Making Stories, Making Sense*** (includes a response by T. Raphael and J. LaZansky), January 1980. (ERIC Document Reproduction Service No. ED 181 432, 42p., PC-$3.32, MF-$.83)

No. 15: Tierney, R. J., & LaZansky, J. ***The Rights and Responsibilities of Readers and Writers: A Contractual Agreement*** (includes responses by R. N. Kantor and B. B. Armbruster), January 1980. (ERIC Document Reproduction Service No. ED 181 447, 32p., PC-$3.32, MF-$.83)

No. 16: Anderson, T. H., Armbruster, B. B., & Kantor, R. N. ***How Clearly Written are Children's Textbooks? Or, Of Bladderworts and Alfa*** (includes a response by M. Kane, Senior Editor, Ginn and Company), August 1980.

No. 17: Tierney, R. J., Mosenthal, J., & Kantor, R. N. ***Some Classroom Applications of Text Analysis: Toward Improving Text Selection and Use***, August 1980.

No. 18: Steinberg, C., & Bruce, B. ***Higher-Level Features in Children's Stories: Rhetorical Structure and Conflict***, October 1980.

No. 19: Durkin, D. ***What is the Value of the New Interest in Reading Comprehension?***, November 1980.

CENTER FOR THE STUDY OF READING

TECHNICAL REPORTS

No. 1: Halff, H. M. ***Graphical Evaluation of Hierarchical Clustering Schemes,*** October 1975. (ERIC Document Reproduction Service No. ED 134 926, 11p., PC-$1.82, MF-$.83)

No. 2: Spiro, R. J. ***Inferential Reconstruction in Memory for Connected Discourse,*** October 1975. (ERIC Document Reproduction Service No. ED 136 187, 81p., PC-$6.32, MF-$.83)

No. 3: Goetz, E. T. ***Sentences in Lists and in Connected Discourse,*** November 1975. (ERIC Document Reproduction Service No. ED 134 927, 75p., PC-$4.82, MF-$.83)

No. 4: Alessi, S. M., Anderson, T. H., & Biddle, W. B. ***Hardware and Software Considerations in Computer Based Course Management,*** November 1975. (ERIC Document Reproduction Service No. ED 134 928, 21p., PC-$1.82, MF-$.83)

No. 5: Schallert, D. L. ***Improving Memory for Prose: The Relationship between Depth of Processing and Context,*** November 1975. (ERIC Document Reproduction Service No. ED 134 929, 37p., PC-$3.32, MF-$.83)

No. 6: Anderson, R. C., Goetz, E. T., Pichert, J. W., & Halff, H. M. ***Two Faces of the Conceptual Peg Hypothesis,*** January 1976. (ERIC Document Reproduction Service No. ED 134 930, 29p., PC-$3.32, MF-$.83)

No. 7: Ortony, A. ***Names, Descriptions, and Pragmatics,*** February 1976. (ERIC Document Reproduction Service No. ED 134 931, 25p., PC-$1.82, MF-$.83)

No. 8: Mason, J. M. ***Questioning the Notion of Independent Processing Stages in Reading,*** February 1976. (***Journal of Educational Psychology,*** 1977, ***69,*** 288-297)

No. 9: Siegel, M. A. ***Teacher Behaviors and Curriculum Packages: Implications for Research and Teacher Education,*** April 1976. (ERIC Document Reproduction Service No. ED 134 932, 42p., PC-$3.32, MF-$.83)

No. 10: Anderson, R. C., Pichert, J. W., Goetz, E. T., Schallert, D. L., Stevens, K. C., & Trollip, S. R. ***Instantiation of General Terms,*** March 1976. (ERIC Document Reproduction Service No. ED 134 933, 30p., PC-$3.32, MF-$.83)

No. 11: Armbruster, B. B. ***Learning Principles from Prose: A Cognitive Approach Based on Schema Theory,*** July 1976. (ERIC Document Reproduction Service No. ED 134 934, 48p., PC-$3.32, MF-$.83)

No. 12: Anderson, R. C., Reynolds, R. E., Schallert, D. L., & Goetz, E. T. ***Frameworks for Comprehending Discourse,*** July 1976. (ERIC Document Reproduction Service No. ED 134 935, 33p., PC-$3.32, MF-$.83)

No. 13: Rubin, A. D., Bruce, B. C., & Brown, J. S. ***A Process-Oriented Language for Describing Aspects of Reading Comprehension,*** November 1976. (ERIC Document Reproduction Service No. ED 136 188, 41p., PC-$3.32, MF-$.83)

No. 14: Pichert, J. W., & Anderson, R. C. ***Taking Different Perspectives on a Story,*** November 1976. (ERIC Document Reproduction Service No. ED 134 936, 30p., PC-$3.32, MF-$.83)

No. 15: Schwartz, R. M. ***Strategic Processes in Beginning Reading,*** November 1976. (ERIC Document Reproduction Service No. ED 134 937, 19p., PC-$1.82, MF-$.83)

No. 16: Jenkins, J. R., & Pany, D. ***Curriculum Biases in Reading Achievement Tests,*** November 1976. (ERIC Document Reproduction Service No. ED 134 938, 24p., PC-$1.82, MF-$.83)

No. 17: Asher, S. R., Hymel, S., & Wigfield, A. ***Children's Comprehension of High- and Low-Interest Material and a Comparison of Two Cloze Scoring Methods,*** November 1976. (ERIC Document Reproduction Service No. ED 134 939, 32p., PC-$3.32, MF-$.83)

No. 18: Brown, A. L., Smiley, S. S., Day, J. D., Townsend, M. A. R., & Lawton, S. C. ***Intrusion of a Thematic Idea in Children's Comprehension and Retention of Stories,*** December 1976. (ERIC Document Reproduction Service No. ED 136 189, 39p., PC-$3.32, MF-$.83)

No. 19: Kleiman, G. M. ***The Prelinguistic Cognitive Basis of Children's Communicative Intentions,*** February 1977. (ERIC Document Reproduction Service No. ED 134 940, 51p., PC-$4.82, MF-$.83)

No. 20: Kleiman, G. M. ***The Effect of Previous Context on Reading Individual Words,*** February 1977. (ERIC Document Reproduction Service No. ED 134 941, 76p., PC-$6.32, MF-$.83)

No. 21: Kane, J. H., & Anderson, R. C. ***Depth of Processing and Interference Effects in the Learning and Remembering of Sentences,*** February 1977. (ERIC Document Reproduction Service No. ED 134 942, 29p., PC-$3.32, MF-$.83)

No. 22: Brown, A. L., & Campione, J. C. ***Memory Strategies in Learning: Training Children to Study Strategically,*** March 1977. (ERIC Document Reproduction Service No. ED 136 234, 54p., PC-$4.82, MF-$.83)

No. 23: Smiley, S. S., Oakley, D. D., Worthen, D., Campione, J. C., & Brown, A. L. ***Recall of Thematically Relevant Material by Adolescent Good and Poor Readers as a Function of Written Versus Oral Presentation,*** March 1977. (ERIC Document Reproduction Service No. ED 136 235, 23p., PC-$1.82, MF$-.83)

No. 24: Anderson, R. C., Spiro, R. J., & Anderson, M. C. ***Schemata as Scaffolding for the Representation of Information in Connected Discourse,*** March 1977. (ERIC Document Reproduction Service No. ED 136 236, 18p., PC-$1.82, MF-$.83)

No. 25: Pany, D., & Jenkins, J. R. ***Learning Word Meanings: A Comparison of Instructional Procedures and Effects on Measures of Reading Comprehension with Learning Disabled Students,*** March 1977. (ERIC Document Reproduction Service No. ED 136 237, 34p., PC-$3.32, MF-$.83)

No. 26: Armbruster, B. B., Stevens, R. J., & Rosenshine, B. ***Analyzing Content Coverage and Emphasis: A Study of Three Curricula and Two Tests,*** March 1977. (ERIC Document Reproduction Service No. ED 136 238, 22p., PC-$1.82, MF-$.83)

No. 27: Ortony, A., Reynolds, R. E., & Arter, J. A. ***Metaphor: Theoretical and Empirical Research,*** March 1977. (ERIC Document Reproduction Service No. ED 137 752, 63p., PC-$4.82, MF-$.83)

No. 28: Ortony, A. ***Remembering and Understanding Jabberwocky and Small-Talk,*** March 1977. (ERIC Document Reproduction Service No. ED 137 753, 36p., PC-$3.32, MF-$.83)

No. 29: Schallert, D. L., Kleiman, G. M., & Rubin, A. D. ***Analyses of Differences between Written and Oral Language,*** April 1977. (ERIC Document Reproduction Service No. ED 144 038, 33p., PC-$3.32, MF-$.83)

No. 30: Goetz, E. T., & Osborn, J. ***Procedures for Sampling Texts and Tasks in Kindergarten through Eighth Grade,*** April 1977. (ERIC Document Reproduction Service No. ED 146 565, 80p., PC-$6.32, MF-$.83)

No. 31: Nash-Webber, B. ***Anaphora: A Cross-Disciplinary Survey,*** April 1977. (ERIC Document Reproduction Service No. ED 144 039, 43p., PC-$3.32, MF-$.83)

No. 32: Adams, M. J., & Collins, A. ***A Schema-Theoretic View of Reading Comprehension,*** April 1977. (ERIC Document Reproduction Service No. ED 142 971, 49p., PC-$3.32, MF-$.83)

No. 33: Huggins, A. W. F. ***Syntactic Aspects of Reading Comprehension,*** April 1977. (ERIC Document Reproduction Service No. ED 142 972, 68p., PC-$4.82, MF-$.83)

No. 34: Bruce, B. C. ***Plans and Social Actions,*** April 1977. (ERIC Document Reproduction Service No. ED 149 328, 45p., PC-$3.32, MF-$.83)

No. 35: Rubin, A. D. ***A Theoretical Taxonomy of the Differences between Oral and Written Language,*** January 1978. (ERIC Document Reproduction Service No. ED 150 550, 61p., PC-$4.82, MF-$.83)

No. 36: Nash-Webber, B., & Reiter, R. ***Anaphora and Logical Form: On Formal Meaning Representation for Natural Language,*** April 1977. (ERIC Document Reproduction Service No. ED 142 973, 42p., PC-$3.32, MF-$.83)

No. 37: Adams, M. J. ***Failures to Comprehend and Levels of Processing in Reading,*** April 1977. (ERIC Document Reproduction Service No. ED 145 410, 51p., PC-$4.82, MF-$.83)

No. 38: Woods, W. A. ***Multiple Theory Formation in High-Level Perception,*** April 1977. (ERIC Document Reproduction Service No. ED 144 020, 58p., PC-$4.82, MF-$.83)

No. 40: Collins, A., Brown, J. S., & Larkin, K. M. ***Inference in Text Understanding,*** December 1977. (ERIC Document Reproduction Service No. ED 150 547, 48p., PC-$3.32, MF-$.83)

No. 41: Anderson, R. C., & Pichert, J. W. ***Recall of Previously Unrecallable Information Following a Shift in Perspective,*** April 1977. (ERIC Document Reproduction Service No. ED 142 974, 37p., PC-$3.32, MF-$.83)

No. 42: Mason, J., Osborn, J., & Rosenshine, B. ***A Consideration of Skill Hierarchy Approaches to the Teaching of Reading,*** December 1977. (ERIC Document Reproduction Service No. ED 150 549, 176p., PC-$12.32, MF-$.83)

No. 43: Collins, A., Brown, A. L., Morgan, J. L., & Brewer, W. F. ***The Analysis of Reading Tasks and Texts,*** April 1977. (ERIC Document Reproduction Service No. ED 145 404, 96p., PC-$6.32, MF-$.83)

No. 44: McClure, E. ***Aspects of Code-Switching in the Discourse of Bilingual Mexican-American Children,*** April 1977. (ERIC Document Reproduction Service No. ED 142 975, 38p., PC-$3.32, MF-$.83)

No. 45: Schwartz, R. M. ***Relation of Context Utilization and Orthographic Automaticity in Word Identification,*** May 1977. (ERIC Document Reproduction Service No. ED 137 762, 27p., PC-$3.32, MF-$.83)

No. 46: Anderson, R. C., Stevens, K. C., Shifrin, Z., & Osborn, J. ***Instantiation of Word Meanings in Children,*** May 1977. (ERIC Document Reproduction Service No. ED 142 976, 22p., PC-$1.82, MF-$.83)

No. 47: Brown, A. L. ***Knowing When, Where, and How to Remember: A Problem of Metacognition,*** June 1977. (ERIC Document Reproduction Service No. ED 146 562, 152p., PC-$10.82, MF-$.83)

No. 48: Brown, A. L., & DeLoache, J. S. ***Skills, Plans, and Self-Regulation,*** July 1977. (ERIC Document Reproduction Service No. ED 144 040, 66p., PC-$4.82, MF-$.83)

No. 49: Goetz, E. T. ***Inferences in the Comprehension of and Memory for Text,*** July 1977. (ERIC Document Reproduction Service No. ED 150 548, 97p., PC-$6.32, MF-$.83)

No. 50: Anderson, R. C. ***Schema-Directed Processes in Language Comprehension,*** July 1977. (ERIC Document Reproduction Service No. ED 142 977, 33p., PC-$3.32, MF-$.83)

No. 51: Brown, A. L. ***Theories of Memory and the Problems of Development: Activity, Growth, and Knowledge,*** July 1977. (ERIC Document Reproduction Service No. ED 144 041, 59p., PC-$4.82, MF-$.83)

No. 52: Morgan, J. L. ***Two Types of Convention in Indirect Speech Acts,*** July 1977. (ERIC Document Reproduction Service No. ED 145 405, 40p., PC-$3.32, MF-$.83)

No. 53: Brown, A. L., Smiley, S. S., & Lawton, S. C. ***The Effects of Experience on the Selection of Suitable Retrieval Cues for Studying from Prose Passages,*** July 1977. (ERIC Document Reproduction Service No. ED 144 042, 30p., PC-$3.32, MF-$.83)

No. 54: Fleisher, L. S., & Jenkins, J. R. ***Effects of Contextualized and Decontextualized Practice Conditions on Word Recognition,*** July 1977. (ERIC Document Reproduction Service No. ED 144 043, 37p., PC-$3.32, MF-$.83)

No. 55: Jenkins, J. R., & Larson, K. ***Evaluating Error Correction Procedures for Oral Reading,*** June 1978. (ERIC Document Reproduction Service No. ED 158 224, 34p., PC-$3.32, MF-$.83)

No. 56: Anderson, T. H., Standiford, S. N., & Alessi, S. M. ***Computer Assisted Problem Solving in an Introductory Statistics Course,*** August 1977. (ERIC Document Reproduction Service No. ED 146 563, 26p., PC-$3.32, MF-$.83)

No. 57: Barnitz, J. ***Interrelationship of Orthography and Phonological Structure in Learning to Read,*** August 1977. (ERIC Document Reproduction Service No. ED 150 546, 62p., PC-$4.82, MF-$.83)

No. 58: Mason, J. M. ***The Role of Strategy in Reading in the Mentally Retarded,*** September 1977. (ERIC Document Reproduction Service No. ED 145 406, 28p., PC-$3.32, MF-$.83)

No. 59: Mason, J. M. ***Reading Readiness: A Definition and Skills Hierarchy from Preschoolers' Developing Conceptions of Print,*** September 1977. (ERIC Document Reproduction Service No. ED 145 403, 57p., PC-$4.82, MF-$.83)

No. 60: Spiro, R. J., & Esposito, J. J. ***Superficial Processing of Explicit Inferences in Text,*** December 1977. (ERIC Document Reproduction Service No. ED 150 545, 27p., PC-$3.32, MF-$.83)

No. 65: Brewer, W. F. ***Memory for the Pragmatic Implications of Sentences,*** October 1977. (ERIC Document Reproduction Service No. ED 146 564, 27p., PC-$3.32, MF-$.83)

No. 66: Brown, A. L., & Smiley, S. S. ***The Development of Strategies for Study Prose Passages,*** October 1977. (ERIC Document Reproduction Service No. ED 145 371, 59p., PC-$4.82, MF-$.83)

No. 68: Stein, N. L., & Nezworski, T. ***The Effects of Organization and Instructional Set on Story Memory,*** January 1978. (ERIC Document Reproduction Service No. ED 149 327, 41p., PC-$3.32, MF-$.83)

No. 69: Stein, N. L. ***How Children Understand Stories: A Developmental Analysis,*** March 1978. (ERIC Document Reproduction Service No. ED 153 205, 68p., PC-$4.82, MF-$.83)

No. 76: Thieman, T. J., & Brown, A. L. ***The Effects of Semantic and Formal Similarity on Recognition Memory for Sentences in Children,*** November 1977. (ERIC Document Reproduction Service No. ED 150 551, 26p., PC-$3.32, MF-$.83)

No. 77: Nash-Webber, B. L. ***Inferences in an Approach to Discourse Anaphora,*** January 1978. (ERIC Document Reproduction Service No. ED 150 552, 30p., PC-$3.32. MF-$.83)

No. 78: Gentner, D. ***On Relational Meaning: The Acquisition of Verb Meaning,*** December 1977. (ERIC Document Reproduction Service No. ED 149 325, 46p., PC-$3.32, MF-$.83)

No. 79: Royer, J. M. ***Theories of Learning Transfer,*** January 1978. (ERIC Document Reproduction Service No. ED 149 326, 55p., PC-$4.82, MF-$.83)

No. 80: Arter, J. A., & Jenkins, J. R. ***Differential Diagnosis-Prescriptive Teaching: A Critical Appraisal,*** January 1978. (ERIC Document Reproduction Service No. ED 150 578, 104p., PC-$7.82, MF-$.83)

No. 81: Shoben, E. J. ***Choosing a Model of Sentence Picture Comparisons: A Reply to Catlin and Jones,*** February 1978. (ERIC Document Reproduction Service No. ED 150 577, 30p., PC-$3.32, MF-$.83)

No. 82: Steffensen, M. S. ***Bereiter and Engelmann Reconsidered: The Evidence from Children Acquiring Black English Vernacular,*** March 1978. (ERIC Document Reproduction Service No. ED 153 204, 31p., PC-$3.32, MF-$.83)

No. 83: Reynolds, R. E., Standiford, S. N., & Anderson, R. C. ***Distribution of Reading Time When Questions are Asked about a Restricted Catagory of Text Information,*** April 1978. (ERIC Document Reproduction Service No. ED 153 206, 34p., PC-$3.32, MF-$.83)

No. 84: Baker, L. ***Processing Temporal Relationships in Simple Stories: Effects of Input Sequence,*** April 1978. (ERIC Document Reproduction Service No. ED 157 016, 54p., PC-$4.82, MF-$.83)

No. 85: Mason, J. M., Knisely, E., & Kendall, J. ***Effects of Polysemous Words on Sentence Comprehension,*** May 1978. (ERIC Document Reproduction Service No. ED 157 015, 34p., PC-$3.32, MF-$.83)

No. 86: Anderson, T. H., Wardrop, J. L., Hively W., Muller, K. E., Anderson, R. I., Hastings, C. N., & Fredericksen, J. ***Development and Trial of a Model for Developing Domain Referenced Tests of Reading Comprehension,*** May 1978. (ERIC Document Reproduction Service No. ED 157 036, 69p., PC-$4.82, MF-$.83)

No. 87: Andre, M. E. D. A., & Anderson, T. H. ***The Development and Evaluation of a Self-Questioning Study Technique,*** June 1978. (ERIC Document Reproduction Service No. ED 157 037, 37p., PC-$3.32, MF-$.83)

No. 88: Bruce, B. C., & Newman, D. ***Interacting Plans,*** June 1978. (ERIC Document Reproduction Service No. ED 157 038, 100p., PC-$6.32, MF-$.83)

No. 89: Bruce, B. C., Collins, A., Rubin, A. D., & Gentner, D. ***A Cognitive Science Approach to Writing,*** June 1978. (ERIC Document Reproduction Service No. ED 157 039, 57p., PC-$4.82, MF-$.83)

No. 90: Asher, S. R. ***Referential Communication,*** June 1978. (ERIC Document Reproduction Service No. ED 159 597, 71p., PC-$4.82, MF-$.83)

No. 91: Royer, J. M., & Cunningham, D. J. ***On the Theory and Measurement of Reading Comprehension,*** June 1978. (ERIC Document Reproduction Service No. ED 157 040, 63p., PC-$4.82, MF-$.83)

No. 92: Mason, J. M., Kendall, J. R. ***Facilitating Reading Comprehension Through Text Structure Manipulation,*** June 1978. (ERIC Document Reproduction Service No. ED 157 041, 36p., PC-$3.32, MF-$.83)

No. 93: Ortony, A., Schallert, D. L., Reynolds, R. E., & Antos, S. J. ***Interpreting Metaphors and Idioms: Some Effects of Context on Comprehension,*** July 1978. (ERIC Document Reproduction Service No. ED 157 042, 41p., PC-$3.32, MF-$.83)

No. 94: Brown, A. L., Campione, J. C., & Barclay, C. R. ***Training Self-Checking Routines for Estimating Test Readiness: Generalization from List Learning to Prose Recall,*** July 1978. (ERIC Document Reproduction Service No. ED 158 226, 41p., PC-$3.32, MF-$.83)

No. 95: Reichman, R. ***Conversational Coherency,*** July 1978. (ERIC Document Reproduction Service No. ED 159 658, 86p., PC-$6.32, MF-$.83)

No. 96: Wigfield, A., & Asher, S. R. ***Age Differences in Children's Referential Communication Performance: An Investigation of Task Effects,*** July 1978. (ERIC Document Reproduction Service No. ED 159 659, 31p., PC-$3.32, MF-$.83)

No. 97: Steffensen, M. S., Jogdeo, C., & Anderson, R. C. ***A Cross-Cultural Perspective on Reading Comprehension,*** July 1978. (ERIC Document Reproduction Service No. ED 159 660, 41p., PC-$3.32, MF-$.83)

No. 98: Green, G. M. ***Discourse Functions of Inversion Construction,*** July 1978. (ERIC Document Reproduction Service No. ED 160 998, 42p., PC-$3.32, MF-$.83)

No. 99: Asher, S. R. ***Influence of Topic Interest on Black Children and White Children's Reading Comprehension,*** July 1978. (ERIC Document Reproduction Service No. ED 159 661, 35p., PC-$3.32, MF-$.83)

No. 100: Jenkins, J. R., Pany, D., & Schreck, J. ***Vocabulary and Reading Comprehension: Instructional Effects,*** August 1978. (ERIC Document Reproduction Service No. ED 160 999, 50p., PC-$3.32, MF-$.83)

No. 101: Shoben, E. J., Rips, L. J., & Smith, E. E. ***Issues in Semantic Memory: A Response to Glass and Holyoak,*** August 1978. (ERIC Document Reproduction Service No. ED 159 662, 85p., PC-$6.32, MF-$.83)

No. 102: Baker, L., & Stein, N. L. ***The Development of Prose Comprehension Skills,*** September 1978. (ERIC Document Reproduction Service No. ED 159 663, 69p., PC-$4.82, MF-$.83)

No. 103: Fleisher, L. S., Jenkins, J. R., & Pany, D. ***Effects on Poor Readers' Comprehension of Training in Rapid Decoding,*** September 1978. (ERIC Document Reproduction Service No. ED 159 664, 39p., PC-$3.32, MF-$.83)

No. 104: Anderson, T. H. ***Study Skills and Learning Strategies,*** September 1978. (ERIC Document Reproduction Service No. ED 161 000, 41p., PC-$3.32, MF-$.83)

No. 105: Ortony, A. ***Beyond Literal Similarity,*** October 1978. (ERIC Document Reproduction Service No. ED 166 635, 58p., PC-$4.82, MF-$.83)

No. 106: ***What Classroom Observations Reveal about Reading Comprehension Instruction,*** October 1978. (ERIC Document Reproduction Service No. ED 162 259, 94p., PC-$6.32, MF-$.83)

No. 107: Adams, M. J. ***Models of Word Recognition,*** October 1978. (ERIC Document Reproduction Service No. ED 163 431, 93p., PC-$6.32, MF-$.83)

No. 108: Reder, L. M. ***Comprehension and Retention of Prose: A Literature Review,*** November 1978. (ERIC Document Reproduction Service No. ED 165 114, 116p., PC-$7.82, MF-$.83)

No. 109: Wardrop, J. L., Anderson, T. H., Hively, W., Anderson, R. I., Hastings, C. N., & Muller, K. E. ***A Framework for Analyzing Reading Test Characteristics,*** December 1978. (ERIC Document Reproduction Service No. ED 165 117, 65p., PC-$4.82, MF-$.83)

No. 110: Tirre, W. C., Manelis, L., & Leicht, K. L. ***The Effects of Imaginal and Verbal Strategies on Prose Comprehension in Adults,*** December 1978. (ERIC Document Reproduction Service No. ED 165 116, 27p., PC-$3.32, MF-$.83)

No. 111: Spiro, R. J., & Tirre, W. C. ***Individual Differences in Schema Utilization During Discourse Processing,*** January 1979. (ERIC Document Reproduction Service No. ED 166 651, 29p., PC-$3.32, MF-$.83)

No. 112: Ortony, A. ***Some Psycholinguistic Aspects of Metaphor,*** January 1979. (ERIC Document Reproduction Service No. ED 165 115, 38p., PC-$3.32, MF-$.83)

No. 113: Antos, S. J. ***Processing Facilitation in a Lexical Decision Task,*** January 1979. (ERIC Document Reproduction Service No. ED 165 129, 84p., PC-$6.32, MF-$.83)

No. 114: Gentner D. ***Semantic Integration at the Level of Verb Meaning,*** February 1979. (ERIC Document Reproduction Service No. ED 165 130, 39p., PC-$3.32, MF-$.83)

No. 115: Gearhart, M., & Hall, W. S. ***Internal State Words: Cultural and Situational Variation in Vocabulary Usage,*** February 1979. (ERIC Document Reproduction Service No. ED 165 131, 66p., PC-$4.82, MF-$.83)

No. 116: Pearson, P. D., Hansen, J., & Gordon, C. ***The Effect of Background Knowledge on Young Children's Comprehension of Explicit and Implicit Information,*** March 1979. (ERIC Document Reproduction Service No. ED 169 521, 26p., PC-$3.32, MF-$.83)

No. 117: Barnitz, J. G. ***Reading Comprehension of Pronoun-Referent Structures by Children in Grades Two, Four, and Six,*** March 1979. (ERIC Document Reproduction Service No. ED 170 731, 51p., PC-$4.82, MF-$.83)

No. 118: Nicholson, T., Pearson, P. D., & Dykstra, R. ***Effects of Embedded Anomalies and Oral Reading Errors on Children's Understanding of Stories,*** March 1979. (ERIC Document Reproduction Service No. ED 169 524, 43p., PC-$3.32, MF-$.83)

No. 119: Anderson, R. C., Pichert, J. W., & Shirey, L. L. ***Effects of the Reader's Schema at Different Points in Time,*** April 1979. (ERIC Document Reproduction Service No. ED 169 523, 36p., PC-$3.32, MF-$.83)

No. 120: Canney, G., & Winograd, P. ***Schemata for Reading and Reading Comprehension Performance,*** April 1979. (ERIC Document Reproduction Service No. ED 169 520, 99p., PC-$6.32, MF-$.83)

No. 121: Hall, W. S., & Guthrie, L. F. ***On the Dialect Question and Reading,*** May 1979. (ERIC Document Reproduction Service No. ED 169 522, 32p., PC-$3.32, MF-$.83)

No. 122: McClure, E., Mason, J., & Barnitz, J. ***Story Structure and Age Effects on Children's Ability to Sequence Stories,*** May 1979. (ERIC Document Reproduction Service No. ED 170 732, 75p., PC-$4.82, MF-$.83)

No. 123: Kleiman, G. M., Winograd, P. N., & Humphrey, M. M. ***Prosody and Children's Parsing of Sentences,*** May 1979. (ERIC Document Reproduction Service No. ED 170 733, 28p., PC-$3.32, MF-$.83)

No. 124: Spiro, R. J. ***Etiology of Reading Comprehension Style,*** May 1979. (ERIC Document Reproduction Service No. ED 170 734, 21p., PC-$1.82, MF-$.83)

No. 125: Hall, W. S., & Tirre, W. C. ***The Communicative Environment of Young Children: Social Class, Ethnic, and Situational Differences,*** May 1979. (ERIC Document Reproduction Service No. ED 170 788, 30p., PC-$3.32, MF-$.83)

No. 126: Mason, J., & McCormick, C. ***Testing the Development of Reading and Linguistic Awareness,*** May 1979. (ERIC Document Reproduction Service No. ED 170 735, 50p., PC-$3.32, MF-$.83)

No. 127: Brown, A. L., & Campione, J. C. ***Permissible Inferences from the Outcome of Training Studies in Cognitive Development Research,*** May 1979. (ERIC Document Reproduction Service No. ED 170 736, 34p., PC-$3.32, MF-$.83)

No. 128: Brown, A. L., & French, L. A. ***The Zone of Potential Development: Implications for Intelligence Testing in the Year 2000,*** May 1979. (ERIC Document Reproduction Service No. ED 170 737, 46p., PC-$3.32, MF-$.83)

No. 129: Nezworski, T., Stein, N. L., & Trabasso, T. ***Story Structure Versus Content Effects on Children's Recall and Evaluative Inferences,*** June 1979. (ERIC Document Reproduction Service No. ED 172 187, 49p., PC-$3.32, MF-$.83)

No. 130: Bruce, B. ***Analysis of Interacting Plans as a Guide to the Understanding of Story Structure,*** June 1979. (ERIC Document Reproduction Service No. ED 174 951, 43p., PC-$3.32, MF-$.83)

No. 131: Pearson, P. D., Raphael, T., TePaske, N., & Hyser, C. ***The Function of Metaphor in Children's Recall of Expository Passages,*** July 1979. (ERIC Document Reproduction Service No. ED 174 950, 41p., PC-$3.32, MF-$.83)

No. 132: Green, G. M. ***Organization, Goals, and Comprehensibility in Narratives: Newswriting, a Case Study,*** July 1979. (ERIC Document Reproduction Service No. ED 174 949, 66p., PC-$4.82, MF-$.83)

No. 133: Kleiman, G. M. ***The Scope of Facilitation of Word Recognition from Single Word and Sentence Frame Contexts,*** July 1979. (ERIC Document Reproduction Service No. ED 174 947, 61p., PC-$4.82, MF-$.83)

No. 134: McConkie, G. W., Hogaboam, T. W., Wolverton, G. S., Zola, D., & Lucas, P. A. ***Toward the Use of Eye Movements in the Study of Language Processing,*** August 1979. (ERIC Document Reproduction Service No. ED 174 968, 48p., PC-$3.32, MF-$.83)

No. 135: Schwartz, R. M. ***Levels of Processing: The Strategic Demands of Reading Comprehension,*** August 1979. (ERIC Document Reproduction Service No. ED 177 471, 45p., PC-$3.32, MF-$.83)

No. 136: Anderson, R. C., & Freebody, P. ***Vocabulary Knowledge,*** August 1979. (ERIC Document Reproduction Service No. ED 177 480, 71p., PC-$4.82, MF-$.83)

No. 137: Royer, J. M., Hastings, C. N., & Hook, C. ***A Sentence Verification Technique for Measuring Reading Comprehension,*** August 1979. (ERIC Document Reproduction Service No. ED 176 234, 34p., PC-$3.32, MF-$.83)

No. 138: Spiro, R. J. ***Prior Knowledge and Story Processing: Integration, Selection, and Variation,*** August 1979. (ERIC Document Reproduction Service No. ED 176 235, 41p., PC-3.32, MF-$.83)

No. 139: Asher, S. R., & Wigfield, A. ***Influence of Comparison Training on Children's Referential Communication,*** August 1979. (ERIC Document Reproduction Service No. ED 177 493, 42p., PC-$3.32, MF-$.83)

No. 140: Alessi, S. M., Anderson, T. H., & Goetz, E. T. ***An Investigation of Lookbacks During Studying,*** September 1979. (ERIC Document Reproduction Service No. ED 177 494, 40p., PC-$3.32, MF-$.83)

No. 141: Cohen, P. R., & Perrault, C. R. ***Elements of a Plan-Based Theory of Speech Acts,*** September 1979. (ERIC Document Reproduction Service No. ED 177 497, 76p., PC-$6.32, MF-$.83)

No. 142: Grueneich, R., & Trabasso, T. ***The Story as Social Environment: Children's Comprehension and Evaluation of Intentions and Consequences,*** September 1979. (ERIC Document Reproduction Service No. ED 177 496, 56p., PC-$4.82, MF-$.83)

No. 143: Hermon, G. ***On the Discourse Structure of Direct Quotation,*** September 1979. (ERIC Document Reproduction Service No. ED 177 495, 46p., PC-$3.32, MF-$.83)

No. 144: Goetz, E. T., Anderson, R. C., & Schallert, D. L. ***The Representation of Sentences in Memory,*** September 1979. (ERIC Document Reproduction Service No. ED 177 527, 71p., PC-$4.82, MF-$.83)

No. 145: Baker, L. ***Comprehension Monitoring: Identifying and Coping with Text Confusions,*** September 1979. (ERIC Document Reproduction Service No. ED 177 526, 62p., PC-$4.82, MF-$.83)

No. 146: Hall, W. S., & Nagy, W. E. ***Theoretical Issues in the Investigation of Words of Internal Report,*** October 1979. (ERIC Document Reproduction Service No. ED 177 526, 108p., PC-$7.82, MF-$.83)

No. 147: Stein, N. L., & Goldman, S. ***Children's Knowledge about Social Situations: From Causes to Consequences,*** October 1979. (ERIC Document Reproduction Service No. ED 177 524, 54p., PC-$4.82, MF-$.83)

No. 148: Hall, W. S., & Guthrie, L. F. ***Cultural and Situational Variation in Language Function and Use: Methods and Procedures for Research,*** October 1979. (ERIC Document Reproduction Service No. ED 179 944, 49p., PC-$3.32, MF-$.83)

No. 149: Pichert, J. W. ***Sensitivity to What is Important in Prose.*** November 1979. (ERIC Document Reproduction Service No. ED 179 946, 64p., PC-$4.82, MF-$.83)

No. 150: Dunn, B. R., Mathews, S. R., II, & Bieger, G. *Individual Differences in the Recall of Lower-Level Textual Information,* December 1979. (ERIC Document Reproduction Service No. ED 181 448, 37p., PC-$3.32, MF-$.83)

No. 151: Gentner, D. *Verb Semantic Structures in Memory for Sentences: Evidence for Componential Representation,* December 1979. (ERIC Document Reproduction Service No. ED 181 424, 75p., PC-$4.82, MF-$.83)

No. 152: Tierney, R. J., & Mosenthal, J. *Discourse Comprehension and Production: Analyzing Text Structure and Cohesion,* January 1980. (ERIC Document Reproduction Service No. ED 179 945, 84p., PC-$6.32, MF-$.83)

No. 153: Winograd, P., & Johnston, P. *Comprehension Monitoring and the Error Detection Paradigm,* January 1980. (ERIC Document Reproduction Service No. ED 181 425, 57p., PC-$4.82, MF-$.83)

No. 154: Ortony, A. *Understanding Metaphors,* January 1980. (ERIC Document Reproduction Service No. ED 181 426, 52p., PC-$4.82, MF-$.83)

No. 155: Anderson, T. H., & Armbruster, B. B. *Studying,* January 1980. (ERIC Document Reproduction Service No. ED 181 427, 48p., PC-$3.32, MF-$.83)

No. 156: Brown, A. L., & Campione, J. C. *Inducing Flexible Thinking: The Problem of Access,* January 1980. (ERIC Document Reproduction Service No. ED 181 428, 44p., PC-$3.32, MF-$.83)

No. 157: Trabasso, T. *On the Making of Inferences During Reading and Their Assessment,* January 1980. (ERIC Document Reproduction Service No. ED 181 429, 38p., PC-$3.32, MF-$.83)

No. 158: McClure, E., & Steffensen, M. S. *A Study of the Use of Conjunctions across Grades and Ethnic Groups,* January 1980. (ERIC Document Reproduction Service No. ED 182 688, 43p., PC-$3.32, MF-$.83)

No. 159: Iran-Nejad, A. *The Schema: A Structural or a Functional Pattern,* February 1980. (ERIC Document Reproduction Service No. ED 181 449, 46p., PC-$3.32, MF-$.83)

No. 160: Armbruster, B. B., & Anderson, T. H. *The Effect of Mapping on the Free Recall of Expository Text,* February 1980. (ERIC Document Reproduction Service No. ED 182 735, 49p., PC-$3.32, MF-$.83)

No. 161: Hall, W. S., & Dore, J. *Lexical Sharing in Mother-Child Interaction,* March 1980. (ERIC Document Reproduction Service No. ED 184 066, 39p., PC-$3.32, MF-$.83)

No. 162: Davison, A., Kantor, R. N., Hannah, J., Hermon, G., Lutz, R., Salzillo, R. *Limitations of Readability Formulas in Guiding Adaptations of Texts,* March 1980. (ERIC Document Reproduction Service No. ED 184 090, 157p., PC-$10.82, MF-$.83)

No. 163: Linn, R. L., Levine, M. V., Hastings, C. N., & Wardrop, J. L. *An Investigation of Item Bias in a Test of Reading Comprehension,* March 1980. (ERIC Document Reproduction Service No. ED 184 091, 97p., PC-$6.32, MF-$.83)

No. 164: Seidenberg, M. S., Tanenhaus, M. K., & Leiman, J. M. *The Time Course of Lexical Ambiguity Resolution in Context,* March 1980. (ERIC Document Reproduction Service No. ED 184 092, 58p., PC-$4.82, MF-$.83)

No. 165: Brown, A. L. *Learning and Development: The Problems of Compatibility, Access, and Induction,* March 1980. (ERIC Document Reproduction Service No. ED 184 093, 76p., PC-$6.32, MF-$.83)

No. 166: Hansen, J., & Pearson, P. D. *The Effects of Inference Training and Practice on Young Children's Comprehension,* April 1980. (ERIC Document Reproduction Service No. ED 186 839, 53p., PC-$4.82, MF-$.83)

No. 167: Straker, D. Y. *Situational Variables in Language Use,* April 1980. (ERIC Document Reproduction Service No. ED 185 619, 49p., PC-$3.32, MF-$.83)

No. 168: Green, G. M., Kantor, R. N., Morgan, J. L., Stein, N. L., Hermon, G., Salzillo, R., Sellner, M. B., Bruce, B. C., Gentner, D., & Webber, B. L. *Problems and Techniques of Text Analysis,* April 1980. (ERIC Document Reproduction Service No. ED 185 513, 173p., PC-$10.82, MF-$.83)

No. 169: Green, G. M., Kantor, R. N., Morgan, J. L., Stein, N. L., Hermon, G., Salzillo, R., & Sellner, M. B. *Analysis of Babar Loses His Crown,* April 1980. (ERIC Document Reproduction Service No. ED 185 514, 89p., PC-$6.32, MF-$.83)

No. 170: Green, G. M., Kantor, R. N., Morgan, J. L., Stein, N. L., Hermon, G., Salzillo, R., & Sellner, M. B. *Analysis of "The Wonderful Desert,"* April 1980. (ERIC Document Reproduction Service No. ED 185 515, 47p., PC-$3.32, MF-$.83)

No. 171: Zehler, A. M., & Brewer, W. F. *Acquisition of the Article System in English,* May 1980. (ERIC Document Reproduction Service No. ED 186 907, 51p., PC-$4.82, MF-$.83)

No. 172: Reynolds, R. E., & Ortony, A. *Some Issues in the Measurement of Children's Comprehension of Metaphorical Language*, May 1980. (ERIC Document Reproduction Service No. ED 185 542, 42p., PC-$3.32, MF-$.83)

No. 173: Davison, A. *Linguistics and the Measurement of Syntactic Complexity: The Case of Raising*, May 1980. (ERIC Document Reproduction Service No. ED 186 848, 60p., PC-$4.82, MF-$.83)

No. 174: Tirre, W. C., Freebody, P., & Kaufman, K. *Achievement Outcomes of Two Reading Programs: An Instance of Aptitude-Treatment Interaction*, June 1980.

No. 175: Asher, S. R., & Wigfield, A. *Training Referential Communication Skills*, July 1980.

No. 176: Tanenhaus, M. K., & Seidenberg, M. S. *Discourse Context and Sentence Perception*, July 1980.

No. 177: Hall, W. S., Linn, R. L., & Nagy, W. E. *Spoken Words*, August 1980.

No. 178: Tanenhaus, M. K., Flanigan, H., & Seidenberg, M. S. *Orthographic and Phonological Activation in Auditory and Visual Word Recognition*, August 1980.

No. 179: Green, G. M. *Linguistics and the Pragmatics of Language Use: What You Know When You Know a Language . . . and What Else You Know*, August 1980.

No. 180: Steffensen, M. S., & Guthrie, L. F. *Effect of Situation on the Verbalization of Black Inner-City Children*, September 1980.

No. 181: Green, G. M., & Laff, M. O. *Five-Year-Olds' Recognition of Authorship by Literary Style*, September 1980.

No. 182: Collins, A., & Smith, E. E. *Teaching the Process of Reading Comprehension*, September 1980.

No. 183: Reynolds, R. E., & Anderson, R. C. *Influence of Questions on the Allocation of Attention during Reading*, October 1980.

No. 184: Iran-Nejad, A., Ortony, A., & Rittenhouse, R. K. *The Comprehension of Metaphorical Uses of English by Deaf Children*, October 1980.

No. 185: Smith, E. E. *Organization of Factual Knowledge*, October 1980.

No. 186: Hayes, D. A., & Tierney, R. J. *Increasing Background Knowledge through Analogy: Its Effects upon Comprehension and Learning*, October 1980.