TEXT STRUCTURE AND ITS EFFECT ON TEXT RECALL BY FOURTH GRADE READERS

by

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ABSTRACT

This study investigates the recall of expository text immediately after reading and after one week's delay. It attempts to determine the effect of adversative text structure on recall, and whether reading ability or the use of the text structure to organize the recall relate to the recall of text. The structure of the passages used and the content of the recall protocols were analyzed using Meyer's (1975) text analysis system.

Subjects were 23 fourth-grade boys (12 poor readers and 11 good readers). Each read and orally recalled two passages of expository prose. Protocols were analyzed for the idea units recalled at high, secondary and low levels, according to the content structures derived for each passage. The recalls were also scored as to whether they contained or did not contain the same overall structures as the original passages.

Three-way analyses of variance revealed that good readers recalled significantly more idea units than did poor readers in both the immediate and delayed recalls ($p < .05$). There was no significant difference between good and poor readers' use of the text structure to

organize their recalls (t = 1.3). The results of t tests conducted to compare the number of idea units recalled by students who did use the text structure to organize their recalls and those students who did not use the text structure indicated that students who did use the text structure tended to recall more, but the difference between the two groups' recalls was significant in only two of the four recalls (t - 2.24; t = 2.58; $p < .05$).

Supplementary analyses of the data revealed that good readers tended to recall specific details in their recalls, while poor readers appeared to give more general recalls. Neither good readers nor poor readers recalled the analogy contained in one of the passages.

The study indicates that fourth-grade readers may not have sufficient experience with expository text to develop schemata which might enable them to effectively read and recall adversative style prose passages. These findings are interpreted to suggest that students may need to be made more aware of the various structures found in expository prose. Implications for educational practice are that teachers must themselves be aware of

text structures and the demands these make on intermediate grade readers.

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To my parents

CHAPTER I

INTRODUCTION

Statement of the Problem

This study was undertaken in an attempt to determine how fourth grade students use text organization in recalling expository prose. An investigation in this area was prompted by the number of intermediate level students who read stories in directed reading lessons with apparent ease, but who lack understanding when reading independently.

The move from the primary to the intermediate grades generally forces three major adjustments upon students. The first change students must learn to make is to read and complete related activities independently of the teacher; the lessons are no longer mostly teacher directed. The second change is related to the first; because students are less teacher directed, they must learn to use reading as a tool to learn, rather than simply learn to read.

The third adjustment students must make is to the difference in materials. From reading almost exclusively narrative material in the primary grades, students must adjust to reading an increasing amount of expository material. As the child progresses through the grades, an increasing amount of emphasis is placed on reading to learn from expository material. The beginning intermediate reader,

then, must make major adjustments in his view of reading.

Recent reading theory emphasizes the reader directed interactive nature of reading (Anderson, 1977b; Gibson & Levin, 1975; Ruddell, 1974). The interaction between the reader and what is read is seen to be complex and constantly changing (Rumelhart, 1975). Throughout the literature, the need for students to be familiar with reading situations, purposes and materials is emphasized. What is constantly stressed is that the interaction between the reader and text is easier, comprehension is better, if the student understands not only the purpose of the task, but has some degree of familiarity with the type of material to be read.

In independent reading assignments, students must often learn from relatively unfamiliar prose styles. This study investigated the degree to which students make use of particular structural elements found in expository prose in fourth grade reading material. It sought to relate use of text structure in recall of text to the students' reading ability and to the effectiveness of recall.

REVIEW OF RELEVANT LITERATURE

An investigation into what students recall after reading and what affects that recall must provide a framework for both how the student acquires the information and

then how it is recalled once it has been read. Such a framework is offered in the current literature on schema theory. In addition, such an investigation must consider previous research on the recall of text and examine methods of text analysis through which recall of text can be evaluated. The remainder of this chapter deals with those three areas of interest.

Schema Theory

One widely accepted view of text comprehension is schema theory. Within the theory, a reader's schemata, or organized understandings of the world, act as the basis for comprehending and remembering information in text.

Schema theory did not develop in an attempt to explain reading comprehension, nor did it develop quickly. The term, "schema," was introduced into modern psychology by Bartlett, in his book, Remembering (1932). The longitudinal study of memory which provided the basis for the book is discussed later in this review. The results of that study, however, encouraged Bartlett to view comprehension and memory as constructive activities; that is, that one comes to understand and is able to retrieve information on the basis of already known, organized information. Bartlett (1932) defined a schema as "an active organization of past reactions, or of past experiences,

which must always be supposed to be operating in any well-adapted organic response" (p. 201).

Piaget's work in cognitive development indicated his belief that schemata are governed by the operational level of the individual, and that schemata are active, both when information is being stored, and when it is being recalled (Piaget & Inhelder, 1973). Piaget, however, further related the operational capacities of a schema to the processes of assimilation and accommodation. A person who uses a schema that does not need adjustments when brought into play to comprehend a new event or incident, simply assimilates the new instance into the existing schema. If the new event does not match the existing schema well enough for the schema to be applied in its present form, then accommodation occurs. The schema is adjusted to accommodate the demands which the new instance requires. Piaget believed that cognitive development was indexed by an organism's ability to adapt, to achieve equilibrium with the environment, and therefore, to make sense of the world it perceived (Piaget & Inhelder, 1973). The process of adaptation, according to Piaget, was explained by assimilation and accommodation.

> Every schema is the result of an assimilative activity whose special characteristic is to incorporate new or known data, or to reproduce and sooner or later to generalize what has been discovered. Assimilation, therefore, fashions the schemata, and

> the latter are nothing but the structural result of the former - a circular process comparable to that relating judgements to concepts.
>
> However, every assimilatory schema must perforce accommodate itself to the objects it bears upon, or else the assimilation becomes distorted.
> (Piaget & Inhelder, 1973, p. 21)

Piaget's concept of schema was thus distinctive in its position within a specific theory of cognitive development, but included the general properties of representing organized experience and incorporating new, related experience.

Except for the special role schemata played in Piaget's work, the concept of schema was little used in psychological theory until interest in the comprehension of discourse grew during the 1970's. At that time, interest in schema theory revived and expanded. Part of the expanded interest occurred because of strides made by linguists who had become involved with meaning and the structural elements of language (Chomsky, 1957; Fillmore, 1968). The development of case grammar (Fillmore, 1968) and similar work by Grimes (1972), offered the foundation for methods by which text can be analyzed (Fredericksen, 1975; Kintsch, 1974; Meyer, 1975).

In the current literature of cognitive psychology, the concept of schema is variously described as frame

(Minsky, 1975; Winograd, 1975); and plan (Schank & Abelson, 1977). Basically, however, schemata are seen as cognitive patterns (Anderson, 1977; Rumelhart & Ortony, 1977) which have slots which can be filled by specific details. Schemata can be embedded one into another. Often, parts of wholes are not recognizable outside of their larger contexts, just as wholes are often identified only on the basis of their components. The understanding of wholes and parts happens together. Figure 1 taken from Palmer (cited in Rumelhart, 1981) illustrates the interrelationships which can exist among schema and the effect which context and detail have upon each other. As Rumelhart (1981) notes;

> it is not that parts of a face cannot ever be recognized without the face as a context. But in order to be recognized out of context, they too must have an internal structure. If enough data is available about its internal structure, a schema like the nose schema can serve the function of an organizing whole perfectly well. (p. 20)

Schema theory offers an hypothetical description of the comprehension of discourse. It provides a framework which illustrates that comprehension occurs at many levels, and that readers must activate appropriate schema at those levels for comprehension to occur. Comprehension can be said to happen when the schema

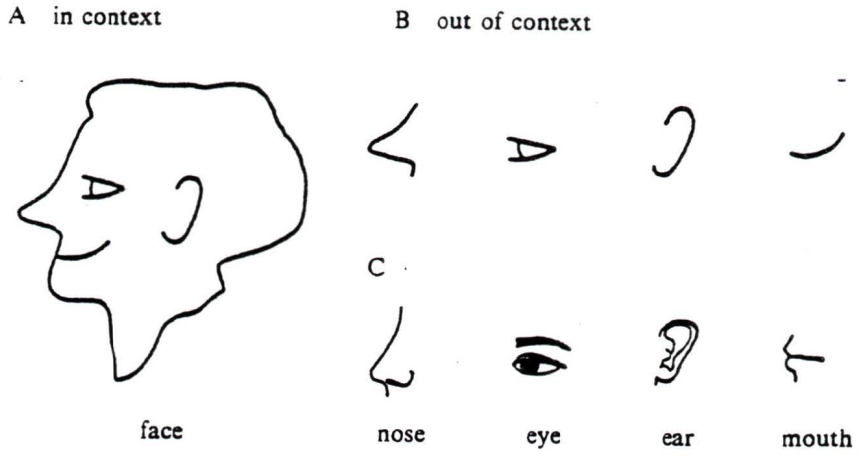

Figure 1

An illustration of part-whole context. Facial features recognizable in the context of a profile (A) are not recognizable out of context (B). When the internal part structure of the facial features is differentiated (C), however, the features become recognizable out of context.

activated by the reader adequately explain the information being read. Rumelhart and Ortony (1977) note:

> Schemata are the key units of the comprehension process .... We say that a schema "accounts for" a situation whenever that situation can be interpreted as an instance of the concept the schema represents. Thus, the bulk of the processing in a schema-based system is directed toward finding those schemata which best account for the totality of the incoming information. On having found a set of schemata which appears to give a sufficient account of the information, the person is said to have "comprehended" the situation.
> (p. 111-112)

Text recall after reading is viewed as a reconstructive activity (Meyer, 1977c). Recall requires that the reader activate the schemata which were operating at the time the information was stored so that the information can be retrieved. For this purpose, the information must be resorted from the storage schemata so that details appropriate to the retrieval need can be located. Since the context in which the retrieval occurs may differ from the input context, several sets of schemata may require activating for information to be recalled.

Schema theory offers a framework for the comprehension of discourse. For the purposes of this paper, it provides the basis upon which the comprehension and recall of text information are discussed.

Text Analysis Techniques

The resumed interest in the comprehension of discourse presented researchers in all fields with the problem of defining and analyzing discourse more exactly. The work in linguistics, especially in case grammar and the semantic relationships (Fillmore, 1968; Grimes, 1972) offered a basis for discourse analysis. Because this study concentrates on work with expository materials, the analysis techniques developed and applied to narrative, especially in the form of story grammars, (e.g., Mandler & Johnson, 1977; Rumelhart, 1977; Stein & Glenn, 1977) are not discussed.

The problem of how the semantic content of a passage should be represented has caused the proliferation of text analysis techniques (Fredericksen, 1972; Meyer, 1975; Kintsch, 1974; Kintsch & van Dijk, 1978; Rumelhart, 1975; Thorndyke, 1977).

Fredericksen (1972; 1975) developed a model of text structure which emphasized the interactive reading process (de Beaugrande, 1981). The model divides discourse segments into propositions, and places emphasis on the relationships among the propositions. It is a network, rather than an hierarchical model. Fredericksen's model includes inferences that are made within the passage. The sentence level of analysis, rather than the passage level, is

stressed. This makes Fredericksen's model, complex and definitive as it appears to be, less useful than it might be for analyzing organizing structural elements in a passage (Reder, 1980).

Unlike Fredericksen, Kintsch's (1974) model of text analysis was based on text form. The basic proposition list is prepared for the text in question, each proposition usually consisting of a predicate and its arguments. Coherence, inference and overall structural elements are applied over and above the basic proposition list. The model pays particular attention to the semantic elements of the passage (de Beaugrande, 1981). An hierarchically arranged model of text, it also emphasizes the representation of sentences rather than the ideas presented in the text (Reder, 1980).

A third model of text analysis is that developed by Meyer (1975). Like Kintsch's model, Meyer's provides an hierarchical rather than a network representation of the passage. Based upon the case grammar adapted from Fillmore (1968) and Grimes (1972), Meyer's technique emphasizes the role relations which link ideas in and among the sentences. Unlike Fredericksen and Kintsch, Meyer's model is overlaid by "rhetorical predicates" which describe the overall structural elements in the passage.

These rhetorical predicates allow each passage to be analyzed on the basis of higher level structures as well as at the sentence level.

Meyer's text analysis system does not provide for inferencing on the part of the reader. Rather than a model of what the reader might construct in comprehension or recall, it deals more strictly with relationships inherent in the text.

This study has used Meyer's text analysis techniques for two main reasons. The first is that Meyer's model was developed for use expressly for expository material and provides the top level structure elements necessary for categorizing and analyzing such passages. Secondly, this model has been used in several studies of recall, and has proven a useful model for such studies.

Studies Investigating the Recall of Text

As was noted earlier, interest in the comprehension and recall of discourse is long standing. This section of the review deals with studies that have specifically investigated recall of text.

Bartlett's (1932) longitudinal study of memory for text was conducted with adults. Each was presented with a story, usually unfamiliar in terms of cultural content,

which was to be read. Following the reading, subjects were asked to recall the passage. Bartlett (1932) noted that the chained recalls he collected (intermittently over a period of 10 years) became increasingly distorted as the number of retellings and the time from the original reading increased. On the basis of his findings, Bartlett concluded that "Remembering ... is an imaginative reconstruction or construction, built out of a relation of our attitude towards a whole active mass of past reactions or experience" (p. 213).

More recent investigations into Bartlett's study indicate that the high degree of distortion evidenced in the recall of his subjects might have occurred for reasons in addition to those that Bartlett suggested. The unfamiliar content of the stories Bartlett used may have caused inaccuracies in understanding at the time the information was read. In addition, more recent studies (Sulin & Dooling, 1974; Dooling & Christianson, 1977) indicate that it becomes increasingly difficult for subjects to discriminate between material actually read, material later retrieved, and inferences made. This causes subjects to "recall" material never actually in the original passage. As Spiro (1977) notes, "The more one relates discourse to prior knowledge, the greater the assimilation into those structures with the resultant loss of particular identity

of the discourse" (p. 139). Schemata are changed by new, incoming information, and this results in a lessening of the separateness of the information from the discourse. When this integration occurs, the schemata at retrieval are very different from the schemata activated at input, and often the latter must be inferred from the schemata current at retrieval. Recall is then reconstructive rather than reproductive and can easily be "distorted" or inaccurate (Spiro, 1977; Rumelhart & Ortony, 1977).

Recent investigations illustrate the role played by schemata in the recall of text. The schemata activated at the time the information is processed affect what is recalled, whether the schemata are schemata concerning actual knowledge or attitude toward the task or the material.

It has been suggested that schemata provide the reader with a framework into which the new information being read can be woven. Schemata provide the "ideational scaffolding" (Ausubel, 1963) into which ideas and processes are integrated, and when that integration is complete, the reader comprehends. Several studies (Langer, 1980; Pearson, 1979) have indicated that students who had an existing "framework" for the material being read

were better able to integrate new material and to answer more questions about the passage than readers without background knowledge. Langer (1980) noted:

> New ideas and information are learned and retained more efficiently when particularly relevant ideas are already available within the reader's cognitive structures. (p. 28)

Studies of reader perspective and recall (Anderson, 1977a; Bransford & Johnson, 1973; Pichert & Anderson, 1977; Schallert, 1975) indicate that perspective or point of view assumed by the reader affects what is recalled from reading. Anderson's (1977a) study indicated that subjects who read a passage with one goal in mind recalled different information from subjects given an alternative goal. Similarly, Schallert (1975) found that subjects given ambiguous paragraphs to read interpreted them according to the title they were provided. Pichert and Anderson (1977) worked with ambiguous paragraphs which readers interpreted according to the perspectives they were given. The information recalled from the passage was closely related to the perspective taken by the reader. Information that did not seem to fit the schema was not likely to be recalled. Townsend (1980), who worked with undergraduate students, achieved similar results. Subjects who were supplied with inappropriate titles and contextual information prior to listening to

a passage were able to recall even less after listening than students who were supplied with no titles or accompanying information. The students given misleading titles activated unhelpful schemata for the material they heard. These studies support the conclusions of Bransford and Johnson (1973), who found that comprehension and recall were much improved when clarifying contextual information such as titles or pictures were given to the reader prior to reading the passage.

Development of techniques for analyzing the semantic content and organization of texts stimulated investigation of the effect of text organization and recall (Bartlett, 1978; Britton, Glyn, Meyer & Penland, 1980; Kintsch, 1976; Kintsch, Kozminsky, Streky, McKoon & Keenan, 1975; Marshall & Glock, 1978-1979; Meyer, 1965, 1980; Meyer, Brandt & Bluth, 1980; Smiley, 1977; Taylor, 1980; Tierney, Bridge & Cera, 1978-1979). Since the same techniques that are used to analyze the original text can also be used to analyze the subject's recollection of that text, many studies have investigated not only recall in relation to text organization, but also readers' perceptions of organization, individual differences in ability to discern organization, and the development of schemata for various kinds of text structures.

Two major studies in text organization and its recall were undertaken by Meyer (1975) and Meyer, Brandt and Bluth, (1980). Meyer's study (1975) was one of the initial investigations into the relationship of text structure and text recall. The study involved undergraduate students, each of whom was asked to read a set of three paragraphs. The paragraphs were especially designed to exhibit specific text organization structures. The primary purpose was to determine the importance of height of information in the content structure to recall.

By "height" in the content structure, Meyer meant the placement of the idea unit within the hierarchical tree structure developed for a passage. The "height" reflects the degree of subordination an idea has in relation to the other ideas from a passage are found high in the content structure for the passage, while subordinate ideas would be in the middle or bottom levels. The superordinate ideas are found to the left of the content structure diagram, while less superordinate ideas are closer to the right side. Thus, "height" coincides with "leftness" in the content structure diagram (Meyer, 1975; Meyer, 1977).

Meyer's study employed her content structure analysis technique. Each paragraph was analyzed and the content of the recalls was related to the content structure of

the paragraph. The study established Meyer's content structure analysis and scoring techniques as useful experimental tools.

The major findings of the study indicated that the height of information within the content structure of the passage definitely affects its recall. Since recall prompted by cue words was better if the cue words came from high level idea units, Meyer (1975) proposed that,

> differences between the recall of information in high and low positions in the content structure is not all due to retrieval differences, but some is due to differences in the amount of information from the two structural positions actually present in memory. (p. 165)

In addition, the study determined that information from high in the content structure was more likely to be retained over time than information from low in the content structure. Meyer (1977a) notes that these findings "point out the importance of the content structure of a passage as a determiner of the learning and retention of information from the passage" (p. 320).

A third major finding of this study was that while signalling tended to increase recall overall, the result was not statistically significant. Meyer (1975) defines signalling as words which "are not included in the content structure since they do not add new content and relations, but simply accent information already contained in the content

structure" (p. 77). Words like "but", "however", and "although" would be signalling terms. Meyer suggests that the lack of significant effect might be due to the fact that signalling was related to idea units already high in the content structure and therefore already likely to be remembered.

A second study was undertaken by Meyer, Brandt and Bluth (1980). This study investigated the effects of schema awareness on the recall of prose by ninth-graders. A sample of 102 ninth-grade students judged to have good, poor, and average ability in reading comprehension was selected. Each subject read two passages prepared especially for the study, either in the "with signalling" or "without signalling" version. One passage had a contrastive (adversative) structure and the other a problem-solution (response) structure. Students read each passage and then wrote down all they could recall of the passages. A delayed recall was collected one week later. The recalls were scored using the content structure of the passage to see which idea units had been recalled. The method duplicated the content structure analysis and scoring system devised by Meyer (1975). In addition, each recall was rated as to whether it was organized in the same manner as the author had organized the original passage.

A separate rating system was devised for this purpose. It was posited that students whose written recalls were structured like the text were using a structure-matching strategy, (structure strategy) and it was hypothesized that they would display superior recall and retention of the text information. The results of this study indicated that while fewer than 50% of the students used the structure strategy (only 22% used it in all four recalls), the subjects who did use the strategy had better recall. The strategy was used by more good readers than poor readers. In addition, students who appeared to use the strategy also proved better at identifying statements which were consistent with information from the passage. These results could be interpreted to support the hypothesis that understanding the author's structure is particularly important to the storage and retrieval of information.

An analysis of the interaction between signalling in the text and the strategy employed by the reader is given by Meyer (1980). Three main strategies which ninth graders are found to employ are analyzed. Meyer concludes that signalling is indeed helpful to some readers, depending on their strategies. She notes that if the reader already employs the structure strategy, signalling

will not affect recall. If, however, readers simply list information without organizing it, (i.e., use the detail/ list strategy) signalling is effective, for it "promotes a switch from their dominant strategy to the structure strategy" (p. 11).

An investigation of recall and use of structure strategy in young children and adults (Taylor, 1980) compared adults, good and poor sixth-grade students, and good fourth-grade students. Each read and recalled a passage immediately and after a two day delay. The results indicated that children who use the structure strategy are better able to recall expository text. Few students, however, appeared to make use of the strategy (59% of sixth-grade good readers; 19% of sixth-grade poor readers; 12% of fourth-grade readers). These low figures support the findings of Meyer, Brandt and Bluth (1980) who noted that less than 50% of ninth-grade students made use of the structure strategy. Taylor concluded that both age and reading ability are related to skill in recalling expository material after reading.

The findings of these studies and of earlier work by Kintsch (1976) and Kintsch et al (1975), support the view that recall of expository text is related to text organization. Whether labelled height in the content

structure (Meyer, 1975), super-ordinate or subordinate proposition levels (Kintsch, 1976) or macro versus micro structure analysis (van Dijk & Kintsch, 1976), investigations of what is recalled indicate the tendency for high level information to be remembered better and longer, especially if the reader is aware of structural clues and patterns.

Reading Ability and Text Recall

A series of text recall investigations has centered around the relationship of reading ability and text recall. Because of the interest in determining how strategy use by good readers differs from strategy use by poor readers, several of these studies are included in this review of literature.

Smiley, Oakley, Worthen, Campione, and Brown (1977) compared the comprehension and recall of passages when read and listened to by good and poor seventh-grade readers. Good readers recalled a greater proportion of the story in each case than did poor readers, and what good readers did recall was more definitely related to the importance of the information.

Smiley et al (1977) found no difference between the results for reading and listening, which suggests that poor readers have a general comprehension problem.

These results differ from those obtained by Meyer (1977b) when she compared the recall of text after listening by sixth-grade students. While she indeed found that good readers recalled substantially more overall, based on their answers to related question, she found no difference between the three groups in their ability to recall high and low level information.

Tierney, Bridge, and Cera (1978-1979) report definite differences between both the amount and the content remembered by good and poor third-grade readers. Good readers "appear to process and generate more causal and conditional relationships which add to the coherency and the organization of their recalls" (Tierney et al, 1978-1979, p. 566).

These studies and others (Canney & Winograd, 1979; Marshall & Glock, 1978-1979; Spiro, 1979; Golinkoff, 1975-1976; Stanovich, 1980; Ryan, 1981) emphasize the relationship between a reader's comprehension and the reader's use of the organization in text. They add support to the thesis that reading is an active, reader-directed process, and that the reader's background knowledge and perspective are essential to comprehension. Studies of text recall support the conclusion that applying a schema for the text organization pattern in the material being read adds to the reader's ability to understand and later

retrieve that information.

The Use of Free Recall as a Measure of Readers Comprehension

A variety of methods have been used to assess reader comprehension. Many of the studies cited previously (Meyer, 1975; Meyer, Brandt and Bluth, 1980; Smiley et al, 1977; Taylor, 1980) used free recall. Although free recall is used in these studies, it is often accompanied by or replaced with an alternative measure.

Most recently, cloze procedure has been used to assess comprehension. Cloze has the advantage of easier scoring, and only requires that limits be set to the allowable responses for judging accuracy. Direct questioning is also frequently used as a means of assessing comprehension. As Smiley et al (1977) note, however, the choice and phrasing of questions can influence the results of comprehension assessment.

Kendall, Mason, and Hunter (1980) investigated the use of multiple choice, cloze, free recall, and maze techniques to measure comprehension. In their work with fifth-graders, they established that while such variables as text structure and passage content influenced the measurement of comprehension, maze and multiple choice were consistently less difficult measures of comprehension than either cloze or recall.

Recall has been criticized as a measure of comprehension because it also assesses memory efficiency. It has the essential advantage, however, of allowing the reader to select what is recalled, and to favour whichever aspects seem important in the reconstruction of the information. For this reason, recall has been used as the basis for measurement of comprehension in major investigations of schemata in reading. As Marshall and Glock (1978-1979) note:

> Recall has a distinct advantage. It measures spontaneously produced information, thus allowing one to note not just what information is understood but how this information is organized.(p. 55)

Since the interest in the present study was directed toward not only assessing what students recalled but also toward investigating their use of the author's organization in that recall, free recall was chosen as the appropriate method for use. It allowed the readers to organize and emphasize the material they read in the manner which seemed most suitable to them.

SUMMARY

This chapter has outlined the problem under investigation and has reviewed literature in the areas of schema theory, text analysis techniques, and recall of text. In addition, it briefly considered the reading

strategy uses observed in good and poor readers and the use of recall as a way of gauging a reader's understanding of written material.

The literature review presented has provided both a theoretical framework and a practical basis for an investigation into what fourth-grade readers recall of text and their use of text organization in that recall. It has also provided for a consideration of those activities in regard to reader ability.

Schema theory suggests that understanding and remembering require the activation of appropriate schemata. This supports the view that students who have relevant schemata available to them will find new and related material easier to learn and remember. Because they have an already established "scaffolding" (Ausubel, 1963), they have appropriate slots into which incoming information can be integrated. Students, therefore, who have had experience with the organizational patterns frequently found in expository text, should have an additional aid to their comprehension and recall of expository prose. "Good readers" may well be those who make use of the organization in text. Those readers who do make use of the in-text structure should have superior recall of the material which has been read. The studies in text recall cited in this review support this view.

Meyer's analysis system was compared briefly with those of Kintsch & Fredericksen and is more fully outlined in Chapter II. Meyer's system provides a technique by which an expository passage can be analyzed into an hierarchical content structure. The content structure illustrates, through the "height" of the individual idea units, the relationships which exist among the ideas in the passage. The free recalls of the readers are then compared with the original content structure developed for the passage. The comparison allows for an analysis of the recall in terms of idea units recalled from the top, middle and low levels of the passage.

Studies of text recall using Meyer's (1975) analysis and other techniques have had similar results. Subjects classified as "good readers" tend to recall more than those classified as poor readers, and to retain information longer. Good readers tend to be more aware of the organizational structures in expository text, and to model their recalls using the structure of the author. Readers who do use the structure of the original text in their recalls remember more overall and retain it longer.

Investigations into the recall of text and the use of text structure have tended to look at the recall of older students. Since the exposure to expository text generally expands about the time students enter fourth

and fifth grade, it seemed appropriate to investigate what is recalled and the use made of text structure by students who are initially encountering the text patterns which are associated with expository prose.

This study, therefore, investigated the recall of fourth grade readers. It examined their recall of short expository prose passages in relation to reader ability, time elapsed from reading, and the use of text organization patterns. In order to conduct the investigation, the following hypotheses were formulated.

The Hypotheses

1. Good readers recall more idea units at all levels than poor readers.
2. Good readers make more use of the structure strategy (text organization patterns) than do poor readers.
3. Students who use the structure strategy have superior recall to those students who do not use the structure strategy.

CHAPTER II

A Summary of Meyer's Text Analysis Technique

The text analysis technique selected for use in this study was that of Meyer (1975). It was chosen for two reasons: (1) it has been used successfully in numerous studies of text recall; and (2) the technique allows for the analysis of the recalls in terms of the global structures present in expository prose passages. Meyer's analysis technique was based upon Fillmore's (1968) case grammar and the semantic grammar of propositions established by Grimes (1972).

Meyer's representation system deals with prose in larger than sentence units, and allows a detailed analysis of the relationships among the ideas within a passage. Like Fillmore's case grammar, Meyer's technique emphasizes the role relations, or terms which indicate the relations between the verb (the lexical predicate) and the other words (the arguments) in the sentence. Like Grimes, however, Meyer also uses rhetorical predicates which operate above the level of the lexical predicates.

Grimes' (1972) grammar produces hierarchically arranged tree structures by which a prose passage can be analyzed. He suggested that discourse is comprised

of three major components: (1) content, which is the text base or list of propositions contained in a passage; (2) cohesion, which results from the relations or labels which bind the propositions into a meaningful unit; and (3) staging, which is the process of organizing the text base into a hierarchy so that the superordinate propositions are separated from the subordinate propositions (Marshall & Glock, 1978-1979).

Grimes' tree structures are arranged to indicate the relationships among the ideas in the passage. The nodes of the tree structure contain major content words from the passages; these words are connected by lines. Between the content words are the labels which state the relationship existing between the two content words. Meyer (1975) notes that this tree structure is similar to the semantic structure proposed by Fredericksen. The hierarchy shows the relationships which exist between the superordinate and subordinate ideas within the passage.

The nodes in Meyer's tree structure are connected by lines, as are Grimes'. Though each role relation is defined as to its function, Meyer (1975) noted "Linguists vary on the labels given to identify role or case relationships and on the specificity of the distinctions made, but the underlying principle of identifying the function

of information in prose is the same" (p. 27).

Grimes established that two types of relations exist among and within the three elements (content, cohesion, and staging) of the passage. Meyer refers to these relations as role relations and rhetorical predicates. Role relations connect one type of content word, the lexical predicate (usually a verb and its adjuncts), to the other content words, or arguments. The role relations of Grimes are similar to the case relations outlined by Fillmore (Meyer, 1975).

Meyer's analysis, like that of Grimes, uses rhetorical predicates to describe the overall structure of the passage. The rhetorical predicates designate various organizing relations found in prose. There are three major types of rhetorical predicates: (1) paratactic, which relate two equal units within the prose passage; (2) hypotactic, which relate two unequal units of the prose passage; and (3) neutral, which list a collection of ideas.

Paratactic rhetorical predicates contain at least two units of equal weight. The response rhetorical predicate, for example, balances a problem with a solution. The hypotactic rhetorical predicates, however, have arguments of unequal weight; one argument is subordinate

to the other. The adversative, explanation, and analogy predicates are examples of this type. In the adversative rhetorical predicate, what does happen is related to what does not, or two points of view are contrasted, with more emphasis being given to one than to the other. The neutral predicates take either the paratactic or hypotactic form depending upon the emphasis given them by the writer. Neutral rhetorical predicates include the collection and the covariance predicates. Rhetorical predicates do not specify role relations, but as Meyer notes, are "primarily responsible for giving prose its overall organization" (1975, p. 31).

Grimes' grammar also includes propositions,which consist of a predicate and its arguments. These propositions can be described as lexical or rhetorical. A lexical proposition contains a lexical predicate and the arguments relating to it. The arguments would be related to the predicate by means of the role relations described above. For example, the sentence "We think of deserts as dry lands with no water," could be a lexical proposition. In this case, it would be diagrammed as follows:

e.g. We think of deserts as dry lands with no water.

THINK — lexical predicate

agent
WE — arguments
patient
DESERTS
attribution
DRY
equivalent
NO WATER

THINK is the lexical predicate, and it is related to its arguments by the role relations.

A rhetorical proposition, however, consists of a rhetorical predicate and its arguments. The arguments would be complete lexical propositions or other rhetorical propositions. Thus, rhetorical propositions usually relate major portions of the passage rather than segments of sentences. An adversative rhetorical predicate, for example, relates the belief and opposing statement in the following brief text: "People say that the stars come out at night, but the stars do not really come out at all." The rhetorical proposition consists of an adversative rhetorical predicate and these two arguments: (1) people say that the stars come out at night, and (2) the stars do not really come out at all. The lexical propositions which serve as arguments in this rhetorical proposition could of course be further analyzed.

These examples indicate the general nature of the hierarchical relationships that can be displayed through the use of Meyer's technique. Meyer (1975) notes that while linguists would probably analyze the propositions to their fullest extent, possibly to the word level, that is not always necessary, depending on the purpose of the analysis. In her own work, Meyer (1975) did not analyze the propositions to a very deep level, since she was using the analysis to characterize recalls and was only interested in whether the sujbects recalled the substance of the ideas and their relationship (p. 42).

Meyer's analysis technique produces an hierarchically arranged tree structure, or content analysis, of text. From this content analysis it is possible to score recalls of the paragraphs in terms of content words, the relationships among them, and the overall structures which the reader has recalled. Each entry in the content analysis is termed an idea unit.

A complete description of Meyer's prose analysis, indicating its similarities to and differences from Grimes' grammar, is given by Meyer (1975, chapter II).

The prose analysis described by Meyer (1975) has been utilized in the analysis of the two prose passages selected for use in this study. A detailed description

of the passages and their individual content analyses are given in Chapter III.

CHAPTER III

METHOD

This study attempted to determine what is recalled from expository prose by good and poor fourth grade readers. In addition, it investigated the use made of text structure patterns in recall, and whether using the text structure patterns affected the amount recalled. This chapter is a description of the techniques used in gathering the data to be used in testing the hypothesis stated at the conclusion of Chapter I.

Subjects

The students who participated in the study were selected from a pool containing all fourth grade boys in three schools in School District No. 65 (Cowichan). In these schools, there were approximately 50 boys in three grade 4 classrooms and two grade 4-5 split classrooms. All three schools served mostly white middle class populations in urban and semi-rural areas.

The study required that pools of good and poor readers be established. Since the procedure required a great deal of time to gather and analyze the data from each student, a limited number of students could be included in the study. To avoid confounding the findings

with possible sex differences, only male students were selected. No district-wide standardized test scores by which reading ability could be estimated were available. All the students in the study were reading from the Ginn 720 reading series (Clymer, 1979) so it was decided that teacher rating of classroom reading ability and reading series level would be used as criteria of reading achievement. Each classroom teacher was asked to classify the boys in the class for reading ability, as good, average and poor. The level of the Ginn 720 reading textbook that the student was using was also determined. For purposes of the study, only students rated as good readers who were also reading Ginn 720 level 11 or higher were considered to be good readers. Only students rated as poor readers who were also reading the first half of Ginn 720 level 10 or below were considered to be poor readers. Any student with a first language other than English or who was designated by the school as learning disabled was eliminated. This preliminary selection established a pool of 16 good readers and a pool of 20 poor readers. All were within the age range of 9.0 to 11.5 years.

Using a table of random numbers, 12 students were selected from each pool, and student numbers were assigned.

Letters outlining the proposed study and requesting parental permission were sent home (Appendices A1 and A2). The final sample for the study contained 23 subjects, 11 good readers and 12 poor readers. Although 24 students initially received permission to participate, one student was withdrawn because of parental objection when the study began. Information regarding the reading level ranges and ages of the sample is given in Table 1.

Materials

The materials used in the study consisted of two brief passages of expository prose which each student was asked to read and recall. These prose passages were selected following two criteria: (1) that the passages used should closely resemble materials students are frequently asked to read; and (2) that the materials should be within the reading range of all students in the study.

Because the task the students were asked to perform was designed to resemble an independent rather than a teacher-directed reading session, the materials were chosen from reference materials. Very often, the most common reason beginning intermediate students have for independent reading of expository materials is to write research reports. What they write depends upon their understanding

Table 1

Ages and Reading Levels of Good and Poor Reader Groups

Student No.[b]	Age (Yr.-Mo.)	Reading Level (Ginn 720)	Student No.	Age (Yr.-Mo.)	Reading Level (Ginn 720)
1	9-9	10-11[a]	2	10-3	9
8	9-8	10-11	3	11-2	9
10	9-11	11	4	9-10	9
13	10-6	11	5	10-2	8-9
14	10-2	11-12	6	9-6	9
16	10-6	11-12	7	10-1	9
17	9-11	11-12	9	9-7	9
19	10-2	11	11	10-1	9-10
20	10-3	11	12	11-2	9-10
21	10-3	11	18	10-10	7-8
22	9-5	11	23	10-9	9-10
			24	11-1	9-10
Median	10-2	11	Median	10-2.5	9

[a]Where two level numbers are given (i.e. 10-11), the student was in the process of changing levels at the time the study was conducted.

[b]Student No. 15, a good reader, was withdrawn from the study.

and recall of what they read.

A general review of science reference materials commonly used at the intermediate grades indicated that the adversative rhetorical predicate is an organization frequently used in such texts. In these texts, the adversative structure is often used to present a commonly held view and then to contrast it with other information. Such a passage was selected from The sun, the moon, and the stars (Freeman and Freeman, 1979). This passage was chosen because it seemed typical of those found in many reference texts, and had content which the research felt would interest fourth grade readers. This passage was shortened for use in this study by the deletion of two paragraphs which introduced a secondary topic. The resulting STARS passage, 146 words in length, is shown in Appendix B-1.

The second passage used in the study, DESERTS (Appendix B-2), was written by the researcher and modelled on the adversative structure of the STARS passage. Its topic was chosen for two reasons: (1) desert geography was not in the regular curriculum, so the passage would not represent a recently taught subject; and (2) it was judged to contain concepts of approximately equal difficulty to the STARS passage. DESERTS was written to have the

same adversative organization as STARS and contains 147 words. Both passages have mid-second-grade readability according to the revised Spache Readability Formula (Spache, 1974).

The two passages were analyzed according to the Meyer (1975) technique. The analysis yielded a hierarchical content structure for each passage (Appendices C-1 and C-2). Scoring keys (Appendices C-3 and C-4) corresponding to the content structure were prepared for evaluating the students' recalls.

The passages both contain two adversative structures, each of which is judged to be an attribute of the main topic. In both passages, the adversative structures are signalled explicitly by the word but. STARS was found to contain 73 idea units and DESERTS 82 idea units. The content structure analyses developed for the passages yield levels of idea units. STARS has eight levels while DESERTS has seven. For analysis of recalls, the idea unit levels were grouped into high level (levels 1-3), secondary (levels 4-5), and low level (levels 6-8) idea units. A comparison of the STARS and DESERTS passages in terms of length, readability, and idea units is given in Table 2. High level idea units contain the rhetorical predicates which provide the passage with its overall organization, and some of the major idea units of the

passage. The major idea units are those which contain the pivotal information of the paragraph. These are generally the ideas one would expect to find in the briefest of summaries. They are the main ideas in the paragraph. The secondary idea units are essential to the central meaning of the paragraph and contain the developing content idea units. They give the bulk of the information. Low level idea units are those which support high and secondary idea units but are added details that are not truly essential to the reader's comprehension of the passage.

As can be seen from Table 2 and from the content structures (Appendices C-1 and C-2), the passages have very similar content structures. The high and low level idea unit groups are equal across passages and there is a difference of only nine idea units throughout. As Table 2 indicates, the low level idea units included levels 6 through 8 in STARS but only levels 6 and 7 in DESERTS. There were no level 8 idea units in DESERTS.

Procedure

Each student was interviewed individually by the researcher, in two visits one week apart. During each visit the researcher presented the student with the tasks,

Table 2

Comparison of STARS and DESERTS Passages

Passage	Total Words	Levels	Idea Units	Readability Level (Spache)
STARS	146	1-3	17	2.25
		4-5	44	
		6-8	12	
		Total	73	
DESERTS	147	1-3	17	2.42
		4-5	53	
		6-7	12	
		Total	82	

and tape recorded his responses.

In all three schools, space was provided so that the researcher was assured of privacy during the individual sessions with the students. In one school, this was the nurse's room, in the second, the staff room and in the third, the library, which was not in use. In each case, the classroom teacher was given a list showing the order in which students were requested to visit the researcher. All students from each room were seen sequentially, the order having been determined randomly.

Session One

At the beginning of each initial session, the researcher introduced herself and outlined the purpose of the task. Care was taken to ensure that students felt comfortable with the researcher and were not overly nervous before the first task was explained.

Each student read and recalled two passages. The order of the passages was alternated from one student to the next with the restriction that equal numbers of good and poor readers received each order.

Each student was presented with a set of the two passages. These were placed face down before the student while the researcher explained the task. Complete direc-

tions for the task are found in Appendix D. After hearing the directions and asking any pertinent questions, the student proceeded to read the first passage. When that was completed, the researcher directed the student to begin the recall, which was tape recorded. The researcher offered no prompting during the recall. The student's recall was judged to be complete when he indicated, verbally or non verbally, that he could not remember any more. If the cue was non verbal, the researcher verified it by asking, "Anything else?" after a wait of five seconds. This procedure was then duplicated for the second passage.

Following the second recall, the researcher thanked the student and made note of any comments volunteered about the task. At no time were questions asked regarding the content, structure or difficulty of the passages.

Session Two

Session two took place one week following the first interview. Students were seen in the same order, in the same location and under the same circumstances as outlined for session one.

After a brief chat with each student, the second task was introduced. Students, without benefit of re-

reading, were asked to recall the passages they had read one week previously. The student was cued only with the title of the first passage he had read and his recall of that passage was tape recorded. Then he was cued with the title of the second passage and his recall of the second passage was recorded. Following the second recall each student was thanked for his participation and any comments volunteered about the task were noted.

The recordings of the recalls were then transcribed by the researcher. The exact words of the student, including comments and even pauses, were included in the transcription.

Scoring

The words in each recall were counted in order to determine the total word score. This score included intrusions and errors, which were also totalled separately. The total word score, however, excluded any metacognitive statements made by the student; these were totalled separately. Metacognitive statements were those which reflected the child's thinking about the recalling, rather than about the content of the passage, and included such statements as "I don't know," "That's it," and most frequently, "That's all I can remember." These were

not included in the total word score because they did not relate directly to the content the child was trying to recall. This initial analysis of the recalls yielded three separate scores: (1) the total number of words; (2) the number of words in intrusions and errors; and (3) the number of words in metacognitive statements.

Each recall was then compared with the appropriate scoring protocol (Appendices C-3, and C-4) which showed the content structures of the original paragraphs according to Meyer's (1975) analysis. The recall was placed next to the scoring protocol; as each segment of the recall was read, the appropriate idea unit was checked. If the recall included synonyms or appropriate paraphrases of the original content, the corresponding idea units were judged to be present in the recall.

When the scoring of content words was completed, the scorer analyzed the recall again, this time judging whether role relations were present. Dual scoring was necessary because the scoring protocols allow that either a role relation or content word can stand alone. For example, in the STARS passage, a child would receive credit for the role relation idea unit <u>setting time</u> if any indication was made of a time range referring to when stars come out. They would not, however, receive credit

for the content words AT NIGHT unless the recall specifically included those words or a paraphrase of them.

Additional scoring restrictions were placed on the high level rhetorical predicates. The adversative idea units were not marked present unless both parts of the adversative were present. In the STARS scoring protocol, then, the first adversative would not be judged present unless the recall included both DO NOT COME OUT and SAY.

The attribution and collection idea units (numbers 2 and 3) were scored last. Attribution was credited if at least one complete adversative was present in the recall. Collection, however, demanded that at least one part of each of the two adversatives in the passage was present in the recall. In STARS, for example, a student had to include at least one part of DO NOT COME OUT and SAY and at least one part of DO NOT MOVE and SEEM TO MOVE in order to get credit for the collection idea unit.

Once the actual comparison of the recall to the scoring protocol was complete, the number of idea units present at each level was computed. The sum of the level totals made up the total recall score.

The analysis technique accepts any reasonable paraphrase of an idea unit. This leaves some degree of

subjectivity in the scoring of the recalls. In previous studies, however, interrater reliabilities have been above r = .95 (Meyer, 1975; Meyer, Brandt & Bluth, 1980).

For this study, 10 recall protocols (10% of the total) were randomly selected and were scored by an independent rater, who was trained in the technique. These 10 protocols were compared with those scored by the researcher. The possible number of idea units in the 10 recalls was 766, and the scorers agreed 95.69% of the time as to which idea units were present in or absent from the recalls.

Each recall was also judged as to whether it reflected use of the primary organization of the paragraph. In both passages, the primary organization was a collection of two adversative structures. These adversative and collection structures were represented by idea units 2 and 3. Consequently, a student was credited with using the primary organization of the original paragraph (i.e. using the structure strategy) if either idea unit 2, idea unit 3, or both were judged present in the recall.

Analysis of Data

The number of idea units recalled by each student at each of three organizational strata (levels 1-3, 4-5,

6-8) were recorded. These scores provided the basis for the statistical analyses performed on the data. Specifically, they allowed an investigation of the differences in the amount recalled by good and poor readers at the three idea unit strata for both stories, and for both the immediate and delayed instances. In addition, the total number of words in each recall, the number of words in intrusions, and the number of words in metacognitive statements were analyzed to provide additional information about the students' recalls.

CHAPTER IV

RESULTS

Introduction

The results of the study are presented in this chapter. Descriptive data which provided input for the analyses are presented first, followed by the statistical analyses. All statistical analyses are presented in relation to the hypotheses, which are discussed in the order they were stated. The final section of the chapter describes supplementary analyses to which the data were submitted.

Descriptive Data

The students' recalls were scored individually as was detailed in Chapter III. The initial scoring for each recall counted the total number of words in the recall, the number of words in intrusions, and the number of words in metacognitive statements. The means and standard deviations of each of these scores were calculated by ability group for each recall instance, as indicated in Tables 3, 4, and 9.

Table 3 shows the mean total number of words for good and poor readers in each of the four recall instances.

Table 3

Means and Standard Deviations of Total Number of Words in Recalls

Group		STARS Immediate	STARS Delayed	DESERTS Immediate	DESERTS Delayed
Good Readers	Mean	71.6	58.0	82.2	73.7
	S.D.	22.8	23.5	31.5	31.1
Poor Readers	Mean	57.4	40.8	56.0	37.0
	SD	19.1	29.7	26.1	29.8

Good readers used more words in their recalls than did poor readers in each of the four recalls. Delayed recalls of good and poor readers were shorter for both stories than were immediate recalls. Good readers used more words in their immediate recall of DESERTS than of STARS, while poor readers used approximately the same number of words in their recalls of the two stories. The difference between immediate and delayed recall of STARS was similar for good readers and poor readers. For DESERTS, however, the reduction in number of words from immediate to delayed recall was twice as large for the poor readers as for the good readers.

Table 4 presents the data regarding number of words in intrusions. Statements of information not included in the original text but relevant to some aspect of it were scored as intrusions. Statements that contradicted information given in the original text were originally scored as errors. However, since the number of errors was very small, they were included as intrusions in the analysis. As Table 4 indicates, recalls of good readers contained a slightly smaller percentage of intrusions than the recalls of poor readers. The delayed recalls of both ability groups contained twice as large a percentage of intrusions than did the immediate recalls. Overall,

Table 4

Means, Standard Deviations and Percentages of Words in Intrusions

Group		STARS Immediate	STARS Delayed	DESERTS Immediate	DESERTS Delayed
Good Readers	Mean	8.6	14.2	8.5	25.9
	SD	12.1	20.3	22.5	28.8
	% of TWS[a]	12.0	24.4	10.3	35.1
Poor Readers	Mean	6.8	11.6	7.4	14.4
	SD	7.9	15.6	11.4	26.2
	% of TWS[a]	11.9	28.4	13.2	38.9

[a]100x words in intrusions divided by total words in the recall.

intrusions accounted for only about 10% of the words in immediate recalls but for more than 30% of the words in delayed recalls.

Metacognitive statements were analyzed according to number of words contained in such statements (Table 9 in Appendix E). There were no consistent differences in number of metacognitive words between immediate and delayed recalls or between good and poor readers. For this reason, the metacognitive statements were not analyzed further.

The scoring of the recalls for idea units was the basis for the major analyses relating to Hypothesis 1. The scoring originally analyzed the passage into levels according to height of passage information. STARS had 8 levels and DESERTS 7. For purposes of statistical analyses these levels were grouped into three main strata (levels 1-3, 4-5, and 6-8). These divisions were chosen because the levels contained within each stratum perform different functions within the content structure. The first stratum, levels 1-3, contains the essential organizing elements of each passage; the second stratum, levels 4-5, contains the major content idea units; and the third stratum, levels 6-8, contains idea units which are additional details, but not essential to the comprehension of the

passage. The scoring yielded the number of idea units recalled at each level, and within each stratum. Table 5 shows the mean number of idea units recalled by good and poor readers in each stratum for each recall instance. As Table 5 indicates, for STARS, the highest percentage of idea units was recalled from levels 4-5; for DESERTS, the highest percentage of idea units was recalled from levels 1-3. While the first stratum idea units were equally well recalled from both stories, second stratum idea units were less well recalled from DESERTS, and third stratum idea units were less well recalled from STARS. The last is particularly true in the delayed recall instance (1.1% of reall).

The data summarized in Tables 3 through 5 form the basis of the analyses reported in the remainder of this chapter. The results are reported in terms of the hypotheses and the analyses to which the data were submitted.

Statistical Analyses

Hypothesis 1 was that good readers recall more idea units at all levels than do poor readers. Hypothesis 1 was tested separately for immediate and delayed recalls by means of two three-way analyses of variance (good vs. poor readers, STARS vs DESERTS, and strata) with repeated

Table 5

Mean Numbers and Percentages of Idea Units Recalled

Source		Levels 1-3		4-5		6-8		Total	
		STARS							
		Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed
Text[a]		17.0	17.0	44.0	44.0	12.0	12.0	73.0	73.0
Good Readers	Mean	5.3	4.6	17.9	12.1	1.5	0.2	24.6	17.0
	%	31.0	27.3	40.7	27.5	12.1	2.3	33.8	23.3
Poor Readers	Mean	5.0	2.8	15.0	8.0	1.6	0.0	21.6	10.8
	%	29.4	16.7	34.1	18.2	13.2	0.0	29.6	14.8
Total	Mean	5.1	3.1	16.5	10.0	1.5	0.1	23.1	13.9
	%	30.2	21.9	37.4	22.8	12.6	1.1	31.7	19.1
		DESERTS							
		Immediate	Delayed	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed
Text[a]		17.0	17.0	53.0	53.0	12.0	12.0	82.0	82.0
Good Readers	Mean	6.1	4.5	17.5	10.3	2.9	1.8	27.2	16.6
	%	39.6	26.2	32.9	19.4	24.3	15.2	33.1	20.2
Poor Readers	Mean	5.2	3.0	10.4	6.4	0.8	0.7	16.4	10.1
	%	30.4	17.7	19.7	12.1	6.9	5.5	20.0	12.3
Total	Mean	5.9	3.7	13.9	8.3	1.9	1.3	21.8	13.3
	%	34.9	21.9	26.3	15.7	15.6	10.3	26.6	16.2

[a]Number of idea units in original text.

measures on the last two factors. Because the analysis of variance required equal cell sizes, and there were data from 12 poor readers but only 11 good readers, data for an imaginary good reader were created using the means of the good readers' scores. Since the number of idea units in the text varied across strata, recall data for the analysis of variance were converted to percentages of idea units recalled within strata.

The results of the three-way analyses of variance for immediate and delayed recalls are shown in Appendix E, Tables 10 and 11. The main effects for ability and idea-unit strata were significant. The main effect for passage was non-significant as were all interactions, except for the interaction between passage and stratum in the delayed recalls. The good readers recalled significantly more than the poor readers in both immediate and delayed recall. As there was no significant interaction between ability and either stratum or passage, there was no evidence that the superiority of the good readers was greater for any one stratum or passage than for another. In addition, two way analyses of variance (good versus poor readers and STARS versus DESERTS) were conducted for each stratum separately, for immediate and delayed recalls. For the immediate recall, the difference between good and poor

readers was significant for the second (levels 4-5) stratum ($F = 5.29$, $p = .005$) but not for the first (levels 1-3) stratum ($F = 1.04$, $p = .32$) or the third (levels 6-8) stratum ($F = 3.82$, $p = .06$). For the delayed recalls, the differences between good and poor readers was significant for the first stratum ($F = 6.85$, $p = .01$) and the third stratum ($F = 4.56$, $p = .04$) but not for the second stratum ($F = 3.86$, $p = .06$). Since the difference between good and poor readers in the three way analysis of variance were significant for both the immediate and delayed recalls, and the interactions with stratum were not significant, and since the two way analysis for each stratum showed significant differences between good and poor readers for each stratum in either the immediate or delayed recall, Hypothesis 1 was judged to be supported.

The results of the analyses of variance for the immediate and delayed recalls were consistent except that in delayed recall (Table 11, Appendix E) there was a significant interaction between stratum and story. The basis for this interaction is explored later in this chapter.

Hypothesis 2 was that good readers make use of the structure strategy more than do poor readers. Whether the structure strategy was used in recall was judged by which high level idea units the recall contained.

If either the attribution or collection idea unit in level 1 was present in the recall, then the student was credited with using the structure strategy. The attribution idea unit was credited if at least one complete adversative structure was present in the recall; the collection idea unit was credited if at least one half of each adversative was present. These criteria were applied separately to each recall.

The structure strategy was used at least once by 18 of the 23 students (78%). Of the 18 students who used it once, however, only 8 students used it more than once. The good readers used the structure strategy 17 times, or in 38% of their recalls, while the poor readers used it 12 times, or in 25% of their recalls. Only one student (a good reader) used the structure strategy throughout his 4 recalls. The mean number of times the structure strategy was used by each student (good and poor) was calculated. The difference between the means for good readers and poor readers was evaluated by a t-test as shown in Table 6. Since the difference between good and poor readers was not significant Hypothesis 2 was not supported.

Hypothesis 3 was that students who use the structure strategy recall more than students who do not use the

Table 6

Mean Number of Times Structure Strategy Was Used by Good Readers and Poor Readers in Four Recalls

Group	Mean	SD	t
Good Readers	1.54	1.21	
			1.3 (n.s.)
Poor Readers	1.00	0.74	

structure strategy. This hypothesis was tested by comparing the number of idea units recalled from levels 4-8 by students who did use the structure strategy with the number recalled by students who did not. The differences were tested by a series of t-tests, one for each recall instance. The t-values are shown in Table 7.

As Table 7 shows, Hypothesis 3 was supported by both recalls of the DESERTS passage but by neither recall of the STARS passage. A possible explanation of this inconsistency is given later.

Table 7

Number of Idea Units in Levels 4-8 Recalled by Students Who Did Use (SS) and Did Not USE NSS) the Structure Strategy

		STARS		DESERTS	
		Immediate	Delayed	Immediate	Delayed
Group					
	N	8	4	12	4
SS	Mean	17.63	15.00	19.08	16.00
	SD	4.53	12.68	5.29	7.78
	N	15	19	11	19
NSS	Mean	16.46	9.05	13.00	8.00
	SD	7.11	5.53	7.60	5.20
t		0.42	1.54	2.24*	2.58*

*$p \leq .05$ (df 21)

Supplementary Analyses

This section reports analyses carried out to supplement or clarify the findings thus far reported. The unhypothesized significant interaction between strata and stories in delayed recall indicated the pattern of recall across structural levels differed for the two stories. This difference in pattern is apparent in the percentages of recall shown in Table 8 (abstracted from Table 5).

Table 8

Percentage of Textual Idea Units in Delayed Recalls of All Readers (N = 23)

Passage	Levels			
LEVELS	1-3	4-5	6-8	Total
STARS	22.0	22.8	1.1	19.1
DESERTS	21.9	15.7	10.3	16.2

Students recalled more in levels 4-5 from STARS than from DESERTS, but much less in levels 6-8. The students recalled almost nothing from levels 6-8 of STARS. In an attempt to discover why such differences between the

stories might occur, the content of the idea units was examined.

Levels 6-8 in STARS relate almost entirely to an analogy that compares the apparent movement of the stars across the sky to the slow movement of an hour hand across the face of a clock (idea units 49-56, Appendix C-3). Levels 6-8 in DESERTS contain idea units that tell specific facts about the desert -- its colours and how the blending of colours lets animals move about in safety. It may be that the specific facts contained in levels 6-8 of DESERTS seemed more relevant to the theme of DESERTS than the rather abstract analogy given in levels 6-8 in STARS, and were therefore more easily recalled. The data for good and poor readers' delayed recalls of STARS indicates (Table 5) that neither good nor poor readers recalled levels 6-8 in STARS to any degree (good, 2.3%; poor, 1%), while levels 6-8 in DESERTS were substantially recalled by the good readers (15.2%) but less well by the poor readers (5.5%).

Even in immediate recall, a smaller percentage of the textual idea units in levels 6-8 of STARS was recalled than for any other stratum in either story. It seems likely that neither group of readers was able to use the analogy in STARS as an aid to understanding. These fourth

grade readers may not have understood the function of the analogy in this passage.

In order to examine differences between the immediate and delayed recalls further, three-way analyses of variance comparing ability groups, strata, and the immediate and delayed recalls were performed separately for each story. The results of those analyses are given in Tables 12 and 13 in Appendix E. The main effects for stratum and for time (the difference between immediate and delayed recall) were significant for both stories. The difference between good and poor readers, however, was significant only for DESERTS. The interaction between time and ability was also significant for DESERTS. No other interactions were significant.

The differences in the results for the two passages again appear linked to content differences between the passages. The relatively small difference between good and poor readers for STARS may reflect the very limited recall of levels 6-8 by either good or poor readers, especially after a delay. Since these levels did not contribute to the difference between the two groups, there was less chance for the good readers to have superior total recall.

The interaction between ability and time in the DESERTS passage results from the good readers recalling many more idea units in the immediate recall of the DESERTS passage, but forgetting proportionally more than did poor readers in the week between the two recalls. The data in Table 5 show that good and poor readers forgot an equal proportion of idea units at the high (1-3) levels (13% each), but at the secondary (4-5) and low (6-8) levels, good readers forgot a much higher proportion of idea units than did poor readers. At the secondary levels good readers lost 13% of the idea units they had originally recalled, while poor readers lost 7%; at the low levels the good and poor readers forgot 9% and 1% respectively.

The secondary and low levels of DESERTS contain a high number of specific details. It appears that the good readers were able to recall these in the immediate recall, while the poor readers were not. The delayed recalls of both groups lack the details which were present in the immediate recalls of the good readers. The major difference appears to have arisen in the idea units 68-82 (Appendix C-4) which contained information about desert colours and the effects of the colours on the visibility of animal movement -- details which made up

the explanation of the second adversative, which stated that the desert seemed empty but truly was full of life.

It was previously noted that the mean number of words in intrusions was similar for good and poor readers, and that the means were higher for all groups in the delayed recalls (see Table 4). A frequency distribution of the number of words in intrusions was prepared for each recall. It yielded the following medians and ranges: STARS immediate, median 2, range 0-33; DESERTS immediate, median 3, range 0-76; STARS delayed, median 5, range 0-71; and DESERTS delayed, median 4, range 0-87. The large ranges in three of the four recall instances were the result of only seven recalls, each of which contained more than 36 intrusion words and were from the recalls of only four different students. Of the seven recalls, four were from the delayed recall of DESERTS. These account for the unusually large mean number of words in intrusions for DESERTS seen in Table 4.

The recalls with a large number of intrusion words were analyzed to see what types of intrusions they contained. Two characteristics were apparent. The first was that intrusions occurred as a result of attempts to explain something that was stated in the recall. For example, in telling there was water in deserts, students

went on to explain oases, which were not mentioned in the passage. This type of intrusion was also found frequently in recalls that contained only a few intrusion words.

The other apparent characteristic was substitution of prior knowledge for passage information. This characteristic was found primarily in the recalls of Student 11 and Student 17. Student 17 provided three of the seven recalls with a large number of intrusion words and all three had this type of intrusion. The information Student 17 included was usually on the right topic and correct, just not from the original text. Student 11 gave two of the seven recalls with a large number of intrusion words. He also relied upon prior information, but appeared slightly more creative in his reporting of it. The degree to which intrusions overwhelmed his actual recall is best seen through reading the recall with the largest number of intrusion words. A verbatim transcript of that recall follows.

Student No. 11 DESERTS Delayed

> Um... well the desert is very sandy its uh ... it's very um yellowish and hot ... and there's camels there, but there's some um ... kind of a ... there's men there that have ... um ... some ... I can't remember ... some kind of a mask on them and or something, and ... they

> go around and there's villages some places maybe, they say, and there's villages there that they the men, they rob, um, they take pot and they rob the people, and they sometimes they steal the ladies and take them for slaves or wives or ... sumpin' like that. And ... there's camels there that they ride on ... and there's also a place ... there's pyramids in them ... uh ... Can't remember anything else.

The final supplementary analysis that was completed to determine for each passage which kinds of idea units were lost after delay and which kind were recalled only after delay. It appears that detailed explanations and supporting information were frequently omitted from the delayed recall of STARS. The idea units containing the analogy (idea units 59-56) were also forgotten in the delayed recall, but had been only infrequently recalled in the immediate instance.

The idea units dropped in the delayed recalls of DESERTS (13-17, 21-25, 47-49, and 76-78) also indicated that it was explanation and supporting detail that was left out of delayed recalls. Idea units 13-17 contained evidence that water <u>was</u> to be found in the desert. They contained considerable detail about the water reaching the surface of the ground. What students did recall was there was water in deserts, rather than the details of how and where it appeared. Idea units 21-25 contained

the second portion of the first adversative, which related that we tend to think of deserts as dry lands. These units were dropped by 5 students, and may have been omitted because it seemed obvious, or redundant with the name desert. The portion of the adversative that stated that there is water in deserts was retained. As well, two sets of idea units contained explanatory information. Idea units 47-49, dropped by 7 students, contained evidence of life in the desert, while idea units 76-78, dropped by 5 students, contained the explanation of colour helping it to appear that the desert was empty. For both passages, it appears that what was dropped from the immediate recalls was typically information that could be inferred and supplementary explanations and details.

Fewer additions than deletions occurred in the delayed recalls, but two groups of idea units were added to recalls of STARS, and one group to recalls of DESERTS. Idea units 32-34 were added to the delayed recalls of STARS by 3 students. They contain statements that stars can be seen after dark, without any explanation. These additions may relate to the 69 students having dropped idea units 28-31 from STARS, which explained why stars are not seen in the daylight. The omission and deletion of these particular idea units may result from students not seeing

the need to state both portions of an explanation. That is, having made the statement that stars can be seen at night, it may not have seemed necessary to also state that stars are not seen in the daylight. In addition, idea units 7 and 8 were added by 3 and 6 students respectively. They state that stars are THERE, and students seem to use THERE rather than the equivalent IN THE SKY in the delayed recalls. Once again, this reflects the students' tendency to omit specific details in the delayed recalls. The single group of idea units that was frequently recalled only in the delayed recall of DESERTS were idea units 25-27 and 30. They were added by 4 students. These idea units contain information that the deserts do indeed appear dry. These idea units were recalled, however, without relation to the adversative that that is what people THINK about deserts. In both passages, the additions to the delayed recall are few; they seem to represent a simpler way of stating information rather than the addition of new information.

CHAPTER V

DISCUSSION

Introduction

In this chapter the results of the analyses performed to test the three major hypotheses are examined. In addition, the results of the supplementary analyses are discussed. As well, the findings are discussed in terms of their implications for classroom teaching and for research.

The purpose of this study was to investigate what was recalled from expository prose after reading and to determine whether reading ability or the use of the author's structure were related to the amount recalled. The results of the study indicated that good readers in grade 4 recall generally more than poor readers. They also suggest that using the structure strategy may affect the amount recalled, but that this may also depend on content variables. The results did not, however, indicate any significant difference between good and poor readers' use of the structure strategy.

Summary of Findings

The finding that good readers were able to recall more after reading than were poor readers is in keeping

with the studies cited in the review, in particular those by Meyer, Brandt, and Bluth (1980) and Taylor (1980). In the present study good readers recalled 27% of the idea units overall (two passages, immediate and delayed recalls) while poor readers recalled 15% of the idea units. These figures are comparable to those given by Meyer, Brandt and Bluth (1980). They reported 34% of the idea units being recalled by good readers and 15% by poor readers. The latter results are presented to provide a comparison for the percentage of recall achieved in the present study, and it must be remembered that Meyer et al (1980) worked with ninth grade students, written recalls, and two different text structures.

The analyses of both immediate and delayed recalls indicated that the good readers' superiority was maintained at all three strata of the content structure. There was no indication that the good readers' superior recall was more pronounced at any one level than another; this suggests a generally better performance by the good readers and gives no indication of superior ability to recall idea units from any particular height in the content structure.

The results relating to the second hypothesis, which examined the use of the strategy structure, were

rather unexpected. There was no significant difference between the mean number of times the structure strategy was used by good readers and by poor readers. Meyer et al (1980) found that use of the structure strategy was directly related to ability; that is, more good readers than poor readers used the structure strategy. But Taylor's (1980) study yielded mixed results. In the immediate recall, Taylor found no differences between the sixth-grade good readers, sixth-grade poor readers, or fourth-grade good readers' use of the structure strategy. In the delayed instance, however, there was more use of the structure strategy by sixth grade good readers than by either sixth grade poor readers or fourth grade good readers. Since this indicated that good readers had better recall over time than either peers who were poor readers or younger good readers, Taylor suggests that both age and reading ability are related to recall of text after reading, and that use of the structure strategy definitely aided recall.

The lack of difference between good readers'and poor readers' use of the structure strategy must be examined in terms of the method used to determine structure strategy use. In both the Meyer et al (1980) and Taylor (1980) studies, use of the structure strategy was

determined by the arrangement of the idea units in the actual recall. That is to say, the rating was awarded in relation to how well the recall actually reflected the order and arrangement of the passage. To get credit for a problem-solution (response) pattern, the recall would first have to have the problem stated and then be followed by the solution(s) given in the text. Full credit would only be given if both the words problem and solution actually appeared in the recall. In the present study, use of the structure strategy was determined by the presence of the adversative idea units in the recall; no emphasis was placed on their order or arrangement. The adversatives stated in the original passage simply had to be expressed somewhere in the recall. The adversatives did have to be stated in the same form as the original. That is to say, adversatives stated in the negative form in the recall but in the positive in the original were not accepted, though paraphrases were generously credited. No credit, of course, was given if the adversative was left implicit.

Meyer et al (1980) found that the structure strategy was used at least once in four recalls by fewer than 50% of the readers; Taylor found only 12% of the fourth grade good readers used the structure

strategy in their delayed recalls. In the present study, the structure strategy was used at least once in four recalls by 78% of the students. Of the 18 students who used the strategy at least once, however, only 5 good readers and 3 poor readers used it more than once. Student No. 20, a good reader, was unique in using the structure strategy consistently through all four recalls.

The difference between the number of students credited with using the structure strategy in the present study and the smaller numbers using the strategy in the Meyer et al and Taylor studies may have occurred for several reasons. Firstly, the systems used to assess the use of the structure strategy differ; it may well be that the method used here was somewhat generous. Had the scoring required that both the collection and attribution idea units be present in the recall before the student was credited with using the structure strategy, only 22% of students would have been assessed as using the structure strategy at least once. Secondly, the top level structures of both passages were limited in number and were signalled explicitly by the use of "but" to point out the adversatives. it may be that the explicit signalling of the top level idea units, together with the shortness of the passages, caused the adversatives

to be more readily recalled than would normally be expected.

A major difference between the passages used in the present study and those used by Meyer (1975) and Meyer, Brandt & Bluth (1980) is that the contrasts in the passages used in this study were clearly signalled. Statements like People say that the stars come out at night. But the stars really do not come out at all. are difficult to overlook. The passages used with older students contained more subtle contrasts and less signalling.

The shortness of the passages and the relatively few top level idea units may well contribute to the even distribution of recalled idea units at the top two strata. Earlier studies (Kintsch & Keenan, 1973; Meyer, 1975) indicated that superordinate idea units were much more likely to be recalled than subordinate idea units. That was not consistently so in the present study. As was reported in Table 5 little difference existed between the percentage of idea units recalled from the first stratum and the percentage of idea units recalled from the second stratum. In STARS, 7.2% more idea units were recalled from the second stratum than from the first stratum, while in DESERTS, 8.6% more idea units were recalled from the first stratum than from the second stratum.

It may be that fourth grade readers are not as adept as older students (e.g. Meyer used ninth grade students) at discerning the importance of particular ideas within the passage. Taylor (1979) suggests that this may indeed be the case, as her work with third- and fifth-grade students indicated that they had little ability to discriminate between subordinate and superordinate idea units. In addition, it may be that students did not recall the first stratum idea units more readily because they failed to fully understand the adversatives. That is, they recalled the second parts of the adversatives which contained the new information, but omitted the part of the adversative which related what people say or think. Taylor's (1980) study was based on the recall of only a single passage of the attributive descriptive style -- a set of generalizations followed by details. It seems plausible that fourth grade students might find the attribution structure more difficult to recall than the new information from the signalled portions of the adversative structures. The present study was limited in its investigation of recall in that it tested only the adversative text structure in two passages where the adversatives were heavily signalled.

One area that has not been investigated in relation

to use of the structure strategy and to what is recalled from text is the distinction between oral and written language. There are many basic differences between the two language modes (Oaken, Winer & Cromer, 1971; Rubin, 1978; Schallert, Kleiman & Rubin, 1977). These differences might well affect the recall of text. The present study was limited to recall after reading. The recalls themselves, however, were given orally. In Meyer et al (1980) both the original text and the recall were completed in the written mode, while Taylor used oral recalls. It seems plausible that differences between the mode of receiving the information and the mode of completing the recall might well influence what was recalled and the organization of the recall. The written format of the original text might, for example, be accurately reflected in written recall. That is to say, students might reflect the features of written language, such as paragraphing, sentence style and punctuation when completing a written recall. On the other hand, the physical demands of completing a written recall might limit some students in a way that oral recall would not. A student does not, of course, have the opportunity to organize or rearrange an oral recall in the way that that is possible with a written recall.

Other studies or recall (Bartlett, 1978; Meyer, Brandt & Bluth, 1980; Taylor, 1980) found that students who used the structure strategy had superior recall of what was in the original text. The present study yielded mainly supportive results in this area. While there was a significant difference between the amount recalled by SS and NSS groups when recalling the DESERTS passage, no significant difference was noted for STARS. It seems possible, however, that the content characteristic that may have caused the lack of significant difference between the amount recalled by good and poor readers in the immediate and delayed recalls of STARS might also have affected the amounts recalled by SS and NSS groups. Few idea units were recalled from the lowest stratum by either group (SS:Mean = 1.0 idea unit and NSS:Mean = 0.8 idea unit). Once again, this seems to indicate the lack of comprehension of the analogy by either group, since the analogy comprises the majority of idea units at the low level in STARS. The delayed recall of STARS by the SS and NSS groups reinforces the suggestion that the limiting effect of the analogy may well have restricted the SS group from achieving superior recall over the NSS group. While the difference between the means for the delayed recalls of the SS and NSS groups was also not significant,

the SS group recalled a mean of 15.0 idea units, while the NSS group recalled only a mean of 9.1 idea units. Students using the structure strategy in the delayed recall were thus more able to recall the passage than were students who did not use the strategy.

The separate analyses of variance performed for the immediate and delayed recalls of each passage indicated differences in what was recalled from the low level idea units of each passage. Neither good readers nor poor readers had any degree of recall of the low level idea units from STARS. It has already been suggested that this lack of recall may be the result of the analogy which comprises those low level idea units, and that neither good readers nor poor readers comprehended that analogy. The low level idea units from DESERTS, on the other hand, were recalled quite differently by good and poor readers. As was mentioned in Chapter IV, the low level idea units from DESERTS contained many specific details. Good readers had good immediate recall of these low level idea units while poor readers did not. Poor readers recalled very few of these details even in the immediate recall, and both ability groups lost the detail in the delayed recall. This appears to coincide with the findings of Perfetti and Lesgold (1977) who noted poor readers'

inability to retain exact wording after reading or listening, and with Maria (1981) who found that poor readers tended to convert their recall almost immediately to the gist of what was read, while good readers retained a more exact, detailed memory.

Limitations of the Study

The results of the study must be examined in relation to its limitations. The study attempted to determine what might be recalled by fourth grade readers when involved in an independent reading situation, but in fact, the task set was closely monitored. To the degree that no suggestions were given to the students as to how to complete the required task, the activity was an independent one. The task was directed, however, in that the students interacted with the researcher, who recorded their recalls and gave the students explicit direction regarding the task requirements prior to the reading. Investigations into methodology might examine the possibilities of collecting recalls of material actually read in the independent reading situations which occur in the school day.

A second limitation of the study occurred because of the passages chosen for use in the study. Although

carefully chosen to represent text commonly used at the beginning intermediate grades, the passages were short in length. Because of that the passages may not have been completely adequate to illustrate differences between the recalls of the groups examined. Longer passages would, perhaps, have indicated more clearly the advantage of using the structure strategy and also made its use clearer. In addition, both passages contained the adversative text structure, so that the data illustrate only what fourth grade readers recall from that one structure. A larger study analyzing the recalls from a range of the text structures most commonly used in the intermediate grades would be more illustrative.

The third limitation of the study stems from the sample. The sample for the study was limited in number, containing only 23 students, and was restricted to boys only. The limitation of the sample was exaggerated, however, by the lack of standardized test results available to assign students to groups. Good and poor readers were separated into groups by teacher perception of ability and reader level achieved. This method resulted in two groups with single characteristics rather than a sample of readers divided on the basis of a continuum of test scores.

While the study indeed was limited by these factors, its results may be no means be dismissed because of them. The results presented give a clear indication of the information likely to be recalled by fourth grade readers.

Conclusions

The remainder of this chapter deals with the findings of the study in relation to method and theory. It presents first the findings of the study related to specific theory, and secondly, it discusses the implications of the findings for teaching and for future research.

The basic theory presented as the "ideational scaffolding" (Ausubel, 1963) for this study was schema theory. Schema theory suggests that comprehension of written discourse is more accurate and easier if the reader has a schema for what is read. That is to say, if a reader has had previous experience with a similar situation or task, or has previous knowledge of particular content, comprehension occurs more readily. Therefore, if a new passage fits an already established schema, at least in part, the reader has a framework into which the details of the new passage can be fitted. For example, if a student has read many texts telling about specific animals, a schema will have been established about animals.

When reading about an unfamiliar animal, then, the reader has already an idea of the kinds of information the new text will probably contain, and how it is likely to be presented. In the present study, rather than content about animals, an attempt was made to determine whether fourth grade readers possessed a schema for expository prose presented with an adversative text structure. In relation to the present study, the concepts of schema theory appear to offer a logical framework for several of the findings.

The findings of the study suggest that, in general, fourth grade students have not developed reliable schemata for comprehending expository prose presented with an adversative text structure. The students who participated in this study used the structure strategy in only 31% of the recalls completed. This represents very limited use of the structure strategy, which in turn suggests that the students may have had little previous experience with the adversative structures which gave the overall organization to the passages they read. Earlier studies (Meyer, Brandt & Bluth, 1980; Schallert, 1975) suggest that organizing the recall using the existing structures of the original text is the most effective method for recall. Given that, it appears that fourth grade students

are not generally effective recallers of text, at least when the adversative structure is the text pattern being used. Since the texts used in the study were typical of those designed for intermediate students, it seems that students at the beginning intermediate levels may have had too little experience with expository text to allow them to deal with it effectively in an independent reading situation.

One of the most interesting findings of the study was the students' lack of recall of the analogy in STARS. It appears that the fourth grade students either attached no importance to the analogy, or could not determine that it would be useful to their understanding of the passage, and therefore worth remembering. It seems reasonable to believe that fourth grade students have not yet developed a schema for analogies; or it may be that they simply did not have a schema for this particular analogy (Bransford, 1981). That is, a student reading the particular analogy might understand it <u>is</u> an analogy, and that it was meant to expand the reader's comprehension, but not understand its application in this exact instance. For example, students may well have understood the idea that the hour hand moves almost imperceptibly around the face of a clock; they may not have understood the relationship

between that concept and the nature of the apparent movement of stars across the night sky. Too little is known about young readers' understanding of analogy to evaluate this possible explanation, and since only one passage used in the study contained an analogy, no comparison of the analogy recall is possible. What is certain is that the analogy used in STARS was not recalled by the readers, nor was the information it parallelled particularly well recalled.

A third factor relating to the findings of the study was the content of the comments volunteered by the students during the task. The background of the students, in terms of directed versus non-directed reading activities was emphasized by the students' comments. Certainly they appeared to be unsure of <u>how</u> to recall after reading, which is surely a necessary skill in independent work. The degree to which independent reading and recall seemed unfamiliar was exemplified by the comment of one student who noted that he "never had to remember it before. We always get to look up the answers." This student's comment reflects the kinds of adjustments the students must learn to make when accommodating to the changing demands made of them as they progress from the primary to the intermediate grades. There often are no questions to accompany independent reading; the student is left to make of it what

he can. In addition, the student must learn to recall and synthesize what was read to produce an accurate and helpful summary of the material used.

Implications for Teaching

Teaching children to read and to learn from reading is surely one of the basic goals of schooling. The results of this study give rise to some implications about the form that teaching might take. Studies involving students' comprehension and recall of narrative even at very young ages (Mandler & Johnson, 1977; Stein & Glenn, 1977; Thorndyke, 1977) suggest that schemata for stories are acquired early, probably as a result of repeated hearing and telling and reading of stories modelled upon a variety of set patterns. Yet students have not been given an equal opportunity to acquire schemata for various expository prose patterns. This seems to indicate that earlier and more intense teaching in this area might well be beneficial to students.

That students can, through direct instruction in experimental conditions, acquire an understanding of and learn to benefit from the various organization patterns found in expository text seems possible. Bartlett (1978) worked with ninth graders, explicitly teaching the identi-

fication and characteristics of various text structure, and found students' recall and question answering improved after such instruction. A study investigating the discrepancy between learning disabled sixth grade students' ability to deal with inductively and deductively styled text (MacGinitie, 1982) also indicated that students could be taught strategies which better equipped them to understand the content of inductively styled passages. While it may not be desirable for students to be given direct instruction in text styles and characteristics, these studies provide a solid basis for the suggestion that teacher awareness of expository text patterns must be developed so that incidental, on-going instruction in text comprehension strategies begins to occur in primary and intermediate classrooms.

One specific implication for the classroom is most clearly indicated by the kind of idea units most readily recalled in the study. Durkin's study (1978-79) of comprehension indicated that little if any teaching of comprehension strategies occurred in elementary classrooms. Students in this study more readily recalled explanatory portions from the passages they read than they recalled the overall organizing structure - in this case, the adversative structure. This indicates a definite need for teachers to direct students back to the text, to

teach strategies by which the students can begin to extract meaning independently from text, rather than explain to students orally the content of what they have read.

Implications for Research

This study has suggested several questions which still need to be answered about research into the comprehension and recall of expository text. The analysis system (Meyer, 1975) utilized seemed a reliable and useful tool by which to understand passage content and organization in a research situation. It offers a method by which recall of text can be consistently compared to the original content. The measurement of structure strategy use, however, needs further refinement. Before generalizations regarding recall, structure strategy use, and the effects of structure strategy use can be made, a consistent, reliable methodology must be established. The effects of varying the modes of input and recall, that is, the relationships between reading a text and recalling it in either oral or written form need investigation. It is possible that written recall may be affected by the visual representation of the text and that this might cue the reader into following the original text structure more closely.

A final area which warrants further investigation is the role of analogy in learning. Schema theory implies analogous learning, and direct teaching commonly employs analogy to make new information clear. A recent study by Hayes and Tierney (1982) indicates students may benefit from being provided with analogous structures. How analogies are perceived, learned from, and begin to be spontaneously developed needs to be investigated.

Summary

As illustrated in the discussion, schema theory indeed provides both a theoretical framework and a practical basis for understanding how the recall of text reflects a reader's understanding of what he has read. The fact that the students who participated in this study were not easily able to comprehend and recall the expository passages they read indicates they had not yet developed the necessary schemata to apply to that task.

This study, though focussing on only the adversative text structure, has contributed to the understanding of how young readers interact with that particular structure. Its findings, which must not be overgeneralized, prompt further questions related to comprehension and recall of text, and suggest implications for both teaching and further research.

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APPENDICES

APPENDIX A

Letters of Permission

Appendix A-1

_____ Elementary School

Dear Parents:

Ms. Judy Rogers, a Kelowna teacher presently at the University of Victoria, has received permission to conduct a study in this school district involving fourth grade boys. The study is concerned with what children recall of what they read, and whether the ways information is written affects what is remembered.

Children in our fourth grade classroom(s) have been randomly selected and will work with Ms. Rogers for two 15 minute sessions, spaced one week apart. They will be asked to read two short information passages.

To ensure confidentiality, all the information gained in the study will be identified by student numbers, rather than names.

If you have any questions regarding this study, please contact Ms. Rogers at 477-2408 (Victoria). If your child may participate in the study, please return the bottom portion of this notice.

Yours truly,

Principal

_____ has permission to take part in
(Child's name)
the study being conducted by Ms. Rogers.

Signed _____
Parent or guardian

Appendix A-2

KHOWHEMIN ELEMENTARY SCHOOL

June 4, 1981

Dear Parents:

I am a Kelowna teacher presently at the University of Victoria and have received permission from Cowichan School District to conduct a research study involving fourth grade boys. The principal of Khowhemin Elementary, Ms. Szaka, has agreed that students from that school may participate if their parents approve.

Children from fourth grade classes at Khowhemin and two other elementary schools were randomly selected and willwork with Ms. Rogers for two 15 minute sessions, spaced one week apart. They will be asked to read two passages.

The study is being conducted as partial requirement for the Master of Arts in reading at the University of Victoria. It is concerned with what children recall when they read, and whether they way the information is presented affects recall.

To ensure confidentiality, all the information gained in the study will be identified by student numbers, rather than names.

If you have questions regarding the study, please call Ms. Rogers at 477-2408 (Victoria). If your child may participate in the study, please return the bottom portion of this notice to the school.

Yours truly,

Judith Rogers

_____has permission to participate in the study being conducted by Ms. Rogers.

Signed _____

Parent or guardian

APPENDIX B

Prose Passages

B-1 Stars

B-2 Deserts

Appendix B-1

STARS

People say that the stars come out at night. But the stars really do not come out at all. They are there all the time. The stars are always in the sky, night and day. But you cannot see them in the daytime because the sky is too bright. But after the sun sets and the sky gets dark, you are able to see many stars.

All the stars seem to move slowly across the sky. You cannot really see this movement because it happens so slowly. It is like watching the hour hand on a clock. You know that the hand moves, but you cannot see it moving.

But the stars are not moving at all. It is really the earth that moves. The earth turns on its axis. And this turning makes the stars seem to go from east to west across the sky.

Appendix B-2

DESERTS

We often think of deserts as dry land with no water. But there really is water in the desert. It is there all the time. The water is often hidden below the ground. You do not know that the water is there because you cannot see it. But wherever the water finds an opening in the rocks it bubbles to the top of the rocks and sand as a spring.

The desert seems empty of life and very still. It is bare and brown most of the time. There are no green fields or forests. The desert colors are brown, yellow and gray, like the rocky earth and sand.

But the desert is full of life and movement. Many animals live in the desert. They are not easy to see. Being colored in the gray-brown tones of the desert lets many animals move about in safety.

APPENDIX C

Content Structure

C-1 Stars

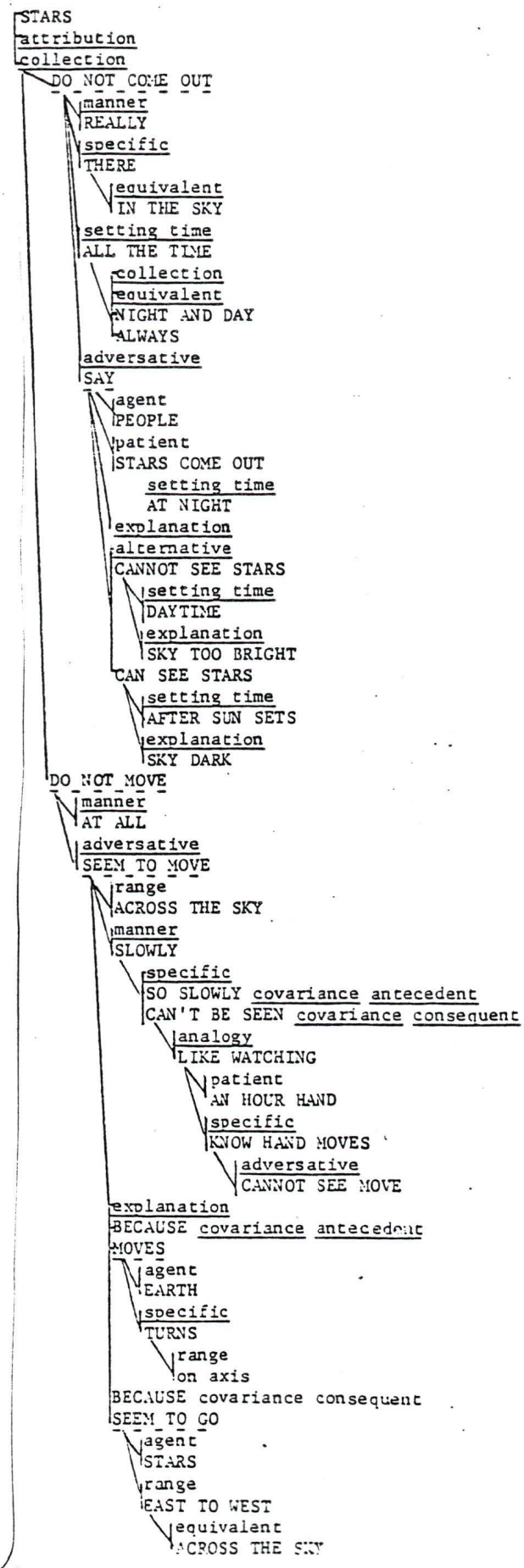
C-2 Deserts

Scoring Protocols

C-3 Stars

C-4 Deserts

STARS

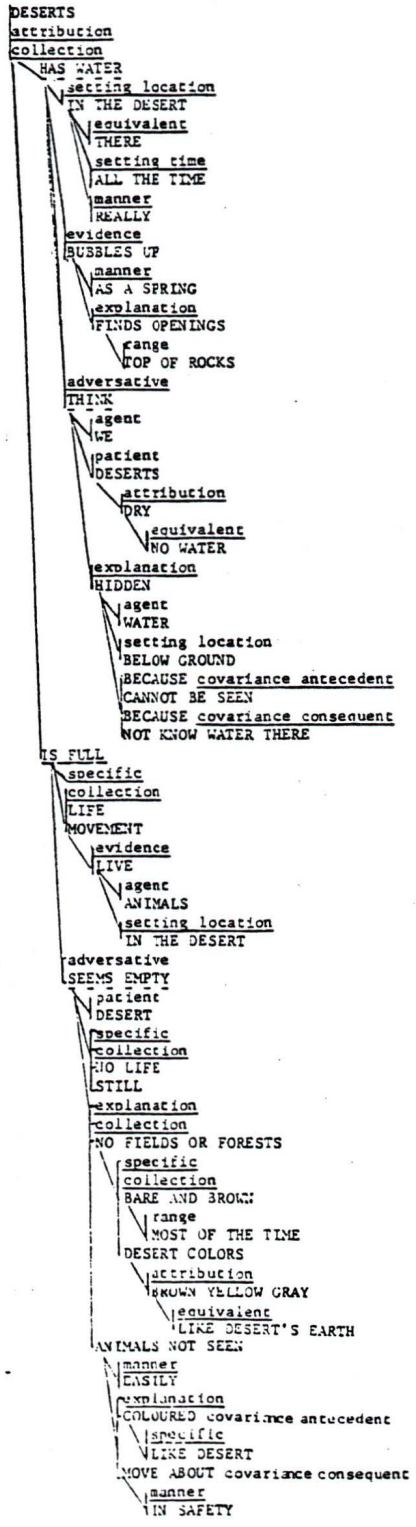


Totals possible for each level
Total achieved
Total words

Appendix C-2

CONTENT ANALYSIS

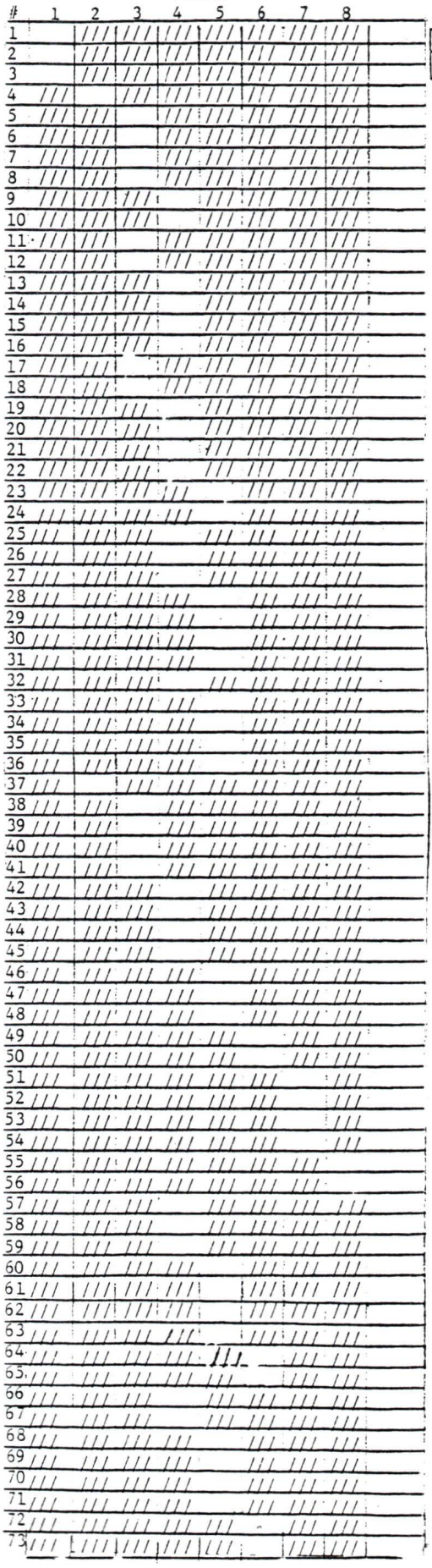
DESERTS



Totals possible for each level
Totals achieved
Total words _____

Scoring Protocol

STARS



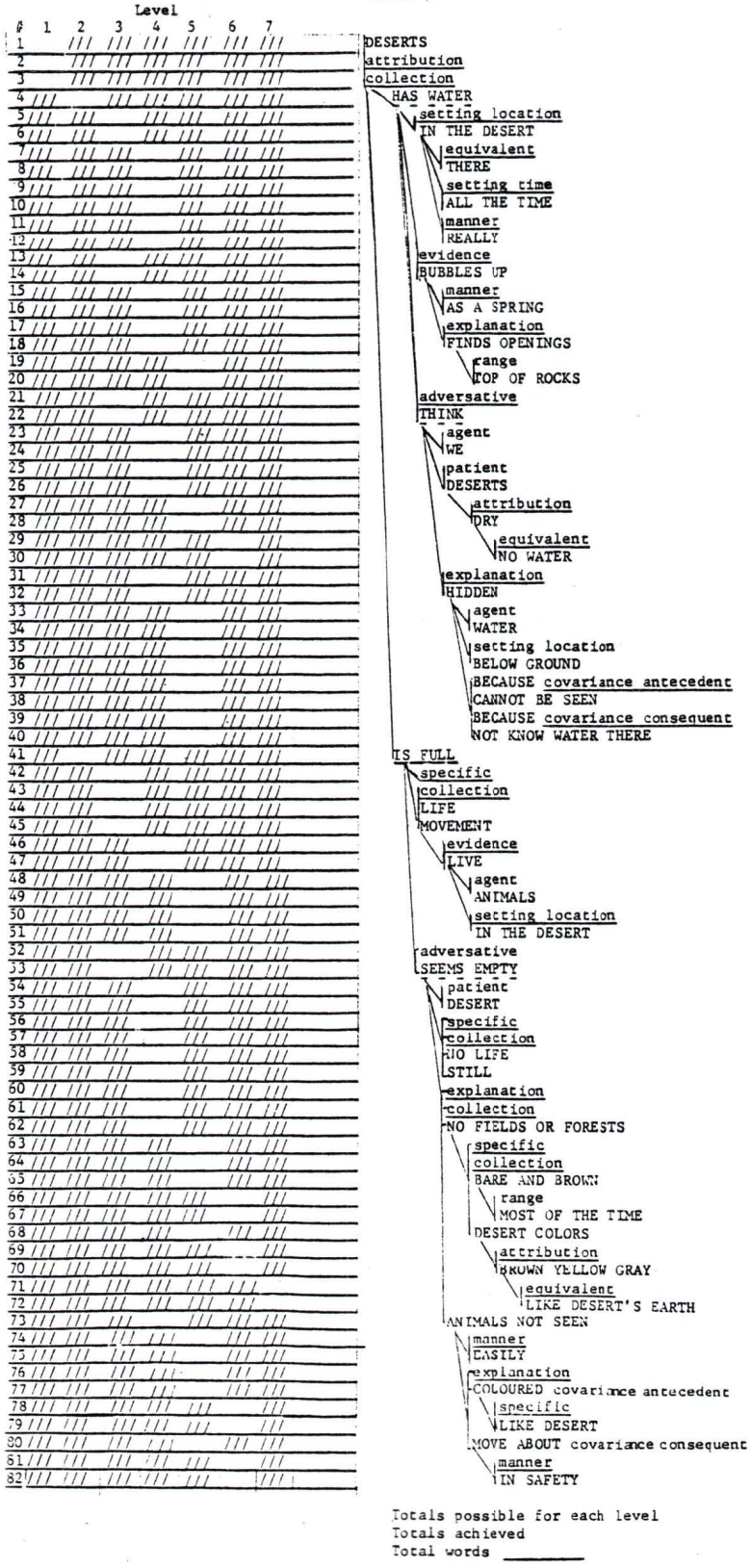
- STARS
- attribution
- collection
  - DO NOT COME OUT
    - manner
      - REALLY
    - specific
      - THERE
        - equivalent
          - IN THE SKY
    - setting time
      - ALL THE TIME
        - collection
        - equivalent
          - NIGHT AND DAY
          - ALWAYS
    - adversative
      - SAY
        - agent
          - PEOPLE
        - patient
          - STARS COME OUT
            - setting time
              - AT NIGHT
        - explanation
        - alternative
          - CANNOT SEE STARS
            - setting time
              - DAYTIME
            - explanation
              - SKY TOO BRIGHT
          - CAN SEE STARS
            - setting time
              - AFTER SUN SETS
            - explanation
              - SKY DARK
  - DO NOT MOVE
    - manner
      - AT ALL
    - adversative
      - SEEM TO MOVE
        - range
          - ACROSS THE SKY
        - manner
          - SLOWLY
            - specific
              - SO SLOWLY covariance antecedent
              - CAN'T BE SEEN covariance consequent
                - analogy
                  - LIKE WATCHING
                    - patient
                      - AN HOUR HAND
                    - specific
                      - KNOW HAND MOVES
                        - adversative
                          - CANNOT SEE MOVE
        - explanation
        - BECAUSE covariance antecedent
        - MOVES
          - agent
            - EARTH
          - specific
            - TURNS
              - range
                - on axis
        - BECAUSE covariance consequent
        - SEEM TO GO
          - agent
            - STARS
          - range
            - EAST TO WEST
              - equivalent
                - ACROSS THE SKY

Totals possible for each level
Total achieved _____
Total words _____

Appendix C-4

Scoring Protocol

DESERTS



Totals possible for each level
Totals achieved
Total words _____

APPENDIX D

Directions to the Student

Directions to the Student

Prior to the Reading

The envelope contains two passages. They are stapled together in the order in which you are to read them. Read the top passage silently, using your finger under word you are reading. This will let me know that you are reading the passage. When you have finished reading the top passage, I am going to ask you to recall what you can of it. We will be taping your recall. When you have completed the recall of the first passage, we will go on to the second.

Prior to the Immediate Recalls:

You have finished reading. Now I would like you to tell me everything that you can recall about the passage you have just read.

Prior to the Delayed Recalls:

One week ago you read and recalled two passages. Today I would like to hear everything that you can remember about the passages. We will tape your recalls. Begin with the passage about (whichever passage the student was assigned first will be cued first, either Stars or Deserts). Tell me everything you can still recall about _____.

APPENDIX E

Statistical Tables

Appendix E-1

Table 9

Means and Standard Deviations of the Number of Words in Metacognitive Statements

Group		STARS Immediate	STARS Delayed	DESERTS Immediate	DESERTS Delayed
Good Readers	Mean	6.72	5.90	3.81	3.90
	SD	4.03	6.17	2.17	2.80
Poor Readers	Mean	5.25	5.00	6.90	5.91
	SD	3.44	3.19	3.20	5.20

Appendix E-2

Table 10

Analysis of Variance of the Percentage of Textual Idea Units in Immediate Recalls

Source of Variation	SS	df	MS	F
Between Subjects	2248.44			
group (good vs poor readers)	2248.44	1		7.49*
subj. within group	6607.19	22	3003.27	
Within Subjects				
stratum (levels 1-3 vs 4-5 vs 6-8)	5279.19	2	2639.59	12.25**
ability x stratum	915.56	2	457.78	2.13
stratum x subj. w g	9478.06	44	215.41	
passage (STARS vs DESERTS)	1.44	1	1.44	0.00
ability x passage	732.75	1	732.75	2.08
passage x subj w g	7749.56	22	352.25	
stratum x passage	522.44	2	276.22	1.12
ability x stratum x passage	810.44	2	405.22	1.64
stratum x passage x subj w g	10888.31	44	247.46	

*p .02

**p .001

Appendix E-3

Table 11

Analysis of Variance of Percentages of Textual Idea Units in Delayed Recalls

Source of Variation	SS	df	MS	F
Between Subjects				
group (good vs poor readers)	2266.46	1	2266.46	7.78*
subj within groups	6409.61	22	291.35	
Within Subjects				
stratum (levels 1-3 vs 4-5 vs 6-8)	7247.61	2	3623.80	50.98**
ability x stratum	82.00	2	41.00	0.58
stratum x subj. w g	3127.82	44	71.09	
passage (STARS vs DESERTS)	17.35	1	17.35	0.11
ability x passage	10.58	1	10.58	0.07
passage x subj. w g	3528.07	22	160.37	
stratum x passage	1604.86	2	802.43	9.45**
ability x stratum x passage	175.71	2	87.86	1.03
stratum x passage x subj. w g	3738.12	44	84.96	

*p .02

**p .001

Appendix E-4

Table 12

Analysis of Variance of Percentage of Textual Idea Units in Immediate and Delayed Recalls of STARS

Source of Variation	SS	df	MS	F
Between Subjects				
group (good vs poor readers)	1354.16	1	1354.16	3.73
subj. within groups	7979.22	22	362.69	
Within Subjects				
stratum (levels 1-3 vs 4-5 vs 6-8)	15188.63	2	7594.32	40.56**
ability x stratum	309.34	2	154.67	0.83
stratum x subj. w g	8239.09	44	187.25	
time (immediate vs delayed)	3742.59	1	3742.59	18.04**
ability x time	57.07	1	57.07	0.28
time x subj. w g	4564.46	22	207.48	
stratum x time	171.41	2	85.71	0.85
ability x stratum x time	136.84	2	68.42	0.68
stratum x time x subj. w g	4458.60	44	101.33	

**p .001

Appendix E-5

Table 13

Analysis of Variance of Percentages of Textual Idea Units in Immediate and Delayed Recalls of DESERTS

Source of Variation	SS	df	MS	F
Between Subjects				
group (good vs poor readers)	3390.25	1	3390.25	7.87
subj. within groups	9473.00	22	430.59	
Within Subjects				
stratum (levels 1-3 vs 4-5 vs 6-8)	2649.31	2	1324.66	6.92*
ability x stratum	177.13	2	88.56	0.46
stratum x subj. w g	8420.69	44	191.38	
time (immediate vs delayed)	1723.88	1	1723.88	10.55*
ability x time	931.00	1	931.00	5.70
time x subj. w g	359.33	22	163.33	
stratum x time	440.44	2	220.22	2.41
ability x stratum x time	294.31	2	147.16	1.61
stratum x time x time x subj. w g	4024.50	44	91.47	

*p .05

VITA

Surname: Rogers Given Names: Judith Stephanie

Place of Birth: Quesnel, British Columbia

Date of Birth: January 4, 1946

Educational Institutions Attended, with Dates of Entering and Leaving:

University of Victoria	1964 to 1967
University of Victoria	1977 to ____ (summer)
University of Victoria	1978 to ____ (summer)
University of Victoria	1980 to 1982

Degrees, Diplomas, Etc., Awarded, with Dates and Names of Institutions

B.Ed.	1967	University of Victoria, Victoria, B.C.

Honors and Awards:

_____

_____

Publications:

_____

_____

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TEXT STRUCTURE AND ITS EFFECT ON

TEXT RECALL BY FOURTH GRADE READERS

Author: [redacted]

Judith Stephanie Rogers

Sept. 23, 1982