AN ANALYSIS OF THE EFFECTS OF PRE-READING ACTIVITIES ON THE COMPREHENSION MONITORING OF LEARNING DISABLED ADOLESCENTS

by

Bonnie Souder Billingsley

Dissertation submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

Doctor of Education

in

Special Education Administration and Supervision

APPROVED:

_____   _____
Terry M. Wildman,   Philip R. Jones,
   Co-chairman   Co-chairman

_____   _____
Judy B. Engelhard   John A. McLaughlin

_____   _____
Roger S. Gurney   Constance R. Schmidt

July, 1987
Blacksburg, Virginia

AN ANALYSIS OF THE EFFECTS OF PRE-READING ACTIVITIES ON THE COMPREHENSION MONITORING OF LEARNING DISABLED ADOLESCENTS

by

Bonnie Souder Billingsley

(ABSTRACT)

Reading problems create difficulties for many learning disabled (LD) students. Little is known, however, about the causes of reading failure among LD students. Researchers have recently focused on the comprehension processes of this population, particularly the metacognitive processes involved in reading.

An important area of investigation is how comprehension monitoring can be facilitated during reading. Research in reading and learning disabilities suggests that LD students do not adequately monitor their comprehension during reading. According to schema theory, the activation of readers' prior knowledge should enhance LD students' ability to monitor their comprehension during reading. This study assessed the effects of pre-reading schema activation and schema presentation tasks on the comprehension monitoring of LD adolescents. Specifically, this study investigated the effectiveness of self-questions, structured overviews + self-questions, and a control condition on subjects': 1) de-

tection of passage errors and 2) accuracy on two statement identification tasks.

Fifty-four LD adolescents in grades 9-12 from public schools in Southwest Virginia participated in this study. All subjects were required to meet specific placement, verbal IQ, reading comprehension and exclusionary criteria before they were included in the study.

Subjects were randomly assigned to three experimental conditions (two pre-reading and one control). Dependent variables were the number of embedded errors detected and accuracy on two statement identification tasks (SIT). The first set of SIT items measured subjects' recognition of information in the passages. The second set was designed to measure subjects' accuracy on determining the plausibility of information in the passages.

Data were analyzed using a repeated measures MANOVA and one-way univariate tests. Post hoc tests were used to determine which means were significantly different from each other. In addition, the number and types of questions generated, probe data and interview responses were analyzed and reviewed.

Major empirical findings include: 1) subjects in the structured overview and self-questioning condition identi-

fied significantly more embedded errors than subjects in either the self-questioning or the control condition; 2) subjects in the control condition recognized less passage information (SIT 1) than subjects in either the self-questioning or the structured overview and self-questioning condition; and 3) no significant differences were found among groups in the identification of statement plausibility (SIT 2).

ACKNOWLEDGEMENTS

Appreciation is extended to the College of Education faculty and to my committee for providing an intellectually stimulating and supportive environment during my graduate studies. Dr. Philip Jones was a helpful advisor throughout my doctoral program and has been a model advocate of handicapped children. Dr. Terry Wildman, co-chairman of my dissertation provided many hours of patient guidance and encouragement. His expert assistance with this study is greatly appreciated. Special thanks is also due to Dr. John McLaughlin. He gave generously of his time and knowledge throughout my graduate career. I am also grateful to Drs. Judy Engelhard, Roger Gurney and Constance Schmidt for their comments and assistance on the drafts of this manuscript.

I am grateful to Drs. Jan Bowman and   for their willingness to share the passages and comprehension measures used in this study.   provided valuable assistance in the data collection process. Dr. Eric Smith and   provided assistance in the statistical analysis of the data.   provided courteous and efficient typing of the dissertation.

Dr. Andrew Oseroff and   have been faithful mentors for many years. I certainly owe them my

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

Chapter 1

INTRODUCTION

Reading problems create difficulties for many learning disabled (LD) students (Maria & MacGinite, 1982; Wong & Jones, 1982). Yet little is known about the causes of reading failure among LD students (Bowman, 1984). Researchers have recently begun to focus on the comprehension processes of LD students, particularly the metacognitive processes involved in reading (Bos & Filip, 1984; Bowman & Davey, 1986; Connor, 1983; Idol-Maestas, 1985).

The term metacognition refers to one's awareness and regulation of learning processes and has been applied to many learning tasks (Brown, 1978; Flavell, 1981). Comprehension monitoring, a type of metacognition, involves both the evaluation and regulation of one's efforts to understand spoken or written language (Baker & Brown, 1984).

It is essential in reading to know how one's comprehension is proceeding. Such assessment assists the reader in selecting appropriate reading strategies. The fluent reader has the ability to self-check and to self-correct during reading (Winograd & Johnston, 1982). The evaluation or self-checking component of comprehension monitoring involves a continual assessment of how comprehension is proceeding during reading. The regulation or self-correcting phase of comprehension monitoring is used when the reader

chooses appropriate strategies to remediate comprehension difficulties.

This study examines the effects of pre-reading activities on the comprehension monitoring of LD adolescents. Specifically, the present study appraises the effects of certain pre-reading conditions on LD subjects' accuracy of error detection, accuracy in the recognition of passage information and accuracy in the identification of statement plausibility.

In order to fully appreciate the research problem, it must be placed in the context of related research in comprehension monitoring and schema theory. The purpose of this chapter is to provide a framework for understanding the research problem.

Research in Comprehension Monitoring

Most investigations of comprehension monitoring are either developmental studies or comparisons of average readers and non-handicapped poor readers. Collectively, these studies suggest that both younger children and poor readers are less likely than older students and good readers to notice comprehension problems in text. Researchers suggest that these younger children and poorer readers lack metacognitive awareness and control and thus do not adequately assess how their comprehension is proceeding (August, Flavell & Clift,

1984; Baker & Brown, 1984; Garner & Kraus, 1982; Paris & Myers, 1981; Wagoner, 1983).

While only a few studies have specifically investigated comprehension monitoring in LD students (Bos & Filip, 1984; Bowman & Davey, 1986; Wong & Jones, 1982), research studies in the areas of reading and learning disabilities demonstrate that poor readers do not adequately monitor their comprehension during reading (Baker, 1982; Bos & Filip, 1984; Bowman & Davey, 1986; Forrest-Pressley & Waller, 1984; Wong, 1986). LD students do not necessarily lack the ability to monitor their comprehension; however, they do not engage spontaneously in evaluation and regulation processes (Bos & Filip, 1984). These findings support the view that LD students are passive learners who do not actively control their own learning processes (Torgesen, 1982; Wong, 1979b, 1986; Wong & Jones, 1982).

Since LD students and poor readers are less likely than good readers to monitor their comprehension, an important area of investigation is how comprehension monitoring can be facilitated during reading. Performance on monitoring tasks may be influenced by a variety of factors such as the reader's schema, presentation mode and task difficulty (Bowman & Davey, 1986). The present study examines the role of schemata in comprehension monitoring.

The Role of Schemata in Comprehension and Comprehension Monitoring

Numerous studies have shown that prior knowledge has a strong influence on comprehension (Bransford & Johnston, 1972; Pichert & Anderson, 1977; Steffensen, Joag-dev & Anderson, 1979). Schema theory attempts to explain the organization and integration of new information with prior knowledge (Pearson & Spiro, 1980). A schema is an abstract structure that represents the reader's acquired knowledge (Wilson & Anderson, 1986). Accomplished readers bring appropriate schemata to bear on passages to aid understanding. The results of numerous studies suggest that "children and adults read with comprehension when they generate meanings for written language by relating it to their knowledge and memories of experience" (Wittrock, 1981, p. 229).

Schema theory also provides an explanation of how readers monitor their comprehension during reading. The systemization of a reader's prior knowledge into organized structures or schemata provides a framework for assessing how comprehension proceeds during reading. The accomplished reader considers text information in light of what is already known by making predictions and forming inferences. When the passage contains information that seems ambiguous or contradicts the reader's predictions, a "triggering event" occurs (Palincsar & Brown, 1984), that alerts the reader to a com-

prehension difficulty. The more expectations or predictions that one forms about the passage, the greater the opportunities for these expectations to be confirmed or disconfirmed. The confirmation or violation of the reader's expectations provides information about whether or not one understands the passage (Capelli & Markman, 1982).

Facilitating Comprehension Monitoring and Comprehension

The above discussion suggests that comprehension monitoring should be facilitated by providing the reader with appropriate schemata or by assisting readers in activating relevant schemata. Providing the reader with relevant background information and advance organizers should enhance the reader's ability to understand and monitor comprehension (Wittrock, 1981). In addition, if readers are given opportunities to activate appropriate prior knowledge they will be better able to use their experiences to interpret text (Capelli & Markman, 1982; Winograd & Johnston, 1982; Wittrock, 1981). This section presents an overview of two types of pre-reading activities designed to facilitate comprehension monitoring in reading (structured overviews and self-questions).

The use of pre-reading activities to facilitate comprehension monitoring has received limited attention in the literature. However, two studies have used pre-reading tasks to activate elementary readers' schemata. Peeck, Van Den

Bosch, and Kreupeling (1982) found that the writing of pre-dictions prior to reading had a positive effect on readers' detection of anomalous sentences. However, Winograd and Johnston (1982) found that asking subjects a question that was designed to activate schema failed to increase the detection of text anomalies in both good and poor readers.

The different findings of the above studies may be the result of the particular orienting tasks used. It is likely that some orienting tasks are more effective than others in activating schemata. Pre-reading tasks may take many forms and can rely on relatively unstructured or highly organized activities.

The use of structured pre-reading tasks such as over-views, rely on the teacher to present the key elements or underlying structure of the passage to subjects. These types of activities may be particularly helpful to students who have difficulty identifying the important parts of text. No studies were found that investigated the effects of struc-tured schema presentation on comprehension monitoring. Fur-ther, the use of pre-reading tasks to facilitate comprehension monitoring in LD students has not been inves-tigated.

The presentation of structured tasks prior to reading has been found to be effective in improving LD students' reading comprehension (Darch & Carnine, 1986; Darch & Gersten, 1986; Idol-Maestas, 1985; Sachs, 1983). Structured

tasks such as advance organizers have been more successful in promoting comprehension in LD students than less structured tasks (Darch & Gersten, 1986; Sachs, 1984).

Structured overviews and advance organizers assist in making the underlying structure of a passage apparent to the learner. These devices help the learner to bridge the gap between what is already known and what needs to be learned (Ausubel, 1978). The presentation of an outline or a visual overview of how the major ideas of a passage interrelate can assist the reader in defining the purpose for reading and in formulating expectations about the passage to be read. Organizers may also provide readers lacking prior knowledge with a structure for interpreting the passage. Thus, advance organizers have the potential to provide and structure information for the reader, as well as assist in the activation of relevant schemata.

Structured organizers have been particularly useful in improving comprehension in poor readers (Pearson & Gallagher, 1983; Wittrock, 1981). Since poor readers are not as sensitive to important information in text as good readers (Smiley, Oakley, Worthen, Campione & Brown, 1977; Williams, 1986), advance organizers assist poor readers by highlighting the important aspects of the text.

Prior knowledge can also be activated through the use of pre-reading questions. Previous research has shown that self-questioning is an effective way to enhance learning from

text (Dreher & Gambrell, 1985; Palincsar & Brown, 1984; Singer & Donlan, 1982; Wong, 1985b). The reader through forming self-questions activates background knowledge and sets purposes for reading. These self-questions assist the reader in developing expectations about what is likely to be contained in a passage. These expectations are important to guide comprehension monitoring.

Structured overviews are also useful in stimulating readers to generate relevant questions about a passage. When readers generate self-questions based on structured overviews they are beginning to develop links between what they know and particular ideas contained in the passage. Singer and Donlan (1982) suggest that self-questions may be used to extend a knowledge structure or to form a bridge from one knowledge structure to another.

In summary, the awareness of how one's comprehension is proceeding is important to effective reading. LD adolescents are less likely than average readers to monitor spontaneously their comprehension during reading. Palincsar and Brown (1984) included these areas in a description of essential processes in reading: (1) understanding the purposes of reading; (2) activating relevant background knowledge; (3) allocating attention to important parts of text; and (4) formulating expectations about text. Pre-reading tasks may help to orient the reader to the passage, thus facilitating the use of these processes.

Study Variables

The dependent variables of this investigation include the following measures on LD subjects': 1) detection of embedded errors while reading; 2) accuracy of recognition of passage information; and 3) accuracy of identification of statement plausibility. These measures are used to assess subjects' comprehension monitoring during reading and their recognition and comprehension of passage information after reading.

The independent variable is pre-reading conditions. This study investigates the effectiveness of two specific pre-reading activities on the above dependent variables. These two pre-reading activities are structured overviews + self-questions, and self-questions alone. A control condition is used for comparison. A summary of the potential underlying activities enhanced by these pre-reading conditions is provided in Table 1.

The combination of structured overviews and self-questions should provide a powerful pre-reading activity that involves all of the processes discussed above. The structured overview should provide the subjects with a framework for understanding the important ideas in the passage and the interrelationships among these key ideas. Structured overviews should also guide the subjects' development of

Table 1

Potential Underlying Processes Enhanced by Pre-Reading
Conditions

Underlying Activities	Pre-Reading Conditions	
	Self-Questioning	Structured Overview and Self-Questioning
Provides a focus and purpose for reading	X	X
Activates background knowledge	X	X
Creates expectations about text	X	X
Provides background information and main ideas of text		X
Provides a stimulus for question generation		X
Provides a link between what is known and what needs to be learned		X

questions. Self-questioning allows the reader to use what he or she already knows to formulate questions based on the overview. These self-questions help readers establish purposes for reading and create expectations about the passage.

The treatment which combines the structured overview with self-questions is seen as most powerful since subjects may have difficulty formulating relevant questions without a structured overview of the passage. The lack of relevant prior or content knowledge can hamper the generation of self-questions (Wong, 1985b). Self-questioning should be facilitated by making the structure of the passage explicit to the students.

The self-questioning condition alone should also help the reader establish purposes for reading. In addition, self-questions should facilitate subjects' activation of background knowledge and creation of expectations about text. These pre-reading conditions warrant comparison given the attention in the literature to the role of prior knowledge in reading comprehension and comprehension monitoring. This study extends the comprehension monitoring research by investigating the effects of two types of pre-reading activities on LD students' comprehension monitoring and comprehension performance.

Contribution of the Study

Comprehension skills are needed for success in almost all academic areas and in many non-school activities. The adolescent student with reading problems faces greater problems than the elementary school student. In secondary schools, teachers often assume that students have basic comprehension skills (Brown & Palincsar, 1982; Marsh, Gearheart & Gearheart, 1978). Adolescents also face complex reading materials and must read greater amounts of material.

Comprehension monitoring is important to understanding text and for effective studying. When students know that they do not understand, they can employ remedial strategies such as rereading, questioning and consulting outside sources. Comprehension monitoring also allows students to better allocate their attention to areas that need further study.

The problem of how to help students become aware of what they do not understand is a critical task for educators. It is particularly important to investigate the specific conditions that encourage effective comprehension monitoring among learning disabled students. Such methods could be used by educators to assist students in both regular and special education classrooms.

If the specific activities that facilitate comprehension monitoring can be identified, they can then be taught to LD

students. LD students who understand themselves as comprehenders and learners and the conditions which encourage effective self-evaluation may be better able to independently monitor their reading performance. Such self-evaluation should help LD students take control of their own learning.

The importance of the evaluation of one's comprehension is illustrated by Holt (1964):

> Part of being a good student is learning to be aware of one's own mind and the degree of one's own understanding. The good student may be one who often says that he does not understand, simply because he keeps a constant check on his understanding. The poor student who does not, so to speak, watch himself trying to understand, does not know most of the time whether he understands or not. Thus the problem is not to get students to ask us what they don't know; the problem is to make them aware of the difference between what they know and what they don't (pp. 28-29).

Outline of the Study

This study investigates the effects of pre-reading activities on LD students' performance on measures of comprehension monitoring and comprehension. The related research literature in comprehension monitoring is reviewed in chapter two to establish the basis for this study. Descriptions of metacognition, comprehension monitoring and schema theory are reviewed to provide a basis for the research questions and methodology used in the present study. In addition, research studies in comprehension monitoring, schema activation and learning disabilities are presented and critically evaluated.

The literature review also outlines the proposed contribution of this study to the current comprehension monitoring and learning disabilities literature.

The third chapter describes the research methodology employed in this study. It describes the research design, the procedures for selecting the LD subjects, the study materials and the research procedures that were used in the study.

The statistical techniques used and the results of the study are presented in Chapter 4. A discussion of the study findings is provided in chapter 5.

Chapter 2

METACOGNITION AND COMPREHENSION MONITORING IN READING AND

LEARNING DISABILITIES: SELECTED FINDINGS

Introduction

The purpose of this chapter is to summarize and analyze
the theory and the research studies that guide the design of
this study.   The chapter is organized into four major
sections that include: 1) an overview of metacognition and
its relationship to research in learning disabilities; 2) a
description of the relationship of metacognition and compre-
hension monitoring to reading and learning disabilities and
an analysis of previous research; 3) considerations of
methodological issues in comprehension monitoring research;
and 4) information related to schema theory and the facili-
tation of comprehension monitoring.   A brief summary con-
cludes this chapter.

The recent interest in metacognition reflects a shift
from a behaviorist to a cognitive view of the learning pro-
cess. The behaviorist approach to learning is based on the
assumption that "a stimulus goes in, a response comes out,
and what happens in between is summarized by a hyphen"
(Farnham-Diggory, 1977, p. 128). Conversely, the cognitive
approach attempts "to understand how incoming information is
processed and structured in memory" (Weinstein & Mayer, 1986,
p. 316).

Cognitive psychologists describe two systems of internal organization, the representational and the executive systems (Anderson, 1975). The representational system refers to how information input is selectively organized, attended to, and meaningfully interpreted. The executive system refers to control processes that are manifested in planning, monitoring, checking and evaluating our actions (Wong, 1986). The representational system thus considers cognition in general while the executive system considers one's knowledge and regulation of cognitive processes.

These systems significantly influence the way researchers and practitioners view the learning process. Cognitive theorists view learning as a constructive process that requires the active involvement of the learner. Further, students who have knowledge of and control over their thinking and learning activities will be able to independently plan, monitor and evaluate their own learning. This knowledge and control over one's own learning is referred to as metacognition. An overview of metacognition is provided in the following section.

Overview of Metacognition

Metacognition is a loosely defined concept that refers to the awareness and regulation of one's own learning processes. Flavell, (1976) a developmental psychologist, is

credited with the origination and popularization of the term,

metacognition, and its early theoretical development.

He offered the following description of metacognition:

> Metacognition refers to one's knowledge concerning
> one's own cognitive processes and products or any-
> thing related to them, e.g., the learning-relevant
> properties of information or data. For example, I
> am engaging in metacognition (metamemory,
> metalearning, metaattention, metalanguage, or
> whatever) if I notice that I am having more trouble
> learning A than B; if it strikes me that I should
> double-check C before accepting it as a fact; if
> it occurs to me that I had better scrutinize each
> and every alternative in any multiple-choice type
> task situation before deciding which is the best
> one; if I sense that I had better make a note of D
> because I may forget it...Metacognition refers,
> among other things, to the active monitoring and
> consequent regulation and orchestration of these
> processes in relation to the cognitive objects or
> data on which they bear, usually in the service of
> some concrete goal or objective (Flavell, 1976, p.
> 232).

Flavell (1976) developed the concept to explain why

adults are more effective than young children in generalizing

mnemonic strategies. He observed that adults know that they

need to spend more time studying items that are difficult to

remember, while young children are apparently unaware of the

parameters needed to be successful on memory tasks. Young

children, therefore, do not generalize learned strategies and

lack metamemorial skills.

The term metacognition has also been defined as "know-

ledge about knowledge, as well as the usage of that knowledge

in the service of control of thinking" (Fisher & Mandl, 1984,

p. 217). Most definitions of metacognition include two broad

components: 1) a <u>knowledge</u> of the skills, strategies and re-
sources needed to perform a task effectively; and 2) the
ability to use <u>self-regulatory mechanisms</u> to complete a task
successfully (Baker & Brown, 1984).

Flavell (1981) defined this first component,
metacognitive knowledge, as the long-term memory represen-
tations of individuals as cognitive agents. Person, task and
strategy categories were used by Flavell and Wellman (1977)
to describe metacognitive knowledge. These categories in-
clude an understanding of people as learners (short-term
memory is limited), learning tasks (essay tests require dif-
ferent methods of study than multiple choice tests) and
learning strategies (outlining is helpful to remembering).
These aspects of stored knowledge may, like other forms of
knowledge, be retrieved and used during cognitive activities
either automatically or deliberately (Flavell, 1981).

The second major component of metacognition is the
self-regulatory function that directs other cognitive skills
(Baker & Brown, 1984; Paris, Cross, & Lipson, 1984). Numerous
researchers (e.g., Brown, 1980; Baker & Brown, 1984;
Palincsar & Brown, 1984) have written about the executive
processes involved in the self-regulation of learning. They
describe executive self-regulatory mechanisms "as <u>checking</u>
the outcome of any attempt to solve a problem, <u>planning</u> one's
next move, <u>evaluating</u> the effectiveness of any attempted
action, <u>testing</u> and <u>revising</u> one's strategies for learning,

and <u>remediating</u> any difficulties encountered by using compensatory strategies" (Baker & Brown, 1984, p. 23). The use of these self-regulatory mechanisms is known as cognitive monitoring. These actions enable individuals to exercise executive control over their thinking, problem-solving and learning.

Comprehension Monitoring

Comprehension monitoring refers to an individual's attempts to understand spoken and/or written language. Comprehension monitoring is a form of metacognitive self-regulation and refers to the evaluation and regulation of one's comprehension processes (Baker, 1979). Evaluation or self-checking activities refer to continual assessments of how comprehension is proceeding. Regulatory or self-correcting activities refer to subsequent strategies to remediate comprehension difficulties.

Initial studies in comprehension monitoring were conducted in the area of oral communication (Markman, 1977). Although these studies have been influential in comprehension monitoring research, the major focus in this review will be on comprehension monitoring in reading and learning disabilities.

Relevance of Metacognition to Learning Disabilities

The concepts of metacognitive knowledge and regulation are particularly important to understanding students with learning problems. A number of researchers suggest that the learning difficulties of LD students may be due to their passive approach to learning and their failure to use effective self-regulatory strategies (Bos & Filip, 1982; Paris & Oka, 1986; Torgesen, 1982; Wong, 1986). This view is a departure from the traditional explanation of learning disabilities which suggested that the poor performance of LD children "reflects enduring deficits in certain basic abilities required for normal processing of information" (Torgesen, 1982, p. 45). The relationship between metacognitive processes and learning disabilities is reviewed in this section.

Learning Disabled Students As Inactive Learners

Learning disabled students are often described as inactive learners who do not actively attempt to control their own learning processes (Hagen, Barclay, & Newman, 1982; Torgesen, 1977; Torgesen, Murphy, & Ivey, 1979; Wiens, 1983; Wong, 1986). This view of LD students emphasizes the passive and disorganized nature of their approach to learning tasks. Torgesen (1982) cites 40 studies completed since 1976 that discuss LD children's use of learning strategies. Torgesen

concluded that "learning disabled children as a group do not engage readily in certain organized, goal-directed strategies that aid performance on intellectual tasks" (p. 46).

Most studies of LD children's use of information processing strategies have been in the area of memory. Memory researchers conclude that LD children are less efficient than normally-achieving children in their use of strategic memory processes (Bauer, 1982; Torgesen, 1977, 1985; Torgesen & Goldman, 1977; Wong, 1979c). Specifically, LD students are not as effective as normal students in using strategies such as verbal rehearsal, labeling, categorizing and inferencing when asked to recall information (Tarver, Hallahan, Kauffman & Ball, 1976; Torgesen, 1977; Torgesen, Murphy, & Ivey, 1979).

LD students also demonstrate strategic deficiencies in a variety of academic areas. Several research studies indicate that LD students do not engage in the constructive and monitoring activities required for successful comprehension (Bos & Filip, 1982; Gold & Fleisher, 1986; Wong, 1979a; Wong & Jones, 1982). LD students are less likely than normal achieving students to make strategy transformations on arithmetic tasks that are familiar to them (Swanson & Cooney, 1985). Slife, Weiss, and Bell (1985) found that LD students are less skilled than regular students in knowledge of their problem-solving skills and their ability to monitor their problem-solving performance on a mathematics task.

LD students are also less likely to use efficient study skills and strategies. Carlson and Alley (1981) report that average-achieving students perform better than LD students on note-taking, listening comprehension, monitoring writing errors, test taking and scanning.

Although LD students approach academic tasks in a passive manner, they are not necessarily deficient in metacognitive strategies (Baker, 1982; Bos & Filip, 1982; Torgesen, 1982; Wong & Jones, 1982). LD students may have the ability to use effective strategies but fail to do so (Bos & Filip, 1982; Wong, 1979b; Wong & Jones, 1982). Flavell describes this phenomenon of failing to use appropriate self-regulatory strategies spontaneously as a production deficiency (Flavell, 1977).

Summary

The concepts of metacognition and comprehension monitoring are hierarchically defined (Baker & Brown, 1984). Metacognition is a superordinate term which applies to knowledge about and the regulation of learning. "Metacognitive processes refer to the control or executive processes that direct our cognitive processes and lead to efficient use of cognitive strategies" (Forrest-Pressely & Waller, 1984). Comprehension monitoring applies to one's evaluation and regulation of comprehension processes (Baker, 1985). Metacognitive processes are transituational and apply to a

variety of learning tasks (Brown, 1980). In this sense, metacognition is relevant to "learning how to learn" (Brown, Campione, & Day, 1981).

Evidence suggests that LD students do not apply self-regulatory strategies effectively in many academic situations. While metacognitive deficits or production deficiencies do not account for all of the academic difficulties LD students experience (Stanovich, 1982; Torgesen, 1982; Wong, 1986), a lack of metacognitive knowledge and failure to use efficient strategies impairs academic performance (Torgesen, 1982).

The broad theoretical context for metacognition and comprehension monitoring in education and learning disabilities is provided in this first section. The role of metacognition and comprehension monitoring in reading comprehension and learning disabilities is examined in the following section.

Metacognition and Comprehension Monitoring in Reading

Metacognition is critical to strategic reading. Although Flavell (1976) is credited with the origination of the concept metacognition, Brown (1980) emphasized the importance of metacognition in effective reading (Wong, 1986). This second section describes the reading comprehension process from a cognitive viewpoint and provides an analysis of previous research in comprehension monitoring.

The comprehension monitoring process as it applies to reading for meaning is reviewed in this section. Reading for meaning is distinguished here from reading for remembering. Reading for meaning concerns the comprehension of written material, while reading for remembering concerns study behaviors (Baker & Brown, 1984). Reading comprehension is also distinguished from the decoding aspects of reading. Metacognitive knowledge and the control of decoding processes and reading for remembering are not within the scope of this review.

A Cognitive View of Reading Comprehension

The "essential skill in reading is getting meaning from a printed or written message" (Carroll, 1970, p. 20). Reading comprehension has been defined as the ability to derive meaning from text (Gibson & Levin, 1975) and is the goal of reading instruction (Ross, 1975). The process of comprehending written material is extremely complex and involves the interaction of a number of variables. The following description of the reading comprehension process, although simplified, provides a framework for understanding how several major variables contribute to reading comprehension.

The reading comprehension process involves active attempts by the reader to understand text by relating it to prior information stored in long-term memory. Pearson and Spiro (1980) state that comprehension is the interaction be-

tween new information and old knowledge. The degree of understanding achieved depends on the extent to which incoming material is transformed, extended and related to prior knowledge (Markman, 1981). Assuming that the reader can decode the text, the degree of interaction between incoming material and prior learning depends on the continuous interaction among the following factors: 1) the compatibility between the reader's knowledge and the structure and content of the text; 2) the structure and organization of the reading material; and 3) the strategies the individual employs to understand and retain the material and to circumvent comprehension failures (Palincsar & Brown, 1984).

Familiarity with the content and structure of the text aids comprehension. An individual's capacity to understand material depends on the extent to which the reader's existing knowledge is compatible with the content of the text. If readers are not familiar with the material, they may have difficulty attending to important parts of text and disregarding trivia (Brown, 1980). Adequate background knowledge is not, in itself, sufficient for comprehension. The accomplished reader considers new information in light of what is already known by making predictions, forming inferences and drawing conclusions throughout the reading process (Palincsar & Brown, 1984).

The structure and organization of the reading material also influences comprehension (Schnotz, 1984). Comprehension

is facilitated by well-organized texts that are written in a familiar style. Authors often give organizational clues to important themes by using headings, topic sentences and summaries. Well-written texts also possess acceptable standards of clarity, syntax and cohesion. Such texts have been referred to as considerate or reader-friendly texts (Palincsar & Brown, 1984).

The use of strategies during reading assists the reader in comprehending text (Scardamalia & Bereiter, 1984). Reading decoding and comprehension activities often occur automatically when information-processing demands are low. When demands are increased and problems arise, the accomplished reader proceeds at a slower pace and uses a variety of activities to solve comprehension difficulties (Brown, Armbruster, & Baker, 1986; Just & Carpenter, 1980).

Accomplished readers also use strategies to compensate for poorly written material or for deficiencies in their own knowledge. Accomplished readers have the ability to comprehend a wide variety of materials (some of which may be poorly written) and to obtain knowledge they do not yet possess (Palincsar & Brown, 1984).

Six underlying activities important to strategic comprehension activities were identified by Palincsar and Brown (1984): (1) understanding the purposes of reading; (2) activating relevant prior knowledge; (3) allocating attention to important information; (4) critical evaluation of content

for internal consistency and compatibility with prior knowledge and common sense; (5) monitoring ongoing activities to see if comprehension is occurring by engaging in activities such as periodic review and self-interrogation; and (6) drawing and testing inferences of many kinds, including interpretations, predictions and conclusions.

In summary, comprehension is a constructive process. Reading comprehension is facilitated when readers use relevant prior knowledge, have well written texts, and use flexibly a variety of reading comprehension strategies. Accomplished readers know their purposes for reading and choose appropriate strategies to meet their purposes.

Comprehension Monitoring in Reading

Comprehension monitoring is embedded in the comprehension process (Wagoner, 1983). Skilled reading involves more than decoding, comprehension and reading strategies. It also involves "knowledge about each of these skills and the ability to control them (e.g., select, monitor, modify)" (Forrest-Pressley & Waller, 1984). This comprehension monitoring process is the focus of this section.

Accomplished readers monitor their comprehension and modify reading activities to increase comprehension. These readers know that they can read "in different ways for different purposes and can do it appropriately" (Forrest-Pressley & Waller, 1984, p. 6). Paris and Myers (1981) refer

to comprehension monitoring as a form of mental "pulse-taking" during reading that helps measure progress towards a reading goal and signals comprehension failures.

Evaluation and regulation are the two components of comprehension monitoring (Baker & Brown, 1984). The evaluation or self-checking component of comprehension monitoring requires the reader to continually assess how comprehension is proceeding during reading. Comprehension monitoring extends beyond the evaluation of one's reading by involving the regulation of strategies to meet comprehension goals. The following description illustrates the role of comprehension monitoring in reading.

The accomplished reader assesses the degree with which comprehension is proceeding and pursues appropriate strategies when difficulties occur. Accomplished readers continually assess the degree to which they understand written material. Knowing how one's comprehension is proceeding lets one know when to reread, consult outside sources and whether to ask questions.

The behavior of accomplished readers was described by Palincsar and Brown (1984). They suggest that accomplished readers distinguish between an automatic and a debugging state in reading. Given facility with decoding, comprehension in the accomplished reader is relatively automatic; comprehension proceeds smoothly until a "triggering event" alerts the reader to a comprehension failure. When such an event

occurs, the reader slows down and employs corrective strategies that take additional time and effort.

These "triggering" events are referred to as metacognitive experiences (Flavell, 1981). These experiences include feelings that something has gone wrong, or that ambiguity and uncertainty exists in the pursuit of a goal. Flavell states that metacognitive experiences can assist us in meeting our goals, "if the feeling elicits additional comprehension effort" (1981, p. 50).

Several conditions alert readers to possible comprehension failures (Markman, 1981). Since comprehensible material requires structure, the absence or perceived absence of an underlying structure should alert the reader to a comprehension difficulty (Markman, 1981). For instance, a sentence with words in the wrong order or omitted words will be difficult to comprehend since the meaning is not immediately clear. Structural difficulties, such as poorly organized material or unfamiliar types of material, often require the sophisticated reader to employ strategies to resolve comprehension difficulties.

Another triggering condition is a discrepancy between new information and the hypotheses or expectations that have been formulated up to that point (Markman, 1981). In order for such an event to occur, the individual must have formed hypotheses about the material and compared these hypotheses to the material. When an individual has made an incorrect

interpretation of the text, the discovered inconsistency provides the reader with important information about how comprehension is proceeding and alerts the reader to look for the causes of the inconsistency (Markman, 1981).

Ambiguity or the awareness of more than one interpretation should also alert the reader to a comprehension difficulty (Markman, 1981). For instance, a statement in the material may be inconsistent with the reader's expectations. Readers may need to suspend judgment and seek further clarification to resolve the ambiguity.

These active interactions with text are often not used by poor readers (Palincsar & Brown, 1984). A number of researchers have theorized that comprehension monitoring may be a skill that differentiates poor and accomplished readers (Baker & Brown 1984; Bos & Filip, 1984; Fisher & Mandl, 1984; Forrest-Pressley & Waller, 1984; Paris & Myers, 1981; Wagoner, 1983; Wong, 1986). Fisher and Mandl (1984) theorize that poor comprehenders do not focus their attention on the most important aspects of the material and do not adequately monitor and control what they are reading. Since these readers do not sense their own non-comprehension, they do not look out for such failures and do not try to assess their own understanding by engaging in activities such as self-testing and self-questioning (Fisher & Mandl, 1984). "Without the information they would get by self-diagnosis, they are unable then to schedule, organize, and start strategies for the by-

passing of comprehension bottlenecks" (Fisher & Mandl, 1984, p. 228).

The above description illustrates the role of comprehension monitoring in reading. Comprehension monitoring is an important component of reading and "may be a skill that differentiates beginning and accomplished readers" (Paris & Myers, 1981, p. 6). Good readers monitor their comprehension as they read. They actively engage in the process of reading by continually assessing how comprehension is proceeding. When they encounter difficulties, they engage in strategic activities to solve comprehension difficulties. Poor readers may lack metacognitive awareness and control and thus fail to adequately monitor their comprehension. Since LD students often approach tasks in a passive manner, they may not actively monitor their comprehension of text (Baker, 1982; Bos & Filip, 1984; Capelli & Markman, 1982; Palincsar, 1986). The next section reviews the results of metacognitive research in reading.

Comprehension Monitoring: A Review of Studies in Reading

Metacognitive studies in reading provide insight into the metacognitive knowledge and self-regulatory skills of the general student population and into the strengths and weaknesses of the methodologies used. A review of studies comparing good and poor readers also provides information useful

in understanding the comprehension monitoring of students with reading problems.

This review is organized in two parts. The first section focuses on comprehension monitoring studies that investigate developmental and good vs. poor reader differences using a variety of research methodologies. The second section analyzes research studies that investigate comprehension monitoring processes in students using error detection methodology.

Comprehension Monitoring: Developmental and Good and Poor Reader Studies

Interviews have been used to assess readers' metacognitive knowledge about reading (Canney & Winograd 1979; Forrest-Pressley & Waller, 1984; Garner & Kraus, 1981; Myers & Paris, 1978). These studies reveal a consistent pattern of results. Younger children and poorer readers focus on the decoding aspects of reading while older and better readers recognize that reading is a meaning-getting process.

Apparently some older, poorer readers continue to view reading as a decoding activty (Baker & Brown 1984; Canney & Winograd, 1979; Forrest-Pressley & Waller, 1984; Wong, 1985a). This may partly result from continued remedial instruction that focuses on the decoding aspects of reading. If students believe that the primary purpose of reading is decoding, then children will process text in a word by word

manner and will have difficulty with comprehension activities (Baker & Brown, 1984).

Poor readers have difficulty relating text information to their prior knowledge about the content of the passage (Capelli & Markman, 1982; Winograd & Johnston, 1982). Poor readers found fewer prior knowledge violations in short passages than good readers (Baker, 1984). Sullivan (1978) also reports that poor high school readers often experience difficulty relating their prior knowledge to reading material. The knowledge that one should activate prior knowledge and the ability to do so are important metacognitive components of reading (Baker & Brown, 1984).

Younger children and poorer readers have difficulty recognizing and focusing on important information in text (Brown & Smiley, 1977; Williams, 1986). These readers do not necessarily lack the ability to identify important information in text, rather they need help in focusing their attention on important information (Snider, 1987a, 1987b).

A few studies examine what readers actually do to regulate reading to meet varied purposes. Forrest-Pressley and Waller (1984) asked good and poor third and sixth grade children to read passages presented under four different instructional conditions: read for fun, for a title, to find specific information and to study. They found that younger and poorer readers were less likely to change their reading strategies to meet the varied reading goals. In a study with

high school students, Smith (1967) found that good readers adjusted their reading behaviors when asked to read for details and for a general understanding, while the poor readers did not.

Comprehension monitoring behaviors have also been studied by observing children while they read. Paris and Myers (1981) observed fourth grade students as they read assigned material by observing their study behaviors. They found that poor readers were less likely than good readers to engage in spontaneous study behaviors. These poor readers rarely used dictionaries, took notes or asked questions. Further, the poor readers remembered less about the text than good readers.

Poor readers and younger children have difficulty judging whether or not they understand something well enough to take a test. Brown, Campione, and Barclay (1979) found developmental differences in children's ability to determine whether or not they were ready to be tested on a passage. In a similar study, Forrest-Pressley and Waller (1984) found that fourth grade students and poorer readers were less accurate in determining whether their answers to comprehension questions were accurate. The children in these studies had difficulty evaluating their own understanding of what they read.

The above studies highlight some of the differences between good and poor readers in their awareness of the param-

eters of reading and in their ability to effectively monitor their comprehension. Younger children and poorer readers appear to lack metacognitive knowledge of reading and do not engage in many of the comprehension monitoring behaviors necessary for effective understanding and study.

Error Detection Studies

Reading fluency involves continually generating hypotheses or expectations for text information based on earlier text information and prior knowledge of content or text structure. If a mismatch occurs between the reader's expectations and the material, it should signal a comprehension difficulty.

The error detection paradigm is a common approach for studying readers' sensitivity to problems in text. This method assumes that readers who are monitoring their comprehension should be able to detect inconsistencies. This review provides an overview of the error detection methodology and an analysis of these studies.

In error detection studies, readers are typically told to listen to or to read a passage that contains an embedded error. The error creates an inconsistency in the passage that should alert the reader to the fact that the subject failed to understand and/or that a problem exists with the material. For instance, Markman (1979) found that children had difficulty identifying inconsistencies in material read to them.

The children heard the following information about Baked Alaska: "to make it they put the ice cream in a very hot oven. The ice cream in Baked Alaska melts when it gets that hot." They later heard that "when they make Baked Alaska, the ice cream stays firm and it does not melt." Even though the children in this study heard each passage twice, they were often oblivious to the incompatible information.

Error detection studies demonstrate that younger and poorer readers are less likely to monitor their comprehension than older and better readers. Canney and Winograd (1979) asked good and poor readers in grades two, four, six, and eight whether five altered passages were readable or not. Problem passages contained semantic, syntactic, lexical, or graphic errors. While the older and good readers found the problem passages to be "unreadable", the poor and younger readers thought all but the graphically altered passages to be readable. In a study by Harris, Kurithof, Terwogt, and Visser (1981), younger and poorer readers were less likely to notice structurally anomalous sentences than were older and better readers. Young and poor readers apparently fail to evaluate the information presented in text along a number of dimensions.

Skilled readers are also better than less skilled readers in identifying missing pages in stories. In a study by August et al. (1984) sixteen fifth grade readers of each type, matched on intelligence, were given five stories to

read. Three of the stories made little sense because a page was omitted to make the story inconsistent. The authors found that the skilled readers were better at reporting the inconsistency and fixing the story.

Garner (1980) also found that good readers are better than poor readers at detecting inconsistencies. She compared poor seventh and eighth grade readers' awareness of text inconsistencies. Each subject was asked to rate four passages as "very easy to understand," "ok," or "difficult to understand." The author found that good readers differentiated their ratings between consistent and inconsistent passages while poor readers did not. Good readers also commented on the disruptive nature of the inconsistencies in the passages, whereas the poor readers' comments rarely pointed to the inconsistencies.

Error detection studies have used different types of errors in passages. Experimenters have used nonsense words in place of words that make sense (Baker, 1984; Miller & Isaksen, 1978; Paris & Myers, 1981). Anomalous sentences have been added to otherwise coherent passages (Harris et al., 1981). Falsehoods or statements that should conflict with prior knowledge have been used in text (Baker, 1984; Markman & Gorin, 1981). Contradictory information has been placed within the same sentence, in contiguous sentences and in sentences separated by other sentences (Baker & Anderson, 1982; Garner, 1980, 1981; Markman, 1979).

Garner (1981) demonstrated that certain types of errors are easier to detect than others. Garner (1981) found that poor readers have an easier time detecting meaningless polysyllabic words than intra-sentence inconsistencies. Garner and Kraus (1982) compared good and poor readers' sensitivity to inter- and intra-sentence inconsistencies in narrative passages. The good readers identified more of the intra-sentence inconsistencies than the inter-sentence inconsistencies. However, the poor comprehenders were unsuccessful at identifying both types of inconsistencies.

Main idea inconsistencies are apparently easier to detect than detail confusions. Baker (1979) examined college students' ability to detect several kinds of inconsistencies in expository passages. College students found it easier to detect main idea inconsistencies than detail errors.

While most of the error detection studies have included only one or two different kinds of errors in a passage, Baker (1984) investigated the effectiveness with which children can identify three types of errors. While the older children were able to detect errors more effectively than the younger children, problem identification was better than found in previous reports. Baker (1984) noted that previous error detection studies involving only one type of embedded error could present a misleading picture of subjects' comprehension monitoring skills. Thus, failure to find a particular type

of error need not indicate a failure to evaluate comprehension along other dimensions.

Readers who are explicitly told to look for problems are more likely to notice problems than students who have not been informed of problems (Baker, 1979; Garner & Kraus, 1981). Providing explicit information about the type of problem to look for is more helpful than simply being informed of a problem. Markman and Gorin (1981) investigated whether eight and ten year old children can adjust their standards of evaluation to locate falsehoods and inconsistencies in stories. Students who were told to locate inconsistencies found them more often than falsehoods and children instructed to find falsehoods found them more often than inconsistencies.

Critical Analysis of Error Detection Studies

Several concerns have been raised about error detection studies. One problem with the good vs. poor reader studies concerns subject selection. While most experimenters control for differences in decoding skills among these groups, few control for intelligence. Some even rely exclusively on teacher judgment to distinguish skilled from less skilled comprehenders. Therefore, the results of such studies may have been confounded by differences in intelligence and comprehension ability.

Another issue raised by critics is whether subjects' failure to report inconsistencies is due to poor comprehension monitoring (August et al., 1984; Baker, 1979; Baker & Brown, 1984; Brown, 1980; Capelli & Markman, 1982). Experimenters caution that a variety of factors could account for children's failure to find errors in passages. In several studies subjects were not told that the passages contained errors. Instead, they were asked to indicate whether the passage was comprehensible (Baker, 1979; Garner, 1980). Students were less likely to identify inconsistencies under these conditions than under informed conditions. The failure to inform subjects of the problems is likely to lead to a serious underestimation of comprehension monitoring ability (Baker, 1984).

Several factors could explain subjects' failure to report inconsistencies. Children may be unwilling to admit comprehension difficulties or they may assume that the problem is theirs and not in the material. In addition, children may be studying the material to get an overview and therefore miss certain inconsistencies since they were not looking for details. Baker (1979) found that college students did not identify inconsistencies in text since they focused on the main idea and therefore missed a sentence that did not fit in.

Another explanation for failure to find errors is that subjects may not have been taught to critically review ma-

terial. Children tend to believe that the communications they receive will be accurate and complete (Grice, 1975). Furthermore, if a child fails to mention a problem, it does not necessarily mean that they failed to find it; the child may have made assumptions to resolve the inconsistency or may have developed a different interpretation from the experimenter. Finally, the child may have detected the inconsistency but had difficulty remembering or verbalizing the error (Baker & Brown, 1984).

Certain experimenters recognized some of these difficulties and revised the questions and instructions given to children in later studies. For instance, Garner and Kraus (1982) asked children whether the writer needed to rewrite any portion of the narrative passage in order to encourage the children to report comprehension problems. These questions were asked in an effort to absolve the children of "miscomprehension blame". Children were more likely to report errors with these directions.

Recent studies have provided more explicit information to the subjects. Subjects have been told that inconsistencies existed in the passage and have been told to find the inconsistencies (August et al., 1984; Baker, 1984). Some researchers provided training to subjects so they would know what types of inconsistencies were contained in text (Baker, 1984; Erickson, Stahl & Rinehart, 1985). In addition, Baker

(1984) found that providing a second opportunity to find the errors improved subjects' comprehension monitoring.

Summary

These studies demonstrate that differences exist developmentally and between good and poor readers on varied comprehension monitoring tasks. The lack of metacognitive knowledge about reading among poor readers and their lack of self-regulation during reading is of concern. Interview studies suggest that poor readers may not even be aware that they should be actively engaged in constructing meaning from text. These studies further suggest that these readers have an incomplete understanding of reading goals.

Error detection studies suggest that many poor readers do not monitor their comprehension effectively, even when confronted with blatant errors. If these errors are not noticed, these students are unlikely to notice the subtle distinctions and comparisons necessary for successful reading. Sensitivity to ambiguities and inconsistencies in text are important to comprehension and critical reading (Robinson, 1978).

Comprehension Monitoring: A Review of Studies in Learning Disabilities

As noted in the first section of this chapter, LD students have been described as passive in their approach to a

to a variety of academic tasks, such as memory strategies, problem-solving, mathematics, writing and reading. Torgesen (1977) conceptualized the LD child as an inactive learner who does not participate in his own learning and has difficulty assessing his own strengths and weaknesses and task demands.

This passive description of the LD reader is of particular concern, since reading is a constructive process that requires the active involvement of the reader. The effective reader attends to the task, has a purpose for reading, continually assesses understanding and uses appropriate strategies to understand text when difficulties occur (Bransford, 1979). This section reviews studies which investigate comprehension monitoring in LD students.

Several studies suggest that LD students may not necessarily lack the ability to monitor their comprehension, but rather fail to engage spontaneously in monitoring processes (Bos & Filip, 1984; Chan, Cole & Barfett, 1987). Bos & Filip (1984) evaluated the comprehension monitoring skills of LD and average-achieving seventh graders. Twenty average-achieving and twenty LD students were given two short expository passages to read that contained inter-sentence inconsistencies. Each student was asked a set of questions after reading the passage. Average-achieving students consistently reported the inconsistency when general questions were asked such as "did everything make sense?" However, the LD students did not report the inconsistency until specific

questions were asked, such as "can pigeons see if they are blindfolded?"

In a second passage, Bos & Filip (1984) used the same procedures. However, the subjects were told that something was wrong with the passages. Eighty-five percent of the average-achieving and LD students were able to identify inconsistencies in this situation. Given this outcome, the authors suggested that LD students do not have a deficit in comprehension monitoring skills, rather they failed to use appropriate strategies. The LD students demonstrated adequate comprehension monitoring skills with minimal cues, however, these cues were inconsequential for the average-achieving students. The authors also found that three of the LD students failed to detect the inconsistency even under the cued condition. Thus, a comprehension monitoring deficit may have existed for these students.

The authors concluded that cues informing LD students of the problem helped them perform as well as the average-achieving students. However, the extensive use of probes in the first passage may have actually trained the LD subjects to identify the errors. It is therefore difficult to assess whether the cues provided on the second passage, the previous probes or a combination of these factors influenced LD subjects' performance on the second passage. The Bos and Filip (1984) study is also limited by the paragraph length passages and the single errors included in the passages. However, the

encouraging aspect of these findings is that LD adolescents were able to monitor their comprehension effectively without extensive assistance.

LD fifth-grade students were also found to be cognitively inactive in regulating their comprehension processes. Wong (1979b) asked LD and average-achieving students to follow a written text while listening to a story. Before the story was read, half of the students received questions that focused on the important aspects of the passage. The other half of the subjects received no questions prior to the story. All subjects wrote free recalls following the stories. The questions increased the retention of main ideas by the LD subjects but did not improve the recall of average-achieving subjects. Average-achieving students engaged spontaneously in the active processing of what they read, while the LD subjects remained inactive until their attention was focused on the important themes in the text.

A number of cognitive training studies suggest that LD students exhibit production deficits since their comprehension monitoring performance improves as a result of strategy training (Chan et al., 1987; Wong & Jones, 1982). Wong and Jones (1982) investigated the effects of self-questioning on LD students' reading comprehension and comprehension monitoring. Half of the LD and normally-achieving subjects received instruction in using a five-step self-questioning procedure. These questions assisted students in focusing on

important ideas in text (e.g., "think of a question about the main idea you have underlined") and on self-monitoring (e.g., "what are you studying this passage for?"). While training facilitated LD subjects' comprehension monitoring performance, it did not significantly improve normally-achieving subjects' performance.

Learning disabled subjects also have learned to improve their comprehension monitoring by receiving specific instruction on how to monitor text for consistency. Chan et al. (1987) provided explicit instruction to LD and average-achieving students (matched on reading age) on using a cross-referencing evaluation strategy to identify internal inconsistencies in text. Subjects who received the explicit explanation demonstrated higher performance levels in both comprehension monitoring and comprehension.

Research is also needed to identify the conditions under which learning disabled students monitor their comprehension. Bowman and Davey (1986) analyzed the effects of four presentation modes (oral reading, oral reading/listening, silent reading, silent reading/listening) on LD students' comprehension monitoring. They found, contrary to the beliefs of some (Bos & Filip, 1982) that the combined presentation of listening and reading does not appear to elicit comprehension monitoring in LD students. Thus, multimodal presentation of information does not assist and may hinder comprehension monitoring.

Since LD students fail to demonstrate comprehension monitoring during reading, facilitating comprehension monitoring is an important area of investigation. Further research is needed to identify the conditions that will facilitate LD students' comprehension monitoring (Bos & Filip, 1982; Bowman & Davey, 1986).

Comprehension Monitoring Research: Methodological Considerations

One of the major problems in studying comprehension monitoring is measuring the individual's awareness of and control over the comprehension process. Comprehension monitoring is a complex activity that does not lend itself easily to observation and measurement. This third section briefly outlines a variety of methods used to study comprehension monitoring, and then, critically evaluates the error detection method used in this study.

The study of comprehension monitoring has typically relied on product measures obtained after reading (Baker & Brown, 1984). These measures have been criticized because they require the individual to infer processes that occurred during reading (Baker & Brown, 1984; Baker & Stein, 1981; Ryan, 1981). Product measures involve asking students what they might do in a particular situation (Cioffi, 1986), what processes they used during reading (Ngandu, 1977), how they might solve a particular comprehension problem (Myers &

Paris, 1978), whether they noticed problems in passages (Garner, 1980; Winograd & Johnston, 1982), and whether they are able to answer comprehension questions (Baker, 1979). Product measures must be interpreted cautiously because of potential memory problems and the possibly inadequate verbal abilities of subjects (Baker & Brown, 1984).

In contrast to product measures, process measures are used to obtain information during the process of reading. Eye movement research (Rayner, 1978), think-aloud protocols (Scardamalia & Bereiter, 1984), measures of time spent on certain segments of text (August et al., 1984), miscue analysis of oral reading (Beebe, 1980; Paris & Myers, 1981), cloze procedures (DiVesta, Hayward, & Orlando, 1979), error detection tasks (August et al., 1984; Baker, 1979; Garner, 1980; Garner & Alexander, 1982) and observations of the reader during reading (Paris & Myers, 1981) provide information about how individuals respond during the process of reading. On-line measures have been criticized because they do not actually assess comprehension.

The Error Detection Paradigm and The Current Study

The error detection paradigm is chosen as a measure of readers' ability to critically evaluate text in this study. The error detection paradigm can be manipulated to assess different levels of comprehension monitoring. For instance,

the error detection paradigm helps determine whether subjects notice blatant main idea inconsistencies, prior knowledge violations, or more subtle inter-sentential inconsistencies. In addition, the error detection method is less disruptive than some of the other methods like the think aloud protocols. Further, the design can be combined with other methods, such as the use of probes to assess subjects' comprehension monitoring skills. Finally, since the error detection method has been used extensively, there is considerable data on using this design.

The usual criticisms of error detection studies are resolved in the present study using the specific strategies discussed below. This discussion addresses the following aspects of these studies: 1) difficulty with types of errors and materials used in studies; 2) reliance on product rather than process measures; 3) questioning devices used, and 4) determining which criteria for comprehension researchers have chosen to use. The following critique outlines the limitations of the error detection design that need to be considered when designing research studies.

Types of Errors and Materials

Materials for error detection studies need to be carefully controlled. The type of error can influence subjects' performance on an error detection task. For instance, Garner

and Anderson (1982) found differences in error detection performance in two comparable groups using a similar passage.

The detection of problem types such as inconsistencies, nonsense words, and prior knowledge violations requires the use of different criteria or standards of evaluation (Baker, 1984). Detecting a prior knowledge violation requires the subject to compare the embedded error with knowledge already attained while detecting inconsistencies requires the subject to compare the consistency of ideas expressed within a passage. If an experimenter uses only one type of embedded error it does not necessarily mean that the child has not evaluated the passage along other dimensions. Therefore, if a passage is embedded with only one type of problem, it may present a "misleading picture of children's comprehension monitoring skills" (Baker, 1984, p. 589).

Error detection materials should be carefully developed and piloted (Wagoner, 1983). The researcher must assure that the type, magnitude and placement of the target errors are appropriate (Winograd & Johnston, 1982). August et al. (1984) also emphasized the need to control for difficulties that might arise from the differing nature of the errors used in studies.

Product vs. Process Measures

Another criticism of error detection studies is that they are often used as product rather than process measures.

Thus, researchers using the error detection design have often relied on measures obtained after reading, rather than during the reading process itself (Baker & Brown 1984; Ryan, 1981; Simons, 1971). This criticism has been addressed by combining the error detection method with other measures such as reading times (Baker & Anderson, 1982), look-backs and reading times (August et al., 1984), patterns of oral reading (Paris & Myers, 1981), observations of subjects while reading (Paris & Myers, 1981), and comprehension measures (Chan et al., 1987; Winograd & Johnston, 1982). Researchers suggest that a variety of measures be used to study comprehension monitoring (Baker & Brown, 1984; Wagoner, 1983; Winograd & Johnston, 1982).

Some researchers have modified the error detection task by asking subjects to mark the passages that they have difficulty with during reading. Subjects are probed about the marked passages after they have finished the assigned task. The later method reduces the memory load of the task.

Use of Probes

Probes during the first part of an experiment may affect subjects' subsequent performance in ways that are difficult to measure. For instance, Bos & Filip (1982) compared differences between average-achieving students and LD students on an error detection task. Students were probed about the inconsistencies using a variety of questions. In a second

phase of the experiment, subjects were told that inconsis-
tencies were present and the LD subjects' performance im-
proved. Given the specific nature of the probes in the first
part of the study, LD students' performances may have im-
proved as a result of the specific nature of the cues and
practice and not necessarily as a result of the informed
condition. Further, extensive use of probes can cause the
subject to become impatient (Winograd & Johnston, 1982).

Summary and Implications

Difficulties with the error detection paradigm require
that researchers carefully consider the implications of the
factors outlined in this section. The type, magnitude and
placement of errors need to be carefully considered when us-
ing this design. The use of probes needs to be carefully
assessed to assure that they do not interfere with subsequent
tasks or cause the subject fatigue.

In addition, researchers should consider using more than
one task. The use of multiple dependent measures provides
converging data that will enhance the understanding of sub-
jects' comprehension monitoring skills (Baker & Brown, 1984;
Wagoner, 1983; Winograd & Johnston, 1982). Baker and Brown
(1984) state that "the importance of obtaining converging
evidence becomes more crucial as the cognitive activity of
interest becomes more complex and more remote from directly
observable events" (p. 24).

This review of error detection methodology outlines considerations for effectively using this paradigm to measure subjects' comprehension monitoring skills. These were considered in choosing the error detection passages used in the present study.

Facilitating Comprehension and Comprehension Monitoring

Learning disabled and poor readers are less likely than average-achieving students to monitor their comprehension during reading (Baker & Brown, 1984; Bos & Filip, 1984; Capelli & Markman, 1982; Wagoner, 1983; Wong, 1986; Wong & Jones, 1982). This finding is of concern since comprehension monitoring is important to effective reading and studying. An important area of investigation is how comprehension monitoring can be facilitated during reading. This area of inquiry is important to those concerned with improving the comprehension monitoring of LD students.

This final section reviews literature related to the facilitation of comprehension and comprehension monitoring through the activation and presentation of background knowledge prior to reading. This review is organized into two parts. The first part outlines the relevance of schema theory to comprehension and comprehension monitoring. The second part reviews research studies that address the use of pre-reading activities to facilitate reading comprehension and comprehension monitoring. The reviewed research suggests

that comprehension monitoring should be facilitated by providing the reader with appropriate background knowledge or by encouraging the reader to activate relevant schema prior to reading.

Schema Theory and Comprehension Monitoring

The earlier description of the reading comprehension process emphasized the importance of prior knowledge in comprehending text. Accomplished readers generate meaning "by constructing relations between their knowledge, their memories of experiences, and the written sentences, paragraphs, and passages" (Wittrock, 1981, p. 229). As readers mature and learn more about the world through instruction and experience, they develop many of the skills important to understanding text (Baker & Brown, 1984).

Schema theory explains how existing knowledge influences comprehension. A schema is an abstract structure that represents the reader's acquired knowledge (Rummelhart, 1980). Schemata function as storage units that the reader can use to interpret new information and assimilate it into the existing knowledge base (Idol-Maestas, 1985).

The activation of schema has a strong influence on comprehension (Baker, 1985; Bransford & Johnson, 1972; Pearson & Spiro, 1980; Pichert & Anderson, 1977; Steffensen et al., 1979). Comprehension occurs when the reader is able to con-

struct schema that explains the whole message (Wilson & Anderson, 1986).

The influence of schemata on comprehension was dramatically illustrated by Bransford and Johnson (1972) by presenting ambiguous passages with and without appropriate contexts. Providing the appropriate context before the passage was read increased comprehension. This experiment demonstrates the need for a schema (a context) to account for the relations among the elements in the passage.

The information recalled after reading is also influenced by the particular schema that is activated prior to reading. Pichert and Anderson (1977) asked college students to take the perspective of either a burglar or a home buyer prior to reading a story. Subjects recalled different information about the same story depending on whether they took the perspective of a home buyer or a burglar. Subjects that were asked to shift perspective on a second recall attempt recalled more information than subjects who were not given an additional perspective. The authors suggested that the new perspective provided subjects with a plan for searching their memory.

Schema theory also provides a framework for explaining how readers become aware of comprehension failures (Capelli & Markman, 1982; Winograd & Johnston, 1982). The systematization of information into higher order structures, or schemata, makes it easier for readers to monitor their

comprehension of text. Readers with well organized knowledge structures are better able to "chunk" information (Miller, 1956), thus freeing capacity to allow for greater comprehension monitoring (Capelli & Markman, 1982). These readers use their knowledge structures to direct attention to important parts of text and to make inferences about text.

In addition, readers with well-developed knowledge structures about a passage's topic are more likely to approach text in a top-down manner (Bobrow & Norman, 1975). That is, the reader's knowledge base and expectations are likely to guide his or her interpretation of the text. The more expectations that the reader has about the text, the greater opportunities there are for these expectations to be confirmed or disconfirmed (Capelli & Markman, 1982). When the text fails to meet the reader's expectations "the monitoring process signals trouble" (Winograd & Johnston, 1982).

The above discussion illustrates the importance of schema theory to the conceptualization of comprehension monitoring and has practical implications for the assessment and facilitation of that process in readers. Problems with comprehension monitoring may be due to the reader's lack of background knowledge, the failure to use available knowledge, the use of inappropriate schemata or due to a combination of these factors. Each of these factors is discussed below.

One's ability to monitor comprehension may be impeded by unfamiliar content. Students may have difficulty inter-

preting the text without appropriate background knowledge. In a study by Steffensen et al. (1979), natives of India and America read two letters. These letters were both about two different kinds of weddings, one about an Indian wedding and the other about an American wedding ceremony. Subjects spent a longer time reading the non-native passage, remembered less about it and made more misinterpretations about the passage.

The lack of prior knowledge makes reading more laborious and understanding the text takes greater cognitive effort. Readers may have greater difficulty monitoring their comprehension since they lack the background knowledge that facilitates the interpretation of the text. Without prior knowledge the reader will likely have difficulty forming hypotheses about text. The reader must then rely heavily on "bottom-up" processing, or the information that flows from print (Bobrow & Norman, 1975).

When one lacks appropriate prior knowledge, it is important to recognize that a gap exists between the material to be comprehended and one's knowledge base (Baker & Brown, 1984). The reader may attempt to remediate the difficulty by engaging in strategic activities such as outlining the passage, rereading and consulting outside sources.

Given similar levels of background knowledge, Spiro (1979) found that some children use their background knowledge more than others. Sullivan (1978) reports that even some high school students experience difficulty relating

their prior knowledge to reading material. Young children and poor readers often fail to use spontaneously appropriate prior knowledge when reading (Capelli & Markman, 1982).

Evidence also suggests that poor readers use inappropriate schemata (Winograd & Johnston, 1982). Some LD students over-rely on top-down processes when interpreting text (Connor, 1983). These top-down processes are triggered by information encountered early in the text and these over-reliant readers ignore subsequent information that would contradict the original hypotheses about the text. Rather than testing "their hypotheses against all of the information in the text, these readers remain inflexible, appearing to misread the details in the text to confirm their hypotheses rather than to use the facts to discard them" (Connor, 1983, p. 37).

Some researchers theorize that if readers are encouraged to activate appropriate schemata they will be better able to interpret text (Capelli & Markman, 1982; Winograd & Johnston, 1982). One way of enhancing the relationship between the text and the reader's knowledge base is "to provide the learner with relevant background information, advance organizers, and useful schemata" (Wittrock, 1981, p. 246). Brown et al. (1977) provided children with frameworks for comprehending ambiguous passages read to them. These frameworks enhanced the readers understanding of the passages.

Summary and Implications

This discussion emphasizes the importance of schema in the comprehension process. While the influence of schema is clearly important to reading comprehension, the influence of schema activation and presentation on comprehension monitoring has received little attention in the literature. In theory, if readers are encouraged to generate expectations about text, comprehension monitoring should improve. Consequently, comprehension monitoring should be facilitated by encouraging readers to activate or generate appropriate schemata for passages prior to reading.

These schema activation and presentation activities may be particularly important to learning disabled readers. Learning disabled students may fail to actively engage in those processes necessary for understanding text. These readers often fail to attend to the macrostructure of text (Wong & Jones, 1982), tend to focus on decoding skills (Sachs, 1983), and exhibit poor comprehension monitoring skills (Bos & Filip, 1984; Wong, 1979b). Sachs (1984) states that "inefficient readers do not view reading as an act which relates to life experiences; to them, reading is often purposeless and meaningless [Reid & Hreski, 1981; Sachs, 1983], thus making comprehension difficult" (p. 226). Specific types of schema activation and schema presentation ac-

tivities need to be studied to determine their effectiveness in encouraging effective comprehension monitoring behaviors.

The Use of Pre-Reading Activities to Improve Comprehension

Pre-reading or "direction-setting activities" are often used by teachers to introduce students to a new topic before asking them to read independently (Beck, McCaslin & McKeown, 1981). Such instruction often includes a variety of activities designed to facilitate the interaction between the reader's prior knowledge and incoming information (Bean & Pardi, 1979). These activities are designed to prepare students to construct the meaning of a text by evoking a network of relevant associations (Beck, McCaslin & McKeown, 1981).

Although there are many ways to enhance readers' interactions with text, pre-reading activities are usually designed to either activate readers' schemata or to directly present readers with background information that will facilitate understanding. Wittrock (1981) distinguishes between these two methods: "One obvious way to try to enhance the relation between text and knowledge is to provide the learner with relevant background information, advance organizers, and useful schemata. Another way cues the reader to remember previously learned information relevant to comprehending the text" (p. 247).

This section reviews selected research on improving comprehension and comprehension monitoring through the use

of pre-reading activities. This section first reviews
studies that used structured overviews and self-questions to
improve comprehension. Second, two research studies concern-
ing the effectiveness of pre-reading activities on compre-
hension monitoring in average-achieving students are
reviewed.

Structured Overviews

Structured overviews such as advance organizers and
previews have received a great deal of attention in educa-
tional literature. Ausubel (1963) defined advance organizers
as "introductory material at a higher level of abstraction,
generality and inclusiveness than the learning passage it-
self" (p. 252). He hypothesized that "meaningful material
is learned by a student in relation to his or her existing
background of relevant concepts, principles, and information
which provide a framework for the reception of new material"
(Graves, Cook & Laberge, 1983).

Ausubel conducted the initial studies of advance
organizers, however hundreds of such studies have been con-
ducted since then. Research results have generally supported
the use of advance organizers to improve the comprehension
of the non-handicapped (Calfee & Drum, 1986; Klauer, 1984;
Pearson & Gallagher, 1983). Only recently have researchers
investigated the effectiveness of advance organizers with LD
students. Advance organizers have been effective in improving

the comprehension and learning of LD students in recent studies (Darch & Carnine, 1986; Darch & Gersten, 1986; Idol-Maestas, 1985; Lenz, Alley, & Schumaker, J., 1987).

Although advance organizers tend to assist most readers, they are most beneficial to low aptitude students and poor readers (Calfee & Drum, 1986; Idol-Maestas, 1985; Pearson & Gallagher, 1983). This is not surprising since poor readers are generally less able than good readers in attending to the macrostructure of text (Baker, 1985; Wong & Jones, 1982). Poor readers have difficulty identifying important ideas in text (Brown & Smiley, 1977; Meyer, Brandt, & Bluth, 1980; Smiley et al., 1977) and in distinguishing between ideas that are central and incidental to the theme of the text (Baker, 1985).

The effectiveness of advance organizers in improving the comprehension of adolescent LD students was investigated by Darch and Gersten (1986). They compared two direction-setting activities designed to increase high-school LD students' comprehension of important concepts during content area instruction. They found that the advance organizer approach was superior to the less structured basal approach to teaching comprehension. Similarly, Darch and Carnine (1986) evaluated the effectiveness of two approaches for teaching LD elementary students literal comprehension during content area instruction. They compared the presentation of content

through a visual-spatial advance organizer and a text. The visual-spatial display was found to be the superior method.

Idol-Maestas (1985) used an advance organizer in the form of an acronym to orient four elementary LD students to stories prior to reading them. The advance organizer required the students to guess the general story context from the title, scan the material for important words and clues to the context and determine whether the passage was fact or fiction. An analysis of performance on comprehension measures showed that students' average performance improved when they used the advance organizer.

Directive schema-based interventions were more effective than a less structured generative-learning intervention in increasing LD elementary students' reading comprehension performance on expository passages in a study by Carnine and Kinder (1985). The authors suggest that increasing students' attention to the structure of text is important. Further, they state that one goal of instruction is to make "the underlying structure of a particular body of information...apparent to the learner" (Carnine & Kinder, 1985, p. 29).

Other types of structured overviews and previews are based on principles similar to those underlying the advance organizer (Graves et al., 1983). Structured overviews prepare students for the general structure of the material to be learned and are less complex than advance organizers. They

are usually written in a language similar to the material to be presented and can be powerful in helping to establish a learning set (Hartley & Davies, 1976).

Overviews have generally had a positive effect on learning (Hartley & Davies, 1976). Structured overviews provide readers "with semantic knowledge prior to reading" (Graves et al., 1983, p. 265). When poor readers are helped to focus on relevant information, they are better able to select what is important. Tobias (1982) states that "any arrangement that increases students' macroprocessing of instructional input is likely to improve achievement" (p. 6).

The use of previews prior to reading a story was investigated by Sachs (1984) with elementary LD students. Each of the twenty-four subjects participated in two conditions: 1) a plans-and-goals conditions; and 2) a conceptual overview statement. The conditions were counterbalanced so that each subject experienced both conditions. The teacher conducted the plans-and-goals activity by asking questions that focused on the main character of the story. The subjects' responses to teacher-generated questions (e.g., "how is the main character going to accomplish the goals?") were recorded on chart paper by the teacher. In the control condition the teacher and student read the title of the story and the teacher briefly described what the story was about prior to reading. The results of this study demonstrated that the structured activity was more effective than the conceptual-overview

statement in facilitating performance on post-comprehension measures. Sachs (1984) concluded that "activities implemented prior to reading, which evoke prior knowledge, interest, and motivation, in addition to setting a reading purpose uplifts the inefficient reader's processing of information" (p.228).

In summary, structured overviews and organizers help students organize incoming material. Structured previews have the potential to provide and structure information for the reader as well as assist in the activation of relevant schemata. Learning disabled students benefit from approaches that provide for rehearsal of important information and concepts prior to reading.

Self-Questioning

The use of student-generated questions to improve students' prose processing has been of interest to researchers (Heldfeldt & Lalik, 1976; Marksberry, 1979; Singer, 1978; Singer & Donlan, 1982; Wong & Jones, 1982). The focus of self-questioning research from the schema perspective is in activating students' prior knowledge through their generation of self-questions (Wong, 1985b). While studies have taught students to use self-questions during reading, the focus of this review is on self-questions generated prior to reading a passage.

The use of teacher-generated questions is the most widely used method of teaching reading comprehension (Singer & Donlan, 1980) and comprises most of the research on questioning (Wong, 1985b). Experimenter and teacher-generated questions have improved the comprehension of average-achieving (Anderson & Biddle, 1975) and LD students (Wong, 1979b). However, a major limitation of teacher posed questions is that students read for the teacher's purposes and not their own (Singer & Donlan, 1982). An alternative to this method is to help students read to answer their own questions about text (Singer & Donlan, 1982). Asking questions prior to reading helps students focus attention on the passage and determine their own purposes for reading. Wong (1985b) states that "for students to be active comprehenders and independent thinkers, they must generate questions that shape, focus, and guide their thinking..." (p. 228).

The generation of self-questions prior to reading helps the reader activate prior knowledge and generate expectations about text. In order to generate questions, readers need to become actively involved in thinking about the passage topic prior to reading. Self-questions require readers to draw upon what they already know to formulate questions (Miyake & Norman, 1979). Thinking about the passage prior to reading should also help the reader develop expectations about what is likely to be found in the text. The confirma-

tion or violation of expectations is important to comprehension monitoring.

Since the generation of questions is dependent on the reader's pre-existing knowledge structures (Miyake & Norman, 1979), the reader has to know enough to ask relevant questions (Gavelek & Raphael, 1985; Singer & Donlan, 1982). Students lacking prior knowledge about a topic may have difficulty forming appropriate questions. Even if the student has the necessary knowledge to generate questions, directed assistance in forming relevant questions may be necessary.

Donlan and Singer (1982) found that the nature of the self-questions posed by students vary greatly and sometimes relate to irrelevant details of the passage. This finding led Singer and Donlan to investigate the effectiveness of providing a problem-solving schema with its accompanying schema-general questions to a group of high school students. The experimental group was taught to generate specific questions based on the problem-solving schema and the schema-general questions as they read complex short stories. The control group was asked to read to answer teacher-generated questions. The experimental group outperformed the control group on post comprehension measures. Singer and Donlan concluded that self-questions were used to form a bridge from one knowledge structure to another.

In summary, the potential value of student-generated questions is that they help the reader set purposes for

reading (Singer & Donlan, 1982), assist in the focusing of attention (Wong, 1985b), and assist readers in developing expectations about text by encouraging the reader to use what he or she already knows to formulate questions (Miyake & Norman, 1979). Structured overviews or schemata may be effective in stimulating readers to generate relevant questions about a passage. When readers generate self-questions based on structured overviews, they are already beginning to develop links between what they know and the particular ideas contained in the passage.

Facilitating Comprehension Monitoring

The use of pre-reading activities to facilitate comprehension monitoring has received limited attention in the literature. Winograd and Johnston (1982) tested the hypothesis that children would be more likely to notice an anomalous sentence in stories if they were provided with schema preparation before reading the story. In this study, elementary aged children were asked to tell the investigator the things that they might see in a circus or a church. However, schema preparation did not improve comprehension monitoring performance, leading the authors to conclude that the error detection measure did not provide an adequate test of this hypothesis.

Another explanation of Winograd and Johnstons' (1982) failure to find the expected results is that the schema-

activation task itself may have been ineffective (Baker, 1985). Pre-reading activities may take many forms and can rely on relatively unstructured or highly organized activities. Winograd and Johnstons' (1982) pre-reading task allows the child to respond to the investigator's question by activating prior knowledge about the given topic. In contrast, structured pre-reading information such as structured overviews and advance organizers rely on the teacher to present the key elements or underlying structure of the passage to the subjects. Further, some researchers have provided subjects with the opportunity to interact with the schema provided by the teacher (Sachs, 1984; Singer & Donlan, 1982).

Peeck et al. (1982) also studied the effects of a pre-reading activation strategy on children's comprehension monitoring using the error detection method. They embedded a 125 word expository passage about a fictitious heath fox with anomalous information. Half of the fifth-grade subjects were asked to write predictions about the habits of the foxes in the passage. The remaining subjects were asked to make predictions about a topic unrelated to the passage. The group that activated information relevant to the passage remembered more than the control group about the anomalous information.

Only two studies were found that investigated the effects of pre-reading activities on the comprehension monitoring of children. Further, no studies were found that

investigated the effectiveness of pre-reading activities on the comprehension monitoring of LD students.

Summary and Conclusions

Comprehension monitoring is an area of metacognition that involves the evaluation and regulation of one's attempts to understand written or spoken language. The focus of this review has concerned the evaluation phase of comprehension monitoring in reading. Comprehension monitoring is of particular relevance to students with learning disabilities since these students often approach tasks in a passive manner and lack organized, goal-directed strategies for learning.

Conceptual processes involved in metacognition and comprehension monitoring, selected comprehension monitoring studies and methodological issues in studying comprehension monitoring were reviewed in this chapter. In addition, the relevance of schema theory to the improvement of comprehension monitoring was also explored.

Since LD students and poor readers apparently do not evaluate spontaneously their own reading, an important area of investigation is how comprehension monitoring can be facilitated. Schema theory suggests that the activation or presentation of appropriate schema prior to reading should help the reader generate expectations and become actively involved with thinking about text prior to reading. Such pre-reading activities are helpful in improving the compre-

hension of students. However, the effects of pre-reading activities on comprehension monitoring has received little attention in the literature. This study investigates the effects of self-questioning and structured overviews on the comprehension monitoring of LD adolescents. The research hypotheses and methodology used in this study are outlined in chapter three.

Chapter 3

METHODOLOGY

Selected theories and research on metacognition and comprehension monitoring as they apply to reading and the learning disabled (LD) student are reviewed in chapters one and two. Past studies demonstrate that LD students and poor readers exhibit deficits in comprehension monitoring. LD students may not necessarily lack comprehension monitoring skill, rather they may fail to engage in the activities necessary for successful comprehension monitoring. The purpose of this study is to investigate the effects of pre-reading tasks on LD subjects' comprehension monitoring performance.

This chapter describes the research design, subjects, materials, research procedures, scoring procedures and data analyses that were used in this study.

Research Hypotheses

Three research hypotheses were used to guide this study. These hypotheses are based on schema theory which suggests that the activation of readers' prior knowledge should enhance LD students' ability to monitor their comprehension during reading. Further, these pre-reading activities are predicted to have a differential effect on subjects' recognition and comprehension of passage information during as-

sessments after reading. The three hypotheses stated in null form are shown below:

Ho[1]: There are no differences between pre-reading con-
ditions and the accuracy of error detection.

Ho[2]: There are no differences between pre-reading con-
ditions and the accuracy of recognition of passage
information.

Ho[3]: There are no differences between pre-reading con-
ditions and the accuracy of identification of
statement plausibility.

Subjects

The learning disabled subjects required for this inves-
tigation were selected from eight secondary schools in
Roanoke City and Roanoke County, Virginia. Forty-four sub-
jects were from the Roanoke City Schools and ten subjects
were from the Roanoke County Schools. All subjects were de-
termined to have a learning disability by an eligibility
committee. The Virginia State Department of Education re-
quires that an eligibility committee review psychological,
educational, medical and sociocultural data to determine
whether the student has a specific learning disability.

A total of fifty-four LD subjects (grades 9-12) between
the ages of 14 years and 5 months and 18 years and 11 months
were involved in the study. The average age of the subjects

was 16 years and 5 months. Thirty-nine of the subjects were male and 15 were female. More males were included in this study since a greater proportion of the LD population is male. The 54 subjects were drawn from initial subject pools of LD ninth, tenth, eleventh, and twelfth graders from the two school systems.

Initial Screening

One hundred and sixty-nine files of students enrolled in LD programs in grades 9-12 from Roanoke City and Roanoke County were screened to determine if they met the initial criteria related to intelligence, reading achievement, and certain exclusionary factors. These criteria are important in defining the LD population to be studied and for controlling variables that may affect subjects' performance on the experimental tasks. Students not meeting these criteria were excluded from the subject pool.

Seventy-six subjects from the two school systems met the initial verbal intelligence, reading comprehension and exclusionary criteria. These subjects had verbal IQ scores between 84 and 116 on the Wechsler Intelligence Scale for Children-Revised (WISC-R). In addition, reading comprehension measures (e.g. Woodcock Johnson Reading Tests; Peabody Individual Achievement Test) suggested that all subjects were able to comprehend material at least at the fifth-grade level, but below their expectancy levels.

Any subject who was previously diagnosed as or was suspected of being hearing impaired, physically handicapped, emotionally disturbed, bilingual, or having uncorrected visual impairment was excluded from the study. These data were obtained from teachers and confirmed by school records.

After the initial screening, two additional assessments were administered to the subject pool meeting the initial screening criteria to determine their eligibility for participation in the study. The Comprehension subtest of the Gates-MacGinitie Reading Test (1978) was administered to the seventy-six subjects meeting the initial screening criteria. This passage comprehension test was administered to determine subjects' general comprehension levels. The Gates-MacGinite comprehension test consists of nine paragraph-length stories, followed by multiple choice questions to assess students' comprehension of the stories. LD subjects were required to score at a grade equivalent of 5.0 or above. Subjects were also asked to read individually a randomly generated word list containing 25% of the words from the passages (see appendix C). This procedure was used to ensure that the subjects had the necessary sight vocabulary to read the material. Subjects who were able to identify 95% of the words and who met the stated comprehension criteria were included in the study.

Subject Assignment

The 54 LD subjects who met all of the predetermined criteria were randomly assigned to the experimental conditions. Mean verbal IQ and reading comprehension scores were computed for each experimental group after random assignment to groups. No statistically significant differences existed between the groups on verbal IQ, $F(2,51)=.06$, $p > .05$ and reading comprehension $F(2, 51)=.78$, $p > .05$. Specific means and standard deviations for the three groups on verbal IQ and reading comprehension are provided in Table 2. All subjects assigned to the groups participated in the study.

Research Design

Subjects were randomly assigned to the two pre-reading conditions and a control condition. Dependent variables were the number of errors detected and the number of statement identification task (SIT) items correctly identified. The detection of passage errors is an on-line measure of the subjects' comprehension monitoring. The SIT items are post assessment tasks of reading recognition and comprehension. Multivariate and one-way univariate analyses were used to test the stated research hypotheses. An overview of the study design is presented in Figure 1. A general description of the independent and dependent variables is included below.

Table 2

<u>Means (M) and Standard Deviations (SD) for Verbal IQ</u>
<u>and Reading Comprehension</u>

Pre-Reading Conditions	Verbal IQ*		Reading Comprehension**
1. Control	(M)	94.4	549.3
	(SD)	6.7	34.8
2. Self-Questioning	(M)	95.3	562.5
	(SD)	9.3	39.2
3. Structured Overview + Self-Questioning	(M)	95.1	562.6
	(SD)	6.8	35.3

*Wechsler Intelligence Scale for Children (WISC-R)

**Gates-MacGinite Comprehension Test (Means [M] and Standard Deviations [SD] are based on extended scaled scores [ESS]. These mean scaled scores translate into grade equivalents of approximately 7.4.).

INDEPENDENT VARIABLE   DEPENDENT VARIABLES

        <u>Pre-Reading</u>
        <u>Conditions</u>

                                            <u>First Passage</u>

1. Structured Overview +
   Self-Questioning (n=18)   Embedded Errors
                                           SIT 1   SIT 2

2. Self-Questions (n=18)
                                           <u>Second Passage</u>

3. Control (n=18)   Embedded Errors
                                           SIT 1   SIT 2

Figure 1. Study Design: Passages were counterbalanced by
          random assignment, such that half of the subjects
          in each condition read the monk seal passage
          first and the other half read the gorilla passage
          first.

Detailed information about these variables is included in the materials and procedures section of this chapter.

Independent Variable

Pre-reading activities were designed to activate subjects' prior knowledge and encourage them to think about content information related to the passages they read. Such activities were predicted to enhance subjects' comprehension monitoring during reading and improve their performance on recognition and comprehension tasks after reading. Subjects in all three conditions were informed that there might be problems in the passages. This is important since the failure to inform subjects of problems in text has been shown in previous studies to lead to an underestimation of comprehension monitoring (Baker, 1985; Baker & Brown, 1984a; Wagoner, 1983). A general description of the levels of the independent variable is included below.

1. <u>Self-Questioning (SQ)</u>. The self-questioning pre-reading activity provided subjects with an opportunity to formulate questions about the topic of the passage. Subjects were given who, when, where, what, why, and how prompts to use in formulating questions. These questions should help subjects create expectations about the text topic prior to reading.

2. Structured Overview + Self-Questioning (SO +SO). The structured overview provided subjects with a visual framework of the passage to be read. This overview was essentially a visual map of the topic and the subtopics of the passage. The examiner provided a verbal description of the framework as it was shown to the subject. Following this introductory activity, the subject was asked to generate questions about the passage. This self-questioning activity was designed to provide the subject with an opportunity to form expectations about the passage based on the framework provided by the examiner.

3. Control Condition. Subjects in the control condition were not given an opportunity to engage in pre-reading activities. Instead, they were asked a series of questions unrelated to the passage.

Dependent Variables

1. Detection of Passage Errors. Each passage contains four inter-sentence and four intra-sentence inconsistencies. Intra-sentence inconsistencies are embedded within a sentence and inter-sentence inconsistencies are embedded within adjacent sentences (see appendix A). Comprehen-

sion monitoring was assessed by analyzing the number of errors that the subject underlined as they read the text.

2. Statement Identification Tasks. Two types of statement identification tasks (SITs) adapted from Bowman and Davey (1986) were used to measure subjects' recognition and comprehension of the passage information (appendix B). The first set of SIT items was used to determine subjects' awareness of information in the passages. The second set of SIT items was used to measure subjects' awareness of the plausibility of passage information.

3. Question Generation, Probes and Interview Items. The number and types of questions generated in the two experimental pre-reading conditions were examined. Additional qualitative information was obtained by probing subjects about the sections of the text that they underlined. These probes were used to assess subjects' reasons for marking non-target information. In order to control for the effect of probes on subjects' subsequent performance, subjects' were probed only after both of the passages were read and the SIT items were administered.

Materials

The materials used to investigate LD subjects' comprehension monitoring included two passages and four sets of

statement identification tasks. Pre-reading materials included two passage topic cards, two structured overviews of the passages, puzzles of the overviews, a list of question starters and question recording sheets. Three scripts and a cassette recorder were used by the two examiners.

Passages

The materials used in this study included two expository passages of approximately 450 words in length. These two passages about monk seals and gorillas were developed by Bowman and Davey (1986) (see appendix A). The authors used a series of validation procedures to develop these passages which are described in appendix D. Both passages are written at the fifth-grade level using the Frye (1977) readability formula (Bowman & Davey, 1986).

Each passage is embedded with eight errors designed to create internal inconsistencies in the text. Two types of inconsistencies, intra-sentence and inter-sentence, were included in the passages. The following examples from the passages illustrate these types of errors:

Inter-sentence Inconsistency: Gorillas have large stomachs so they must eat a lot of food. Gorillas eat large amounts of green plants daily, to fill their tiny stomachs.

Intra-sentence Inconsistency: Monk seals are doomed to disappear, because people, sharks, and disease have made their future hopeful.

Each passage contained four inter-sentence and four intra-sentence inconsistencies. No errors were placed in the first paragraphs of the passages and errors were placed so that they did not interfere with each other. Errors were designed to be similar in both passages. The same passages were used across the conditions; however, the order in which the passages were used was determined by random assignment.

Statement Identification Tasks

Two types of SIT adapted from Bowman and Davey (1986) were used to measure subjects' recognition and comprehension of the passages (see appendix B). The order in which the SIT items appeared was determined by random assignment. Five types of items were included in the statement identification tasks. Both the SIT 1 and the SIT 2 tasks contained the following types of errors:

1. "Text-based/true statements (TB/T). True statements drawn verbatim from the passage.

2. Text-based/violated embedded error statements (TB/VEE). True statements drawn verbatim from the passage (text-based) containing information that was violated by an embedded error.

3. <u>Text-based/embedded error statements (TB/E)</u>. Embedded error statements drawn verbatim from the passage that contradicted previously stated information.

4. <u>Not text-based/true statements (NT/T)</u>. True statements about the topic drawn from a source other than the passage.

5. <u>Not text-based/false statements (NT/F)</u>. False statements about the topic drawn from a source other than the passage" (Bowman & Davey, 1986, 252).

<u>Pre-Reading Materials</u>

Cards listing the passage topics were used to orient all of the subjects to the content of the two passages. Two structured overviews of the passages and puzzles replicating these overviews were used to orient subjects' to the major themes of the passages in the SO + SQ condition. A list of question starters was used to provide subjects' in both pre-reading conditions with assistance in formulating questions (see appendix G). Question sheets were used by the examiners to record subjects' questions. These question recording sheets consisted of a blank sheet of paper for subjects in the SQ group and a structured overview sheet for subjects in the SO + SQ group.

Three prepared scripts (one for each condition) were used throughout the sessions (see appendix F). These scripts outlined in detail all verbal instructions and the use of the study materials. A cassette recorder was used to record each session.

Procedures

Pilot Study

A pilot study was conducted with six students prior to the study to determine the amount of time needed for the sessions and to assess the appropriateness of the materials, directions and probes. The probing procedure was revised and shortened due to subject fatigue and the redundancies of re-sponses.

Overview of Procedures

All 54 subjects were randomly assigned to one of three pre-reading conditions. Passage order was randomly assigned, such that half of the subjects in each condition received the gorilla passage first and the other half received the monk seal passage first. Subjects in each condition received the same introductory statement for both of the passages. Following the presentation of each passage, each subject received the two statement identification tasks. Subjects were probed and asked to respond to three interview items follow-

ing the presentation of both passages and SIT tasks. The sessions lasted approximately 40 minutes.

The entire procedure was conducted over twenty school days. The examiners met individually with subjects in a quiet place at their assigned schools. Both examiners used detailed scripts throughout the sessions (see appendix F). Information from the scripts was read in a conversational tone to the subjects. The experimental procedure was conducted during a single session and all sessions were tape-recorded.

Examiners

All procedures were conducted by two examiners. The investigator of this study was the first examiner and carried out all of the screening procedures. The first examiner completed the study with 37 of the subjects and the second examiner completed study procedures with 17 of the subjects. Subjects were randomly assigned to the experimenters so that each experimenter worked with subjects from all conditions.

The second examiner was a graduate student in psychology at Virginia Tech. Both examiners had previous experience in conducting studies with school age students. The investigator provided five hours of training to the second examiner. This training session involved an overview of the materials, script and study procedures. The investigator modeled the procedures for the second examiner with two students and ob-

served the examiner conduct the study with two additional students prior to the study. The second examiner performed the study procedures accurately during the training session. As a further precaution, four of the session tapes completed by the second examiner during the experimental sessions were reviewed by the investigator. The second examiner accurately carried out the directions outlined in the script during these four sessions.

Initial Directions to Subjects

Students were introduced to the study with a statement adapted from Bowman (1984) (see appendix F). This statement provided subjects with a rationale for the study. Additionally, a warm-up activity using the tape-recorder was conducted to establish rapport and to put the subjects at ease. All subjects had an opportunity to listen to themselves talk on the tape-recorder. Following this warm up activity each subject was given the following information:

> YOU WILL BE SERVING AS A CONSULTANT. I WOULD LIKE YOU TO HELP ME DETERMINE WHETHER TWO SHORT READING PASSAGES MAKE SENSE AND ARE UNDERSTANDABLE TO HIGH SCHOOL (OR JUNIOR HIGH) STUDENTS (subjects were given the same school level that they were in). I WANT YOU TO EVALUATE THESE PASSAGES CAREFULLY TO DETERMINE IF THEY MAKE SENSE. THESE PASSAGES MAY HAVE SOME PROBLEMS.

Introduction of Passage Topic

Subjects were introduced to the topic of the selection prior to the presentation of the passages. A title card was presented to the subject by the examiner and the subject was told the topic of the passage. Following the introduction of the topics, the assigned pre-reading activity (or the control condition) was implemented.

Experimental Conditions

1. Control Group. The control group did not participate in a pre-reading activity. Each subject was instead asked questions that were not related to the passage. Two sets of questions were randomly assigned to the two passages and were asked after the introduction of the passage topic. The two sets of questions appear in appendix F.

2. Self-Questioning Condition. Subjects in the self-questioning condition were asked to think for a minute about the questions they would like to ask about the passage topic. A list of question prompts was available for the subject to use in formulating questions (see appendix G). The examiner recorded the questions as they were generated by the subject on a blank sheet of paper.

3. <u>Structured Overview and Self-Questioning</u>. Subjects in the structured overview + self-questioning group were presented with a visual framework of the passage to be read. This gave the subject a visual overview of the topic and sub-topics of the passage. The examiner also reviewed the visual framework with the subject verbally, pointing to the relevant aspects of the visual framework as it was reviewed. Subjects were then asked to reconstruct the overview using puzzle pieces after they viewed the overview for one minute. This puzzle procedure was used to assure that subjects attended to the overview. Subjects were then asked to generate questions about the passage. A list of question prompts was available for the subject to use (see appendix G). The examiner recorded the questions as they were generated by the subject. These questions were recorded by the relevant area on the structured overview. Questions that did not relate directly to the structured overview were recorded at the bottom of the sheet.

General Directions For All Subjects

After the pre-reading and control conditions were completed, the examiner gave the subject a passage and a pencil and read the following directions:

I WANT YOU TO LISTEN AND FOLLOW MY DIRECTIONS
CAREFULLY. REMEMBER, YOU ARE A CONSULTANT. YOUR
JOB IS TO EVALUATE THIS PASSAGE CAREFULLY. PLEASE
READ THIS PASSAGE SILENTLY TO YOURSELF. I WANT YOU
TO UNDERLINE, AS YOU READ, ANYTHING THAT YOU THINK
DOES NOT MAKE SENSE OR THAT NEEDS TO BE CHANGED.
AFTER YOU HAVE FINISHED READING IT, YOU WILL BE
ASKED TO ANSWER SOME QUESTIONS ABOUT THIS PASSAGE.
YOU MAY ASK FOR HELP ON ANY WORDS THAT YOU CANNOT
PRONOUNCE.

Statement Identification Tasks

Immediately following the reading and marking of the

passages, all subjects were given the two statement iden-

tification tasks. Subjects were asked to follow along as

each of the statements was read to them. They were asked to

place a "+" or a "-" (SIT 1) or a T or an F (SIT 2) in each

of the boxes (see appendix B).

Use of Probes

Subjects were probed after both the passages and the SIT

items were completed. Probes were used to determine why some

subjects underlined non-target information. All subjects who

underlined non-target information were asked: "WHY DID YOU

UNDERLINE THESE WORDS?" All responses to probes were re-

corded by the examiners.

Interview Items and Final Comments:

Subjects were asked to respond to the following three

questions after the probes:

1. WHAT DID YOU DO WHILE YOU WERE READING TO UNDERSTAND
    THESE PASSAGES ABOUT MONK SEALS AND GORILLAS?

2. WHAT DO YOU DO IF YOU HAVE DIFFICULTY UNDERSTANDING WHAT
    YOU READ?

3. WHAT SHOULD TEACHERS DO TO HELP STUDENTS UNDERSTAND WHAT
    THEY READ?

After the subjects responded to these items, the examiner
stated the following to the subject: YOU HAVE DONE VERY
WELL. THANK YOU FOR YOUR HELP. I (MRS. BILLINGSLEY) WILL
BE BACK AGAIN IN FOUR TO SIX WEEKS TO EXPLAIN THE STUDY AND
ANSWER QUESTIONS.

Scoring Procedures

Embedded Inconsistencies

Each inconsistency correctly identified received one
point and subjects received a raw score equal to the number
of errors identified in each passage. Subjects were not pe-
nalized for marking non-target information, however, the
number of non-target words and phrases underlined was re-
corded for each passage.

Statement Identification Tasks

Subjects received one point for each correctly marked
SIT and no points for incorrectly marked items. Each subject
completed four SIT tasks, consisting of twenty items in each
task.

Number and Types of Questions Generated

The number and types of questions generated in the two pre-reading conditions were examined. A frequency count of the number of questions generated within each of the two conditions was made. Categories were established for these data based on a qualitative analysis of the responses.

Probes

All subjects received a score indicating the number of non-target information marked. Non-target information was determined to be any word or group of words that was not an embedded error. The reasons the subjects gave for underlining non-target text information was recorded. These data were categorized based on qualitative analyses of the responses.

Data Analyses

A repeated measures multivariate analysis of variance (MANOVA) was used for an overall test of the research hypotheses. This was determined to be the appropriate analytic tool, given the multiple dependent variables and the repeated passages and SIT tasks. Where MANOVA findings were significant using the Wilks Lambda statistic, one-way univariate analyses of variance (ANOVA) were performed for each dependent variable. For significant ANOVAs, the Student-Newman-

Keuls post hoc tests were used to determine which pair or pairs of means were statistically significant from one another. The level of significance for all statistical tests was set at .05.

As mentioned previously, the number and types of questions generated by the two pre-reading groups were tallied and categorized. Additionally, the reasons subjects gave for underlining non-target data, as well as the responses to interview questions were also categorized. These data were subjected to descriptive analyses.

Reliability

The Kuder-Richardson formula 20 (KR-20) was used to determine the reliability of the embedded error procedure and the statement identification tasks. Reliability coefficients for the embedded errors and SIT 1 and SIT 2 tasks were .86, .73, and .31 respectively. These coefficients will be discussed in chapter five. The reliability coefficients in Bowman's (1984) study for the three dependent variables were .81, .80, and .79 respectively. However, it should be noted that the reliability coefficients for the Bowman (1984) study were based on four passages and four sets of SIT tasks.

Chapter Summary

This chapter described in detail the methodology used in this study. The research design, subjects, materials,

research procedures, scoring procedures and procedures for data analysis were reviewed. Chapter four outlines the results of this study.

Chapter 4

RESULTS

This chapter provides analyses of the data acquired in this investigation. The overall analysis of the research hypotheses required a repeated measures multivariate analysis of variance (MANOVA). The MANOVA technique was used since it allows simultaneous consideration of the three dependent variables.

The results of the repeated measures MANOVA for conditions, passages and passages by condition are presented first. All MANOVA statistics are Wilks Lambda statistics. Following the presentation of the multivariate main effects, the one-way univariate tests and subsequent post hoc tests are then discussed for each of the three major dependent variables.

Following tests of the main hypotheses, subsequent MANOVA, one-way univariate and post hoc tests are reported on the effects of the pre-reading conditions on specific components of the dependent variables. These additional tests were completed to analyze separately the inter- and intra-sentence errors and the five types of SIT 1 items. Finally, descriptive findings from the question generation activity, the non-target information underlined and the interview questions are presented.

Data Presentation, Multivariate Analysis and Follow-up Tests

Results of the repeated measures MANOVA revealed statistically significant main effects for pre-reading conditions, $F(6,98)=5.08$, $p < .0002$, and passages, $F(3,49)= 20.26$, $p < .0002$. The condition by passage interaction was not significant, $F(6,98)= .76$ $p > .05$.

Since two of the main effects were significant, one-way univariate tests were used to analyze the effects of condition on the individual dependent variables. Significant ANOVAs were followed by Student-Newman-Keuls post hoc tests.

Passage Difficulty

Univariate follow-up tests demonstrated that subjects performed significantly better on measures of the gorilla passage than on measures of the monk seal passage for the embedded errors, $F(1,51)=11.23$, $p < .002$, the SIT 1 items, $F(1,51)=9.64$, $p < .01$, and the SIT 2 items, $F(1, 51)=59.88$, $p < .0002$.

Table 3 demonstrates that subjects identified more of the eight possible errors in the gorilla passage (M=5.16) than in the monk seal passage (M=4.16). Similarly in Table 4, subjects also correctly recognized more of the 20 SIT 1 items on the gorilla passage (M=17.56) than on the monk seal passage (M=16.61). Finally, Table 5 reveals that subjects identified more of the 20 SIT 2 items on the gorilla passage

Table 3

Means (M) and Standard Deviations (SD) for Embedded
Errors* by Condition

Pre-Reading Conditions		Passage		
		Gorilla	Monk	Total
Control	M	4.28	3.22	3.75 A**
	SD	2.24	2.51	2.41
Self-Questioning	M	5.11	3.78	4.44 A
	SD	2.74	2.46	2.66
Structured Overview + Self-Questioning	M	6.11	5.50	5.81 B
	SD	1.90	1.95	1.92
Total		5.16	4.16	4.66

 * Total possible embedded errors for each passage = 8
** Means with the same letter are not significantly
   different

Table 4

Means (M) and Standard Deviations (SD) for SIT 1*
Statements by Condition

Pre-Reading Conditions		Passage		
		Gorilla	Monk	Total
Control	M	16.00	15.11	15.56 A**
	SD	2.63	2.17	2.42
Self-Questioning	M	18.11	17.16	17.64 B
	SD	1.58	1.65	1.66
Structured Overview + Self-Questioning	M	18.56	17.56	18.06 B
	SD	1.69	1.62	1.71
Total		17.56	16.61	17.08

 * Total possible SIT 1 for each passage = 20

** Means with the same letter are not significantly
   different

Table 5

Means (M) and Standard Deviations (SD) for SIT 2*
Statements by Condition

Pre-Reading Conditions			Passage	
		Gorilla	Monk	Total
Control	M	15.72	13.78	14.75 A**
	SD	1.41	1.35	1.68
Self-Questioning	M	16.17	13.56	14.86 A
	SD	2.12	1.42	2.22
Structured Overview + Self-Questioning	M	15.72	14.38	15.06 A
	SD	1.81	1.88	· 1.94
Total		15.87	13.90	14.89

  * Total possible SIT 2 for each passage = 20

** Means with the same letter are not significantly
   different

(M=15.76) than on the monk seal passage (M=13.91). Thus, the gorilla passage was significantly easier for the subjects across all dependent measures. However, it is important to note that since the MANOVA for the interaction effect was not significant, the effects of the experimental conditions were similar for both passages. Passage difficulty is thus not an issue to consider in the remaining analyses.

Detection of Embedded Errors

The means and standard deviations for detection of embedded errors are presented in Table 3 for each condition. The univariate follow-up analysis yielded a statistically significant treatment effect, $F(2,51)=4.70$, $p < .02$. Student-Newman-Keuls comparisons revealed that subjects in the structured overview + self-questioning condition identified more of the embedded errors (M=5.80) than subjects in the self-questioning group (M=4.44) and in the control group (M=3.75).

Statement Identification Tasks

The means and standard deviations for the SIT 1 items are presented in Table 4 for each condition. The univariate follow-up analysis yielded a significant treatment effect for passage recognition, (SIT 1) $F(2,51)=13.09$, $p < .0002$. The subsequent post hoc test comparisons for the SIT 1 task revealed that subjects in the control condition (M=15.56) rec-

ognized less passage information than subjects in the self-questioning (M=17.64) and the structured overview + self-questioning (M=18.06) conditions.

The means and standard deviations for the SIT 2 items correctly identified are presented in Table 5. The univariate follow-up analysis was not statistically significant, $F(2, 51)=.22$, $p > .05$.

Additional Multivariate Analysis and Follow-up Tests

A MANOVA was used to determine the effects of the pre-reading conditions on the two types of embedded errors and the five types of SIT 1 items. Results of the MANOVA yielded a significant main effect for condition, $F(14,90)=2.63$, $p < .004$. Univariate results were then used to determine which of the variables were statistically significant. Once the sources of significance were found, post hoc tests were used to determine differences among pair of means.

Detection of Inter- and Intra-Sentence Errors

The means and standard deviations for the inter- and intra-sentence errors by condition are presented in Table 6. Each subject had an opportunity to find eight inter-sentence and eight intra-sentence errors. The univariate ANOVA yielded a significant intra-sentence error effect, $F(2,51)=5.18$, $p < .01$. However, the univariate follow-up results for inter-sentence errors was not statistically significant,

Table 6

Means (M) and Standard Deviations (SD) for
Identified Inter- and Intra-Sentence Errors*
by Condition

Pre-Reading Conditions		Types of Embedded Errors	
		Inter	Intra
Control	M	4.44 A	3.06 A**
	SD	1.89	2.53
Self-Questioning	M	5.17 A	3.72 A
	SD	2.33	2.56
Structured Overview + Self-Questioning	M	6.06 A	5.56 B
	SD	1.83	2.12

 * Total possible for each error type = 8

** Means with the same letter are not significantly
   different

F(2,51)=2.85, p > .05. Student-Newman Keuls comparisons of the intra-sentence means revealed that subjects in the structured overview + self-questioning condition identified more intra-sentence errors (M=5.56) than subjects in the self-questioning group (M=3.72) and the control group (M=3.06).

SIT 1 Item Types

The means and standard deviations for the five types of SIT 1 items are presented in Table 7. The one-way univariate follow-up analyses yielded significant effects for the text-based embedded error statements (TB/E), F(2,51)=5.85, p < .006, the not text-based true statements (NT/T), F(2,51)=7.20, p < .002, and the not text-based false statements (NT/F), F(2,51)=6.0, p < .005. Univariate analyses were not significant for the text-based true statements (TB/T), F(2,51)=1.70, p > .05, and the text-based violated embedded error statements (TB/VEE), F(2,51)=2.15, p > .05.

The Student-Newman-Keuls post hoc test for TB/E statements revealed that subjects in the control condition (M=3.94) recognized less of these statements than subjects in the self-questioning condition (M=5.0) and the structured overview + self-questioning condition (M=5.89). Control subjects also correctly identified fewer of the NT/T items (M=6.17) than the self-questioning (M=7.44) and the structured overview + self-questioning (M=7.44) subjects. The

Table 7

Means (M) and Standard Deviations (SD) for
SIT 1 Item Types

Pre-Reading Condition		TB/T	TB/EE	TB/VEE	NT/T	NT/F
Control	M	7.28 A	3.94 A	6.89 A	6.17 A	6.83 A**
	SD	.89	1.76	.96	1.69	1.42
Self-Questioning	M	7.67 A	5.0 B	7.22 A	7.44 B	7.94 B
	SD	.59	1.78	.94	.70	.23
Structured Overview + Self-Questioning	M	7.61 A	5.89 B	7.56 A	7.44 B	7.61 B
	SD	.50	1.57	.98	.86	.92

(Item Types spans TB/T, TB/EE, TB/VEE, NT/T, NT/F)*

 * Total possible for each type = 8

** Means with the same letter are not statistically
   significant

same pattern was found for the NT/F items. Subjects in the
control group identified fewer of these items correctly
(M=6.83) than subjects in the self-questioning group (M=7.94)
and the structured overview + self-questioning group
(M=7.61).

Additional Results

Analysis of Individual Errors

An analysis of subjects' detection of the individual
errors is presented in Appendix J. Inspection of these data
demonstrates that subjects generally identified more of the
inter-sentence gorilla errors than the other types of errors.
It also highlights the differences between the structured
overview + self-questioning group and the other two condi-
tions on the detection of intra-sentence errors. Further,
these data provide information regarding the relative diffi-
culty of each of the embedded errors. For instance, it ap-
pears that some of the items were identified by the majority
of the subjects while others were identified by less than
half of the subjects.

Questions Generated for the Passages

The number and types of questions generated by the two
pre-reading groups are displayed in Table 8. The types of
questions asked are categorized according to those that: 1)

Table 8

Self-questions generated by pre-reading conditions for both passages

Category of Self-Questions	Self-Questioning	Structured Overview + Self-questions	
Specifically included topics in structured overview	47 (23%)	214	(79%)
Generally related to topic, but did not include sub-topic information	128 (62%)	54	(20%)
Questions unrelated to topic and sub-topic of passages	32 (15%)	2	(1%)
Total Questions	207	270	
Mean Number	11.5	15	

specifically included sub-topic information from the structured overview; 2) generally related to the passage topic, but did not include sub-topic information; and 3) were unrelated to the topic and the structured overview. Questions in the third category did not directly deal with the passage topic and were sometimes nonsensical.

Examples of Questions Generated:

1) Questions that specifically included sub-topic information from the overviews:

   "What types of food do gorillas eat?"
   "How many gorillas live in family groups?"
   "What kinds of games do gorillas play in the day?"
   "How is their family different from humans?"
   "How do people kill the seals?"
   "What types of diseases do they get?"

2) Questions generally related to topic, but not in structured overviews:

   "What do gorillas look like?"
   "Do they beat each other up?"
   "How do they clean themselves?"
   "Where do the seals live?"
   "What's causing the seals to be extinct?"
   "How can we help the seals?"

3) Questions unrelated to topic and structured overviews:

   "How long is the story?"
   "What do people think of gorillas?"
   "How do people get them to the zoos?"
   "What are they being extinct at?"
   "Who wrote the passage?"
   "Do people take pictures of monk seals?"

As Table 8 demonstrates, subjects asked more questions
when first provided with a structured overview of the passage
(M=15) than when asked to generate questions based on the
passage topic (M=11.5). The focus of the questions generated
also differed between the two pre-reading groups. Inspection
of Table 8 shows that subjects in the structured overview +
self-questioning condition used the overview to formulate 79%
of their questions compared to only 23% in the self-
questioning group. Although the self-questioning group often
asked questions that were generally related to the topic
(62%), these questions were often not specific to the passage
content. Further, subjects in the structured overview +
self-questioning condition asked fewer unrelated questions
(1%) about the topic and overview than the self-questioning
only subjects (15%).

Non-Target Text Underlined

An analysis of the reasons that subjects gave for
underlining non-target words and phrases is provided in Table
9. Non-target words and phrases are not the embedded errors,
yet were underlined by the subjects. Most of the subjects
in all conditions underlined non-target words and phrases. A
total of 124 non-target words and phrases were underlined
(M=2.3 per subject).

A review of Table 9 indicates that subjects from all
conditions underlined non-target information. The subjects'

Table 9

Subjects' Reasons for Underlining Non-target Text
Information by Conditions

Subjects' Reasons	Pre-Reading Conditions		
	Structured Overview	Self-Questioning	Control
Information contradicted beliefs/not plausible	19	13	15
Passage information viewed as inconsistent	4	6	6
Specific words unknown or used incorrectly	5	4	6
Text made sense when probed	6	3	3
No reason given	4	3	4
Not categorical/ miscellaneous	6	10	8
Total	44	39	42

reasons for underlining text were similar across the three conditions. Based on a review of the descriptive data, it does not appear that the pre-reading activities had an effect on the underlining of non-target information. A detailed summary of subjects' reasons for underlining text is included in Appendix I.

The reasons given for underlining various words provide evidence that subjects monitored their comprehension using different standards of evaluation. The most frequently mentioned reasons for underlining non-target information suggest that certain subjects were using a prior knowledge standard of evaluation (n=47; 38%). The subjects' comments indicate that the underlined information did not seem plausible based on what they knew or believed about the passage topic. For instance, thirteen subjects apparently found it hard to believe "that gorillas play games."

Certain subjects also found non-target passage information to be inconsistent (n=16; 13%). These subjects were apparently using an internal consistency standard. One subject indicated his use of such a standard by stating, "if gorillas were kind and gentle, they would not play war games."

Subjects also underlined specific words that they did not understand or that they believed were incorrectly used in text, such as "doomed," "paint," and "bellow" (n=15; 12%). These subjects apparently recognized their failure to

understand these words or the use of these words in the passages.

When probed, some subjects indicated that the non-target information underlined made sense after a second review (n=11; 9%). Other subjects responded that they did not know why they underlined certain segments of text (n=11; 9%). In addition, some of the responses could not be categorized or did not fit into the above categories (n=24; 19%). For example, some subjects did not give a reason for underlining, but would raise questions like, "what time do the gorillas wake up?" Other subjects made statements that did not appear to be a reason for underlining, such as, "people need to learn to live with seals."

Interview Questions

The subjects' responses to the three interview questions are summarized by category in Tables 10, 11, and 12. Subjects sometimes mentioned more than one strategy. The responses to the interview questions provide a verbal measure of subjects' knowledge about reading strategies. The major categories of responses are discussed below.

In response to the first interview question, "what did you do as you were reading to understand these passages about monk seals and gorillas?", 29 (45%) of the subjects indicated that they "read", "reread" or "carefully read" the passage. Other types of strategies included: pay attention/concentrate

Table 10

Subjects' Responses to Interview Question 1

Interview Question 1: What did you do as you were reading
to understand these passages about monk seals and gorillas?

	Number of Responses	Percentage
Read/Reread/Reading Carefully	29	45
Pay attention/concentrate	8	13
Compared Parts of Text	8	13
Miscellaneous Strategic (look for things that do not make sense, find answers to questions, found the main ideas, used imagery)	9	14
Nothing/do not know	8	13
Miscellaneous	2	3
Total	64	100

Table 11

Subjects' Responses to Interview Question 2

Interview Question 2: What do you do if you have diffi-
culty understanding what you read?

	Number of Responses	Percentage
Reread it	32	48
Ask for help/ask questions	23	35
Miscellaneous Strategic: (use other resources, compare parts of text, put in my own words, read ahead)	6	9
Miscellaneous	2	3
Nothing, do not know	3	5
Total	66	100

Table 12

Subjects' Responses to Interview Question 3

Interview Question 3: What should teachers do to help students understand what they read?

	Number of Responses	Percentage
Discuss/explain it	23	40
Ask the students questions	7	12
Read to the students	7	12
Have students read more	4	7
Help them understand	4	7
Miscellaneous	4	7
Have students read out loud	2	3
Do not know	7	12
Total	58	100

(n=8; 13%); compared parts of text (n=8; 13%); and miscellaneous strategic responses (n=9; 14%). Eight (13%) of the subjects indicated that they did not know what strategies they used or that they did nothing to understand the passages.

Subjects' responses to the second interview question, "what do you do if you have difficulty understanding what you read?", included two major categories: reread it (n=32; 48%) and ask for help/ask questions (n=23; 35%). Some subjects reported miscellaneous strategic activities such as comparing parts of text and read ahead (n=6; 9%). Three subjects said "nothing" or "I don't know" (5%).

The third question asked, "what should teachers do to help students understand what they read?" Major categories of responses included: discuss/explain it (n=23; 40%); ask the student questions (n=7; 12%); and read to the student (n=7; 12%).

Chapter Summary

This chapter presented analyses of the data acquired in this investigation. Statistical evidence on the research hypotheses of the study and various descriptive statistics were presented. In addition, information concerning questions generated, non-target words and phrases underlined and interview items were outlined.

A repeated measures MANOVA was used to investigate the effects of pre-reading conditions on the accuracy of detection of embedded errors, the accuracy of recognition of passage information (SIT 1) and the accuracy of identification of statement plausibility (SIT 2). Since the MANOVA test was statistically significant, one-way univariate results were examined. Subsequent post hoc tests were used to evaluate the differences between means among the statistically significant univariate results. Post hoc tests demonstrated that subjects in the structured overview + self-questioning condition found significantly more errors than subjects in the self-questioning or the control condition. Further, subjects in the control condition identified fewer SIT 1 items than subjects in the two pre-reading conditions. There were no differences between the three groups in accuracy on the SIT 2 items.

Subjects in the structured overview + self-questioning condition generated more questions than the self-questioning group and most of the questions were related to the structured overview. The self-questioning subjects generated less focused questions.

Descriptions of the non-target information underlined and the interviews were also included in this chapter. A discussion of the significance of these findings is included in chapter five.

Chapter 5

SUMMARY, DISCUSSION AND CONCLUSIONS

A summary of the purposes and findings of this study are presented in this chapter. Following the summary, a discussion of the results of this investigation is provided. The conclusions and implications of this study for theory, future research and instructional practice are presented in the final section of this chapter.

Study Summary

The effects of pre-reading conditions on the comprehension monitoring and comprehension of LD adolescents were investigated in this study. The research hypotheses were derived from a review of selected theory and research concerning metacognition, comprehension monitoring, schema theory and learning disabilities.

The independent variable of this investigation, three levels of a pre-reading condition, was derived from schema theory. Schema theory suggests that the presentation and activation of schema prior to reading should help the reader generate expectations and facilitate active involvement with the text. Specific types of pre-reading tasks have been effective in improving the comprehension of average-achieving (Bean & Pardi, 1979; Calfee & Drum, 1986; Singer & Donlan, 1982) and LD students (Idol-Maestas, 1985; Sachs, 1984).

117

However, the use of such activities to improve comprehension monitoring has received limited attention in the literature. Further, no studies could be found which used pre-reading activities to facilitate comprehension monitoring in learning disabled students.

The dependent variables selected for investigation included measures of the subjects' ability to: 1) recognize problems in expository passages (detection of embedded errors); 2) recognize passage information (SIT 1); and 3) evaluate the plausibility of passage information (SIT 2). These variables were chosen because they assess comprehension monitoring processes during reading and how subjects perform on reading recognition and comprehension tasks after reading.

An experimental study was designed to investigate the effects of two pre-reading conditions on the comprehension monitoring and comprehension of 54 LD adolescents. Two specific types of pre-reading conditions were investigated: 1) self-questions; and 2) structured overviews combined with self-questions. A control condition also was used.

A repeated measures MANOVA was used to analyze the effects of the pre-reading conditions on the three dependent variables (embedded errors, SIT 1 and SIT 2). Since the MANOVA test was significant, one-way univariate results were examined. Subsequent post hoc tests determined which means or groups of means were significantly different from each

other. In addition, the questions generated, interviews and non-target information underlined were analyzed and reviewed.

Major empirical findings are: 1) subjects in the structured overview + self-questioning condition identified more embedded errors than subjects in either the self-questioning or the control condition; 2) subjects in the control condition recognized less passage information (SIT 1) than subjects in either the self-questioning or the structured overview + self-questioning condition; and 3) no statistically significant differences were found among groups in the identification of statement plausibility (SIT 2).

Discussion of Empirical Findings

Differences in Passages

Bowman and Davey (1986) used extensive piloting procedures to develop the passages used in this study. However, even though the passages were designed to be similar in topic, readability, interest, clarity, imageability and organization, there were still differences in the difficulty of the passages for the subjects in this study. These differences were also consistent across all of the measures. It is likely that the gorilla passage was more familiar to the readers and thus easier to understand. This underscores the importance of prior knowledge on subjects' comprehension monitoring.

Error Detection

The structured overview + self-questioning condition yielded significantly higher error detection performance than either the self-questioning or the control conditions. When the subjects were given the opportunity to attend to the macrostructure of the passage prior to reading and generate self-questions based on this structure, they identified significantly more embedded errors. The self-questioning activity was less effective than the structured overview + self-questioning activity in facilitating comprehension monitoring.

The differences among these groups suggests that the nature of the pre-reading task is an important consideration in the facilitation of comprehension monitoring. Some pre-reading tasks are more effective than others in facilitating comprehension monitoring. This finding is consistent with the results of two other studies in which researchers investigated facilitating error detection through pre-reading activities.

Peeck et al. (1982) found that a schema activation task was successful in facilitating the detection of errors in passages. The researchers found that asking subjects to write predictions about a topic prior to reading facilitated the detection of anomalous sentences in expository passages. In contrast, Winograd and Johnston (1982) found that a question

posed to subjects prior to reading was unsuccessful in facilitating error detection. They concluded that the failure to find expected outcomes resulted from methodological limitations in the error detection task. However, Baker (1985) suggested that Winograd and Johnston failed to consider the possibility that the particular orienting task used in the study was ineffective.

The above studies suggest that some pre-reading tasks activate readers' schemata more effectively than others. While the examiner's method of posing a question to subjects was not successful in improving comprehension monitoring in the Winograd and Johnston study, the written predictions had a significant effect in the Peeck et al. study. Similarly, findings from the present study suggest that the self-questioning activity alone was less effective than the structured overview + self-questioning condition in enhancing the comprehension monitoring of the LD subjects. Collectively, these studies suggest that specific types of schema activation and presentation activities are successful in facilitating comprehension monitoring.

The structured overview adds an important dimension to the pre-reading activity. Structured overviews provide readers with a macrostructure of the text. If readers are familiar with the major ideas of the text prior to reading, they can evaluate the extent to which each new sentence in the text can be integrated with the overall organization of

the text (Baker, 1985). This macrostructure may decrease the processing load since the readers do not have to identify or construct the organization of text. Readers should therefore be able to direct more of their attentional capacities to monitoring their understanding of the material (Baker, 1985).

Subjects identified more of the inter-sentence errors than the intra-sentence errors in all of the conditions. Further, there were no significant differences among the groups in the number of inter-sentence errors detected. Garner (1980, 1981) found that good readers identified more of the intra-sentence errors and fewer of the inter-sentence errors. Poor readers had difficulty identifying both types of errors. However, Bowman and Davey (1986), using some of the same passages as the present study with a similar population, found that subjects identified more of the inter-sentence than the intra-sentence errors. It is likely that the obvious nature of the inter-sentence errors made them easier to detect. An analysis of the individual errors is provided in Appendix J.

In summary, the data from this study suggest that comprehension monitoring can be facilitated by a brief pre-reading activity. LD subjects in the structured overview + self-questioning condition found significantly more errors after an orienting task than the other two experimental conditions. While the structured overview + self-questioning activity took only several minutes, it had a powerful effect

on subjects' comprehension monitoring. The data also demon-
strate that not all pre-reading activities facilitate com-
prehension monitoring. The self-questioning activity alone
did not significantly enhance LD subjects' detection of er-
rors. This finding is consistent with previous studies that
have attempted to facilitate comprehension monitoring. Col-
lectively, these studies suggest that the specific nature of
the pre-reading task is important to the facilitation of
comprehension monitoring.

Recognition and Comprehension Tasks (SITs)

The SIT 1 task was designed to assess subjects' aware-
ness of passage information. This task required the subjects
to determine whether particular statements were present in
the passage. This measure did not require the subjects to
integrate passage information or distinguish between factual
and non-factual information. It is a less demanding task
than the embedded error task in this sense.

Subjects in both of the pre-reading conditions accu-
rately identified more items on this task than subjects in
the control group. Although the self-questioning pre-reading
activity did not significantly affect the number of errors
detected among subjects in this condition, it did help them
recognize passage information.

It is important to note that subjects from all condi-
tions generally answered the majority of the SIT 1 items

correctly. The high level of performance on these tasks suggests that the passages were relatively easy for most of the subjects. The average reading level of the subjects was approximately the seventh grade level while the passages were written at a fifth grade level. Further, the SIT 1 task is simply a recognition task, which is decidedly easier than other comprehension measures.

No differences were found among the three groups in identifying statements of plausibility (SIT 2). This third dependent measure required subjects to determine what was true and false about the passages. However, given the low reliability of this measure (alpha level = .31), it is possible that there were differences in the comprehension levels of the three groups that the statement identification task failed to detect. Previous research suggests that pre-reading interventions assist average (Calfee & Drum, 1986; Klauer, 1984; Pearson & Gallagher, 1983) and LD readers (Carnine & Kinder, 1985; Idol-Maestas, 1985; Sachs, 1984) in comprehending text. Further, highlighting content that is central to the text has been shown to facilitate comprehension (Beck, Omanson, & McKeown, 1982; Wittrock, 1981). However, the relationship between comprehension monitoring and comprehension has not been clearly established in the literature. While this study included measures of both comprehension and comprehension monitoring, it is not possible to draw any conclusions on the relationship between the two measures

due to the poor reliability of the SIT 2 task. Further re-
search is needed to investigate the relationship between on-
line and post comprehension measures (Baker, 1982).

The low reliability of the SIT 2 measure contrasts sig-
nificantly with the reliability reported by Bowman (1984).
There may be several reasons for the differences in reli-
ability in the two studies. First, Bowman used 80 SIT 2
items, instead of the 40 used in this study. In general,
greater numbers of items tend to increase the reliability of
an instrument. Second, subject differences across the two
studies may have contributed to the differences in reliabil-
ity. Third, it is possible that the instrument itself is
limited. The SIT 2 items include not-text based statements
which may have been confusing to the subjects. Kerlinger
(1973) states that interpretations of ambiguous items "tend
to be random, and hence they increase the error variance and
decrease reliability" (p. 454). These items may have been
interpreted differently by the subjects which could increase
the error variance. In any event, the results of the SIT 2
items in this study are not readily interpretable, given the
the low reliability of these items.

Discussion of Pre-Reading Conditions

Structured Overview + Self-Questioning Condition

The structured overview + self-questioning condition significantly facilitated subjects' detection of embedded errors and the recognition of passage information. Further, these pre-reading activities also had a significant effect on the number and types of questions generated.

The structured overview + self-questioning activity could have facilitated comprehension monitoring by: 1) providing a framework for the major ideas in the text; 2) decreasing the processing load allowing greater attentional processes to be spent on the monitoring of text; 3) facilitating the creation of subjects' expectations about the text; and 4) providing a focus for self-questioning prior to reading.

Providing the macrostructure of the text may be particularly helpful for LD students and poor readers. Although finding the main ideas in text is an important skill, poor readers are often less sensitive than good readers to the main ideas in text (Bridge, Belmore, Moskow, Cohen & Matthews, 1984; Meyer, Brandt & Bluth, 1980; Smiley, Oakley, Worthen, Campione, & Brown, 1977). Wong (1979b) found that LD subjects were less likely than average-achieving readers to recall spontaneously important information in text.

The structured overview should also decrease the information processing load since the readers did not have to identify the major ideas in the text. Since semantic knowledge is provided through the overview, the subjects could then direct their attention to other knowledge sources and to evaluating information in the text.

The creation of reader expectations about text is also important to facilitating comprehension monitoring. When readers encounter material that contradicts their expectations, this should signal a "triggering event" that alerts the reader to a comprehension failure (Palincsar & Brown, 1984). Therefore, the more expectations that the reader has about the passage, the greater the opportunities for these expectations to be confirmed or disconfirmed (Capelli & Markman, 1982).

The overview itself likely contributed to the creation of expectations about text. Revealing the major text ideas gave the subjects a schema to use as they read. This schema should have created expectations in the reader. Providing a schema for the reader may be particularly important for LD readers, since these readers may lack the necessary background knowledge for comprehension and comprehension monitoring. Snider and Tarver (1987) suggest that LD students may not demonstrate adequate comprehension monitoring skill because of inadequate background knowledge.

The questions asked by the subjects prior to reading also should have helped create expectations about the passages. This claim is supported by the positive effect that the overview had on the number and types of self-questions generated. These questions created expectations in the reader about what is likely to be encountered in the text.

Subjects in the structured overview + self-questioning condition not only generated more questions than the self-questioning group, their questions were also focused on relevant aspects of the text. Most of the questions generated by the structured overview + self-questioning group related to the overview. In contrast, the self-questioning group generated fewer questions which were often not directly related to the passage topic. It may be the focused and organized nature of the questions generated by the structured overview + self-questioning group rather than the greater number of questions that had the greater influence on increased comprehension monitoring. Previous research suggests that in order for comprehension to improve, there must be coherence among the questions that are asked and the content and structure of the text (Singer & Donlan, 1982).

The combination of the structured overview and the self-questions should be considered the effective pre-reading condition in the present study. The effects of structured overviews alone on the detection of embedded errors were not

investigated in this study. Further research is needed to investigate this question.

Self-Questioning Condition

The questions generated by the subjects prior to reading were expected to be instrumental in helping the subjects establish purposes for reading, generate expectations about text and activate background knowledge. Although the self-questioning condition did not result in significantly higher error detection, the subjects in this condition did recognize significantly more of the passage information than the control group. The self-questioning task enhanced the recognition of passage information, however, it did not facilitate the comprehension monitoring process.

An analysis of the self-questions asked sheds some light on why the self-questioning process did not facilitate comprehension monitoring. The self-questions asked were often not focused on the important aspects of the passage. Subjects asked questions that were sometimes peripheral or completely unrelated to the topic. Therefore, it is unlikely that some of the questions asked helped create expectations about the text.

It could even be argued that unfocused self-questioning interferes with comprehension monitoring. Perhaps subjects used irrelevant or inappropriate schema generated by their self-questions as they read. The use of an inappropriate

context has been shown to interfere with post measures of comprehension (Townsend, 1980). Further, the activation of different schemata clearly has an influence on what is re-called after reading (Pichert & Anderson, 1977).

The evidence, however, suggests that the self-questioning condition did not interfere with comprehension monitoring. The mean number of errors generated for the self-questioning condition was higher than the control group. In addition, the fact that the self-questioning subjects recognized significantly more passage information than the control group suggests that subjects in the self-questioning group directed more of their attention to the text than the control group.

Control Condition

Subjects in the control condition recognized signi-ficantly fewer of the embedded errors than the structured overview + self-questioning group. They also recognized less of the passage information than both of the pre-reading groups. These subjects failed to detect many of the errors in text, even though they were told that the text might have problems. This suggests that these readers did not monitor spontaneously their comprehension. This finding is of par-ticular concern since the subjects clearly had the word re-cognition and the global comprehension skills to comprehend a passage at this level.

Although these subjects identified fewer embedded errors, they did notice some of the problems in text. In addition, the control subjects, like the pre-reading subjects identified non-target information that they did not understand. The observed frequencies for underlining non-target information were comparable among the three groups.

Additional Findings

Non-target Information Underlined

Most of the subjects in all of the conditions underlined non-target information. The types of non-target information underlined were diverse and in some cases difficult to categorize. An analysis of the non-target information and subjects' reasons for underlining the non-target information did not yield different patterns across the three groups. It is therefore unlikely that the pre-reading conditions had an effect on the types of non-target information underlined.

The non-target information underlined suggests that the subjects used different standards of evaluation during reading. Baker (1985) argued that the detection of different types of comprehension failures requires readers to use different standards of evaluation. Comprehension failures can involve particular words, particular sentences, relations between sentences, and relationships between larger units (Collins & Smith, 1982). For instance, text information that

violates the reader's beliefs requires the subject to compare text information with what is already known, while problems within the text require the reader to compare different parts of the text.

Subjects underlined non-target information such as: 1) words that they did not understand; 2) information that con- tradicted their prior knowledge; and 3) information that did not seem plausible. This suggests that subjects monitor their comprehension on tasks using a variety of standards of evaluation. Further, these subjects identified the types of failures that occur in ordinary reading situations.

Subjects did not know what some of the words in the passage meant. Subjects underlined words such as "doomed," "bellow," "infected," and "immune." Failure to understand words in text should signal a comprehension difficulty.

Some of the underlined non-target information contra- dicted the subjects' ideas and beliefs about information in the passage. This was particularly true for the gorilla pas- sage. A number of subjects seemed to have inaccurate ideas about gorillas and how they live. Since subjects were asked to underline anything that did not make sense, they would be expected to view text critically and to question information that contradicted their ideas and beliefs.

Subjects also did not find some of non-target passage information plausible. For instance, the non-target infor- mation most frequently underlined concerned the games that

young gorillas play. Eleven of the 54 subjects said that gorillas cannot play the types of games that children play, such as playing catch.

Some of the subjects were unable to give any reasons for underlining text. It is possible that some of these subjects felt compelled to underline something in the text given the study directions. A number of the subjects also found that the non-target information made sense after a second reading.

In summary, the non-target information underlined gives evidence that subjects are able to monitor their comprehension along several different dimensions. The detection of unknown words and seemingly implausible information indicates that subjects are evaluating their understanding of text. It is also likely that subjects underlined text that they might have accepted as plausible during normal reading situations. The task direction to "underline things that need to be changed" probably created a particularly critical attitude toward the text.

Interview Results

Three interview questions were asked to determine what strategies subjects used during reading and other strategies that they might be familiar with. These types of questions assess subjects' knowledge about the metacognitive aspects of reading and their awareness of strategies to achieve comprehension (Wagoner, 1983). Most of the subjects provided

general responses such as rereading and asking for help. Relatively few subjects reported specific strategic activities used during reading or when experiencing comprehension problems.

Subjects were only given one opportunity to respond to each of the interview questions. One could argue that additional probing might have revealed a greater awareness among subjects about reading strategies. However, subjects were asked about strategies from more than one perspective. They were asked to describe the strategies that they used during the experimental task and the strategies that they used when they had difficulties reading. The categories of subjects' responses were similar for both questions.

Previous research suggests that younger and poor readers are less likely than good readers to report awareness and to use comprehension strategies (Canney & Winograd, 1979; Forrest-Pressley & Waller, 1984; Myers & Paris, 1978). Gambrell and Heathington (1981) found that adult good readers were better able than disabled readers to report awareness of the reading process and repair strategies.

The responses to the interview items also were reviewed to determine if subjects reported spontaneously the use of the structured overview and self-questions to be helpful comprehension strategies. Only two subjects referred to these activities. The results of the interviews suggest that LD

subjects may be unaware of specific comprehension strategies and may benefit from explicit strategy training.

Conclusions and Implications

Theory and Research

The success of the structured overview combined with the self-questioning condition in facilitating comprehension monitoring supports the theory that the presentation and activation of schema has a positive effect on comprehension monitoring. In contrast, the self-questioning pre-reading condition only increased subjects' recognition of information in the passage and did not result in significantly increased monitoring performance. It thus seems clear that not all pre-reading tasks are equally effective in improving comprehension monitoring. The self-questioning condition in this study failed to significantly increase LD adolescents' comprehension monitoring. However, further research is needed to investigate the effects of different pre-reading tasks, materials and subjects on comprehension monitoring. In addition, the possible interactive effects of these variables need to be considered.

Comprehension monitoring in LD students can be improved through the use of a brief pre-reading condition. This suggests that LD students are not using available comprehension monitoring capabilities. This supports the notion that LD

students approach learning in a passive and inactive manner. However, these findings are encouraging in that the comprehension monitoring of these students can be facilitated with minimal intervention.

Suggestions for Further Research

This study provides the basis for further research in comprehension monitoring and learning disabilities. Since the design of this study combined structured overviews and self-questioning, is it not possible to determine whether the increase in error detection is due to the structured overview alone or due to the combination of the structured overview and self-questioning. Future studies could answer this question by investigating the effectiveness of the structured overview on the detection of embedded errors.

This study might also be extended to examine the effectiveness of these pre-reading conditions on other types of comprehension and comprehension monitoring tasks. The use of other types of errors would help determine whether the pre-reading conditions are effective with passages involving different types of errors. In addition to varying the types of errors in the text, future studies should include reliable recognition and recall comprehension measures in addition to the on-line measures. In this way the relationship between comprehension monitoring and comprehension tasks could be assessed.

Additional research also should consider the effects of other types of pre-reading activities on the comprehension monitoring of LD students, such as written predictions about text. These studies should also examine the interaction effects of different types of pre-reading conditions with difficult and easy expository and narrative passages.

Most of the comprehension monitoring studies in learning disabilities have been done with secondary students. Additional research might investigate the development of comprehension monitoring skills in readers of different ages and reading abilities. Snider and Tarver (1987) suggest that comprehension monitoring skills develop only after basic decoding, fluency and comprehension skills. Additional research might investigate the relationship of these prerequisite skills to comprehension monitoring in students by controlling for levels in students' reading development.

Most of the studies in comprehension monitoring have placed greater emphasis on subjects' awareness of comprehension failures than on the use of self-regulatory strategies to repair such failures (Wagoner, 1983). The primary purpose of this study was to investigate the evaluation phase of comprehension monitoring. The responses to interview questions in this study suggest that LD students may be unaware of self-regulatory strategies useful in comprehension. Future research should investigate LD subjects' knowledge of the reading process through in-depth interviews using a va-

riety of questions and probes. Think-aloud protocols, such as those described by Meyers and Lytle (1986) may give additional insight into the strategies used by LD readers. Further, future investigations should direct attention to the explicit training of comprehension monitoring, particularly the use of self-regulatory strategies.

This study used experimental procedures to study the comprehension monitoring of LD students. Researchers also need to investigate comprehension monitoring with tasks that more closely resemble those used in school. In addition, the use of natural settings involving teachers and groups of students should be considered.

It would be interesting to investigate the effectiveness of teaching self-directed pre-reading conditions on comprehension monitoring and comprehension. While the structured overview + self-questioning condition was successful in helping readers engage in the evaluation of text, the intervention required the examiners to provide the structure of the text to the readers. Ultimately, LD students need to learn to engage in these processes independently. LD students need to be taught to assess the macrostructure of text and to generate expectations about text prior to reading.

Specific instructional programs could be designed to teach LD students how to use titles, headings and subheadings to determine the major ideas contained in text. Titles and headings often provide clues about text particularly with

respect to the major ideas of text. However, readers often ignore these clues and miss important information about the high-level structure of the text (Collins & Smith, 1982).

Interventions also should be developed that teach LD readers how to generate their own macrostructure of text in the absence of such text aids. A variety of text clues signal important information in text such as type size, italics, expository text structures and words and phrases (Williams, 1986). Several researchers are beginning to investigate methods of assisting LD students in identifying important ideas in text (Englert & Thomas, 1987; Smith & Friend, 1986; Williams, 1986).

Further, the effectiveness of teaching LD students to make interpretations and form predictions about text based on the major ideas of text is another possible area of investigation. Explicit instruction in hypothesis formation and text interpretation will hopefully prove to help students develop greater control over their own learning in a variety of domains and settings.

Instructional Implications

The results of this study suggest some implications for the practitioner. An important finding of this study is that the comprehension monitoring of LD students can be improved through a brief pre-reading activity. This suggests that LD students do not use spontaneously the monitoring capacities

that they have available. Pre-reading conditions that present a structured overview of the major ideas in the text using a visual format and that provide the opportunity for students to generate questions about the overview should assist in facilitating comprehension monitoring in LD adolescents. The particular nature of the overview used is an important consideration since visual overviews have been more effective than other types of organizers, such as outlining (Anderson & Armbruster, 1984). Further, the generation of questions that lack such a focus will probably not be as effective in facilitating comprehension monitoring in these readers.

These types of pre-reading activities can be readily adapted for many types of text material. In addition, these types of activities are straight forward in nature and can be easily used in classroom settings. However, it should also be emphasized that the generalizability of these findings is limited to comparable subjects, materials and procedures used in this study.

REFERENCES

Anderson, J. R. (1975). <u>Cognitive psychology and its impli-
cations</u>. San Francisco, Freeman & Co.

Anderson, R. C., & Biddle, W. B. (1975). On asking people
questions about what they are reading. In G. H. Bower
(Ed.), <u>The psychology of learning and motivation</u>, (Vol.
9), New York: Academic Press.

Anderson, T. H., & Armbruster, B. B. (1984). Studying. In P.
D. Pearson, R. Barr, M. I. Kamil & P. Mosenthal (Eds.),
<u>Handbook of Reading Research</u>, (pp. 657-679). New York, NY:
Longman.

August, D. L., Flavell, J. H., & Clift, R. (1984). Compar-
ison of comprehension monitoring of skilled and less
skilled readers. <u>Reading Research Quarterly</u>, <u>20</u>(1),
39-53.

Ausubel, D. P. (1963). Cognitive structure and the facili-
tation of meaningful verbal learning. <u>Journal of Teacher
Education</u>, <u>14</u>, 217-222.

Ausubel, D. P. (1978). In defense of advance organizers. A
reply to the critics. <u>Review of Educational Research</u>,
<u>48</u>, 251-258.

Baker, L. (1979). Comprehension monitoring: Identifying and
coping with text confusions. <u>Journal of Reading Behavior</u>,
<u>11</u>, 366-374.

Baker, L. (1982). An evaluation of the role of metacognitive
deficits in learning disabilities. <u>Topics in Learning and
Learning Disabilities</u>, <u>2</u>, 27-35.

Baker, L. (1984). Spontaneous versus instructed use of
multiple standards for evaluating comprehension: Effects
of age, reading proficiency, and type of standard. <u>Jour-
nal of Experimental Child Psychology</u>, <u>38</u>, 289-311.

Baker, L. (1985). How do we know when we don't understand?
Standards for evaluating text comprehension. In D.L.
Forrest-Pressley, G.E. MacKinnon, & T.G. Waller (Eds.),
<u>Metacognition, cognition, and human performance</u>, (Vol. 1),
(p. 155). Academic Press, Orlando, Fla.

Baker, L., & Anderson, R. I. (1982). Effects of inconsistent
information on text processing: Evidence for comprehen-
sion monitoring. <u>Reading Research Quarterly</u>, <u>17</u>, 281-294.

141

Baker, L., & Brown, A. (1984). Cognitive monitoring in reading. In J. Flood (Ed.), <u>Understanding Reading Comprehension</u>. International Reading Association, Newark, Delaware.

Baker, L., & Stein, N. (1981). The development of prose comprehension skills. In C. Santa & B. Hayes (Eds.), <u>Children's Prose Comprehension: Research and Practice</u>. International Reading Association, Newark, Delaware.

Bauer, R. H. (1982). Information processing as a way of understanding and diagnosing learning disabilities. <u>Topics in Learning & Learning Disabilities</u>, <u>2</u>, 33-45.

Bean, T., & Pardi, R. (1979). A field test of a guided reading strategy. <u>Journal of Reading</u>, <u>23</u>, 144-147.

Beck, I. L., McCaslin, E. S., & McKeown, M. G. (1981). Basal readers' purpose for story reading: Smoothly paving the road or setting up a detour? <u>Elementary School Journal</u>, <u>81</u>, 156-160.

Beck, I., Omanson, J., & McKeown, M.G. (1982). An instructional redesign of reading lessons: Effects on comprehension. <u>Reading Research Quarterly</u>, <u>17</u>(4), 462-480.

Beebe, M. J. (1980). The effect of different types of substitution miscues on reading. <u>Reading Research Quarterly</u>, <u>15</u>, 324-336.

Bobrow, D. G., & Norman, D. A. (1975). Some principles of memory schemata. In D.G. Bobrow & A.M. Collins (Eds.), <u>Representation and understanding: Studies in cognitive science</u>. New York: Academic Press.

Bos, C. S., & Filip, D. F. (1982). Comprehension monitoring skills in learning disabled and average students. <u>Topics in Learning and Learning Disabilities</u>, <u>2</u>, 79-85.

Bos, C. S., & Filip, D. F. (1984). Comprehension monitoring in learning disabled and average students. <u>Journal of Learning Disabilities</u>, <u>17</u>(4), 229-233.

Bowman, J. (1984). <u>The effects of presentation mode on the comprehension monitoring behaviors of learning disabled adolescents</u>. Unpublished dissertation, University of Marlyland, College Park, Maryland.

Bowman, J. E., & Davey, B. (1986). Effects of presentation mode on the comprehension-monitoring behaviors of LD adolescents. Learning Disability Quarterly, 9(4), 250-257.

Bransford, J. D., (1979). Human Cognition. Belmont, CA: Wadsworth Publishing.

Bransford, J. D., & Johnston, M. K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. Journal of Verbal Learning and Verbal Behavior, 11, 717-726.

Bridge, C. A., Belmore, S. M., Moskow, S. P., Cohen, S. S., & Matthew, P. D. (1984). Topicalization and memory for main idea in prose. Journal of Reading Behavior, 16, 16-80.

Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in instructional psychology, (Vol. 1), (pp. 77-165). Hillsdale, N.J.: Erlbaum.

Brown, A. L. (1980). Metacognitive development and reading. In R. J. Spiro, B. C. Bruce & W. F. Brewer (Eds.), Theoretical issues in reading comprehension, (pp. 453-481). Hillsdale, N.J. Erlbaum.

Brown, A. L., Armbruster, B., & Baker, L. (1986). The role of metacognition in reading and studying. In J. Orasanu (Ed.)., Reading Comprehension: From Research to Practice, (pp. 49-76). New Jersey, Lawrence Erlbaum Associates.

Brown, A. L., Campione, J. C., & Barclay, C. R. (1979). Training self-checking routines for estimating test readiness: Generalizations for list learning to prose recall. Child Development, 50, 501-512.

Brown, A., Campione, J., & Day, J. D. (1981). Learning to learn: On training students to learn from texts. Educational Researcher, 10(2), 14-21.

Brown, A., & Palinscar, A. (1982). Inducing strategic learning from texts by means of informed, self-control training. Topics in Learning and Learning Disabilities, 2, 1-17.

Brown, A. L., & Smiley, S. S. (1977). Rating the importance of structural units of prose passages: A problem of metacognitive development. Child Development, 77(48), 1-8.

Calfee, R., & Drum, P. (1986). Research on teaching reading. In M. C. Wittrock (Ed.), Handbook of Research on Teaching Reading, (pp. 804-849). New York, MacMillan Publishing.

Canney, G., & Winograd, P. (1979). Schemata for reading and reading comprehension performance (Tech. Rep. No. 120). Champaign: University of Illinois, Center for the Study of Reading, April 1979 (ERIC Document Reproduction Service No. ED 164 521).

Capelli, C. A., & Markman, E. M. (1982). Suggestions for training comprehension monitoring. Topics in Learning and Learning Disabilities, 2, 87-96.

Carlson, S. A., & Alley, G. R. (1981). Performance and competence of learning disabled and high achieving high school students on essential cognitive skills (Research Report No. 53). Lawrence, KS: University of Kansas Institute for Research in Learning Disabilities.

Carnine, D., & Kinder, D. (1985). Teaching low-performing students to apply generative and schema strategies to narrative and expository material. Remedial and Special Education, 6(1), 20-30.

Carroll, J. B. (1970). The nature of the reading process. In D. Gunderson (Ed.), Language and reading: An interdisciplinary approach. Washington, D.C.: Center for Applied Linguistics.

Chan, L., Cole, P., & Barfett, S. (1987). Comprehension Monitoring: Detection and Identification of Text Inconsistencies by LD and Normal Students. Learning Disability Quarterly, 10(2), 114-124.

Cioffi, G. (1986). Relationships among comprehension strategies reported by college students. Reading Research and Instruction, 25(2), 220-231.

Collins, A., & Smith, E. E. (1982). Teaching the process of reading comprehension. In D.C. Detterman & R.J. Sternberg (Eds.), How and how much can intelligence be increased, (pp. 173-186). Ablex Publishing Corporation.

Connor, F. P. (1983). Improving school instruction for learning disabled children: The teachers college institute. Exceptional Education Quarterly, 4(1), 23-44.

Darch, C., & Carnine, D. (1986). Teaching content area material to learning disabled students. Exceptional Children, 53, 240-246.

Darch, C., & Gersten, R. (1986). Direction-setting activities in reading comprehension: A comparison of two approaches. Learning Disability Quarterly, 9, 235-243.

DiVesta, F. J., Hayward, K. G., & Orlando, V. P. (1979). Developmental trends in monitoring text for comprehension. Child Development, 50, 97-105.

Dreher, M. J., & Gambrell, L. B. (1985). Teaching children to use a self-questioning strategy for studying expository prose. Reading Improvement, 22(1), 2-21.

Englert, S. E., & Thomas, C. C. (1987). Sensitivity to text structure in reading and writing: A comparison between learning disabled and non-learning disabled students. Learning Disability Quarterly, 10(2), 93-105.

Erickson, L., Stahl, S., & Rinehart, S. (1985). Metacognitive abilities of above and below average readers: Effects of conceptual tempo, passage level, and error type on error detection. Journal of Reading Behavior, 17, 235-252.

Farnham-Diggory, S. (1977). The cognitive point of view. In D. J. Treffinger, J.K. Davis & R.E. Ripple (Eds.), Handbook of teaching educational psychology. New York: Academic Press.

Fisher, P. M., & Mandl. H. (1984). Learner, text variables, and the control of text comprehension and recall. In H. Mandl, N. Stein & T. Trabasso (Eds.), Learning and Comprehension of Text. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In B.C. Resnick (Ed.), The nature of intelligence. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Flavell, J. H. (1977). Cognitive Development. Englewood Cliffs, N.J.: Prentice-Hall.

Flavell, J. H. (1981). Cognitive monitoring. In W. P. Dickson (Ed.), Children's oral communication skills, (pp. 35-60). New York: Academic Press.

Flavell, J. H., & Wellman, H. M. (1977). Metamemory. In R.V. Kail & J.W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Erlbaum.

Forrest-Pressley, D. L., & Waller, T. G. (1984). Cognition, metacognition and reading. New York: Springer-Verlag, New York Inc.

Fry, E. (1977). A readability formula that saves time. Journal of reading, 48, 249.

Gambrell, L. B., & Heathington, B. S. (1981). Adult disabled readers' metacognitive awareness about reading tasks and strategies. Journal of Reading Behavior, 13, 215-222.

Garner, R. (1980). Monitoring of understanding: An investigation of good and poor readers' awareness of induced miscomprehension of text. Journal of Reading Behavior, 12, 55-64.

Garner, R. (1981). Monitoring of passage consistency among poor comprehenders: A preliminary test of the "piecemeal processing" explanation. Journal of Educational Research, 74, 159-162.

Garner, R., & Alexander, P. (1982). Strategic processing of text: An investigation of the effect on adults' question-answering performance. Journal of Educational Research, 75, 144-148.

Garner, R., & Anderson, J. (1982). Strategic processing of text: An investigation of the effect on adults' question-answering performance. Journal of Experimental Education, 50, 70-76.

Garner, R., & Kraus, C. (1981). Good and poor comprehender differences in knowing and regulating reading behaviors. Educational Research Quarterly, 6, 5-12.

Garner, R., & Kraus, C. (1982). Monitoring of understanding among seventh graders: An investigation of good comprehender-poor comprehender differences in knowing and regulating reading behaviors. Educational Research Quarterly, 6, 5-12.

Gavelek, J. R., & Raphael, T. E. (1985). Metacognition, instruction, and the role of questioning activities. In D. L. Forrest-Pressley, G. E. Mackinnon & T. G. Waller (Eds.), Metacognition, Cognition, and Human Performance. Orlando: Academic Press.

Gibson, E., & Levin, H. (1975). The psychology of reading. Cambridge, Mass.: MIT Press.

Gold, J., & Fleisher, L. S. (1986). Comprehension breakdown with inductively organized text: Differences between average and disabled readers. Remedial and Special Education, 7(4), 26-32.

Graves, M. F., Cooke, C., & Laberge, M. (1983). Effects of previewing difficult short stories on low ability junior high school students' comprehension, recall, and attitudes. Reading Research Quarterly, 18(3), 262-276.

Grice, H. P. (1975). Logic and conversation. In P. Cole & J.L. Morgan (Eds.), Studies in Syntax (Vol. 3). New York: Seminar Press.

Hagen, J., Barclay, C., & Newman, R. (1982). Metacognition, self-knowledge, and learning disabilities: Some thoughts on knowing and doing. Topics in Learning and Learning Disabilities, 2, 19-26.

Harris, P. L., & Kruithof, A., Terwogt, M. M., & Visser, P. (1981). Children's detection and awareness of textual anomaly. Journal of Experimental Child Psychology, 31, 212-230.

Hartley, J., & Davies, I. K. (1976). Preinstructional strategies: The role of pretests, behavioral objectives, overviews and advance organizers. Review of Educational Research, 46(2), 239-265.

Heldfelt, J. P., & Lalik, R. (1976). Reciprocal student-teacher questioning. The Reading Teacher, 30, 283-287.

Holt, H. H. (1964). How Children Fail. New York, Dell.

Idol-Maestas, L. (1985). Getting ready to read: Guided probing for poor comprehenders. Learning Disability Quarterly, 8, 243-254.

Just, M. A., & Carpenter, P. A. (1980). A theory of reading: From eye fixations to comprehension. Psychological Review, 87, 329-354.

Kerlinger, F. N. (1973). Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc.

Klauer, K. J. (1984). Intentional and incidental learning with instructional texts: A meta-analysis for 1970-1980. American Educational Research Journal, 21(2), 323-339.

Lenz, B. K., Alley, G. R., & Schumaker, J. B. (1987). Activating the inactive learner: Advance organizers in the

secondary content classroom. <u>Learning Disability Quarterly</u>, <u>10</u>(1), 53-68.

MacGinitie, W.H. (1978). <u>Gates-MacGinitie Reading Tests</u>. Chicago, Ill.: Riverside Publishing Company.

Maria, K., & MacGinite, W. H. (1982). Reading comprehension disabilities: Knowledge structures and non-accommodating text processing strategies. <u>Annals of Dyslexia</u>, <u>32</u>, 33-59.

Markman, E. M. (1977). Realizing that you don't understand: A preliminary investigation. <u>Child Development</u>, <u>50</u>, 986-992.

Markman, E. M. (1979). Realizing that you don't understand: Elementary school children's awareness of inconsistencies. <u>Child Development</u>, <u>50</u>, 643-655.

Markman, E. M. (1981). Comprehension monitoring. In W.P. Dickson (Ed.), <u>Children's oral communication skills</u> (pp. 61-84). New York: Academic Press.

Markman, E. M., & Gorin, L. (1981). Children's ability to adjust their standards for evaluating comprehension. <u>Journal of Educational Psychology</u>, <u>73</u>, 320-325.

Marksberry, M. L. (1979). Student questioning: An instructional strategy. <u>Educational Horizons</u>, <u>57</u>, 190-196.

Marsh, G. E., Gearheart, C., & Gearheart, B. (1978). <u>The Learning Disabled Adolescent: Program Alternatives in the Secondary School</u>. Saint Louis, C. V. Mosby Company.

Meyer, B. J. F., Brandt, D. M., & Bluth, G. J. (1980). Use of top-level structure in text: Key for reading comprehension of ninth-grade students. <u>Reading Research Quarterly</u>, <u>16</u>, 72-103.

Meyers, J., & Lytle, S. (1986). Assessment of the learning process. <u>Exceptional Children</u>, <u>53</u>(2), 138-144.

Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. <u>Psychological Review</u>, <u>63</u>, 81-97.

Miller, J. W., & Isaksen, R. L. (1978). Contextual sensitivity in beginning readers. <u>The Elementary School Journal</u>, <u>78</u>, 325-331.

Miyake, N., & Norman, D. A. (1979). To ask a question, one must know enough to know what is not known. _Journal of Verbal Learning and Verbal Behavior, 18_, 357-364.

Myers, M., & Paris, S. G. (1978). Children's metacognitive knowledge about reading. _Journal of Educational Psychology, 70_, 680-690.

Ngandu, K. (1977). What do remedial high school students do when they read? _Journal of Reading, 21_, 231-234.

Palincsar, A. S. (1986). Metacognitive strategy instruction. _Exceptional Children, 53_(2), 118-124.

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. _Cognition and Instruction, 1_(2), 117-175.

Paris, S. G., Cross, D. R., & Lipson, M. Y. (1984). Informed strategies for learning: A program to improve children's reading awareness and comprehension. _Journal of Educational Psychology, 76_,(6), 1239-1252.

Paris, S. G., & Myers, M. (1981). Comprehension monitoring, memory, and study strategies of good and poor readers. _Journal of Reading Behavior, 13_, 5-22.

Paris, S. G., & Oka, E. R. (1986). Self-regulated learning among exceptional children. _Exceptional Children, 53_(2), 103-108.

Pearson, P. D., & Gallagher, M. C. (1983). The instruction of reading comprehension. _Contemporary Educational Psychology, 8_, 317-344.

Pearson, P. D., & Spiro, R. J. (1980). Toward a theory of reading comprehension instruction. _Topics in Language Disorders, 1_, 71-98.

Peeck, J., Van Den Bosch, A. B., & Kreupeling, W. J. (1982). Effect of mobilizing prior knowledge on learning from text. _Journal of Educational Psychology, 74_, 771-777.

Pichert, J. W., & Anderson, R. C. (1977). Taking different perspectives on a story. _Journal of Educational Psychology, 69_, 309-315.

Rayner, K. (1978). Eye movements in reading and information processing. _Psychological Bulletin, 85_, 618-660.

Reid, D. K., & Hresko, W. P. (1981). <u>A Cognitive Approach to Learning Disabilities</u>. New York: McGraw-Hill.

Robinson, H. A. (1978). <u>Teaching Reading and Study Strategies: The Content Areas</u> (2nd ed.). Boston: Allyn & Bacon.

Ross, A. O. (1975). <u>Psychological aspects of learning disabilities and reading disorders</u>. New York: McGraw-Hill.

Rummelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), <u>Theoretical issues in reading comprehension</u>. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Ryan, E. B. (1981). Identifying and remediating failures in reading comprehension: Toward an instructional approach for poor comprehenders. In G.E. Mackinnon & T.G. Waller (Eds.), <u>Reading research: Advances in theory and practice</u>. New York: Academic Press.

Sachs, A. (1983). The effects of prereading activities on learning disabled students' reading comprehension. <u>Learning Disability Quarterly</u>, <u>6</u>, 248-251.

Sachs, A. (1984). Accessing scripts before reading the story. <u>Learning Disability Quarterly</u>, <u>7</u>, 226-228.

SAS Institute Inc. (1985). <u>SAS user's guide: Statistics, Version 5 Edition</u>, (956 pp.). Cary, N.C.: SAS Institute.

Scardamalia, M., & Bereiter, C. (1984). Development of strategies in text processing. In H. Mandl, N. Stein, & T. Trabasso (Eds.), <u>Learning and Comprehension of Text</u>, (pp. 379-406). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Schnotz, W. (1984). Comparative instructional text organization. In H. Mandl, N. Stein & T. Trabasso (Eds.), <u>Learning and Comprehension of Text</u>, (pp. 53-82). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Simons, H. D. (1971). Reading comprehension: The need for a new perspective. <u>Reading Research Quarterly</u>, <u>6</u>, 340-363.

Singer, M. H. (1978). Active comprehension: From answering to asking questions. <u>The Reading Teacher</u>, <u>31</u>, 901-908.

Singer, H., & Donlan, D. (1982). Active comprehension: Problem-solving schema with question generation for comprehension of complex short stories. <u>Reading Research Quarterly</u>, <u>17</u>, 166-186.

Slife, B. D., Weiss, J., & Bell, T. (1985). Separability of metacognition and cognition: Problem-solving in learning disabled and regular students. Journal of Educational Psychology, 77(4), 437-445.

Smiley, S., Oakely, D., Worthen, D., Campione, J., & Brown, A. (1977). Recall of thematically relevant material by adolescent good and poor readers as a function of written versus oral presentation. Journal of Educational Psychology. 69, 381-387.

Smith, H. K. (1967). The responses of good and poor readers when asked to read for different purposes. Reading Research Quarterly, 3, 53-84.

Smith, P. L., & Friend, M. (1986). Training learning disabled adolescents in a strategy for using text structure to aid recall of instructional prose. Learning Disabilities Research, 2, 38-44.

Snider, V. E. (1987a). A response to Hallahan and Lloyd. Journal of Learning Disabilities, 10, 157-159.

Snider, V. E. (1987b). Use of self-monitoring of attention with LD students. Journal of Learning Disabilities, 10, 139-151.

Snider, V. E., & Tarver, S. G. (1987). The effect of early reading failure on acquisition of knowledge among students with learning disabilities. Journal of Learning Disabilities, 20(6), 351-356.

Spiro, R. J. (1979). Etiology of reading comprehension style. In M. Kamile & A. Moe (Eds.), Schooling and the Acquisition of Knowledge. Hillsdale, N.J.: Lawrence Erlbaum.

SPSS Inc. (1983). SPSS user's guide. Chicago, Ill.: McGraw-Hill.

Stanovich, K. (1982). Individual Differences in the Cognitive Processes of Reading: II. Text-Level Processes. Journal of Learning Disabilities, 15, 549-554.

Steffensen, M. S., Joag-dev, C., & Anderson, R. C. (1979). A cross-cultural perspective on reading comprehension. Reading Research Quarterly, 15, 10-29.

Sullivan, J. (1978). Comparing strategies of good and poor comprehenders. Journal of Reading, 21, 710-715.

Swanson, H. L., & Cooney, J. B. (1985). Strategy transformation in learning disabled and nondisabled students. <u>Learning Disability Quarterly</u>, <u>8</u>, 221-230.

Tarver, S. G., Hallahan, D. P., Kauffman, J. M., & Ball, D. W. (1976). Verbal rehearsal and selective attention in children with learning disabilities: A developmental lag. <u>Journal of Experimental Child Psychology</u>, <u>22</u>, 375-385.

Tobias, S. (1982). When do instructional methods make a difference. <u>Educational Researchers</u>, <u>11</u>(4), 4-9.

Torgesen, J. K. (1977). The role of nonspecific factors in the task performance of learning-disabled children: A theoretical assessment. <u>Journal of Learning Disabilities</u>, <u>10</u>, 27-34.

Torgesen, J. K. (1982). The learning disabled child as an inactive learner: Educational implications. <u>Topics in Learning and Learning Disabilities</u>, <u>2</u>, 45-52.

Torgesen, J. K. (1985). Memory processes in reading disabled children. <u>Journal of Learning Disabilities</u>, <u>18</u>(6), 350-357.

Torgesen, J. K., & Goldman, T. (1977). Rehearsal and short-term memory processes in second grade reading disabled children. <u>Child Development</u>, <u>48</u>, 56-61.

Torgesen, J. K., Murphy, H. A., & Ivey, C. (1979). The influence of an orienting task on the memory performance of children with reading problems. <u>Journal of Learning Disabilities</u>, <u>12</u>, 43-48.

Townsend, M. A. R. (1980). Schema activation in memory for prose. <u>Journal of Reading Behavior</u>, <u>12</u>, 49-53.

Wagoner, S. A. (1983). Comprehension monitoring: What is it and what we know about it. <u>Reading Research Quarterly</u>, <u>17</u>, 328-346.

Wechsler, D. (1974). <u>Manual for the Wechsler Intelligence Scale for Children--revised</u>.New York: Psychological Corporation.

Weinstein, C., & Mayer, R. (1986). The teaching of learning strategies. In M. C. Wittrock (Ed.), <u>Handbook of Research on Teaching Reading</u>. New York: MacMillan Publishing.

Wiens, J. (1983). Metacognition and the adolescent passive learner, <u>Journal of Learning Disabilities</u>, <u>16</u>(3), 144-149.

Williams, J. P. (1986). Teaching children to identify the main idea of expository texts. Exceptional Children, 53(2), 163-168.

Wilson, P. T., & Anderson, R. C. (1986). What they don't know will hurt them. In J. Orasanu (Ed.), Reading Comprehension: From Research to Practice, (pp. 31-48). New Jersey: Lawrence Erlbaum Associates.

Winograd, P., & Johnston, P. (1982). Comprehension monitoring and the error detection paradigm. Journal of Reading Behavior, 14, 61-76.

Wittrock, M. C. (1981). Reading comprehension. In F. J. Pirozzolo & M. C. Wittrock (Eds.), Neuropsychological and cognitive processes in reading, (pp. 229-259). New York: Academic Press.

Wong, B. Y. L. (1979a). Activating the inactive learner: Use of questions/prompts to enhance comprehension and retention of implied information in learning disabled children. Learning Disability Quarterly, 3, 29-37.

Wong, B. Y. L. (1979b). Increasing retention of main ideas through questioning strategies. Learning Disability Quarterly, 2, 42-47.

Wong, B. Y. L. (1979c). The role of theory in learning disabilities research: Part I. An analysis of problems. Journal of Learning Disabilities, 12, 585-595.

Wong, B. Y. L. (1985a). Metacognition and learning disabilities. In D.L. Forrest-Pressley, G.E. Mackinnon, & T. Gary Waller (Eds.), Metacognition, cognition, and human performance, Vol. 2. New York: Academic Press.

Wong, B. Y. L. (1985b). Self-questioning instructional research: A review. Review of Educational Research, 55(2), 227-268.

Wong, B. Y. L. (1986). Metacognition and special education: A review of a view. Journal of Special Education, 20(1), 9-28.

Wong, B. Y. L., & Jones, W. (1982). Increasing metacomprehension in learning disabled and normally achieving students through self-questioning training. Learning Disability Quarterly, 5, 228-240.

APPENDIX A

Experimental Passages with Embedded Errors Identified

From: Bowman, J. E., & Davey, B. (1986). Effects of presen-
     tation mode on the comprehension-monitoring behaviors
     of LD adolescents. <u>Learning Disability Quarterly</u>, <u>9</u>,
     250-257.

155

APPENDIX A

Experimental Passage A

Note: Embedded Errors have been marked with a slash

Within Sentence Embedded Errors = W

Between Sentence Embedded Errors = B

Gorillas

Gorillas are pictured as savage beasts in many books and movies. New studies of gorillas paint a different picture of this animal. Scientists say that gorillas are not savage beasts. Most gorillas are gentle giants.

In the wild, gorillas live in family groups. These groups have 6 to 16 members. It is rare to see a single gorilla, because gorillas like to live alone. /W A typical family has several mature males, the females, /W and their young. Adult male gorillas, called silver-backs, are the females over 10 years of age. These males are the leaders of the family. The oldest and strongest male rules the family.

Gorillas lead simple lives. Gorilla families feed early in the day and they spend the rest of the day taking naps in their nests. They build sleeping nests on platforms of branches in the tops of tall trees or on the ground. The sturdy nests are made of grass, leaves, and bushes, and these strong nests will support the weight of several gorillas. These nests are very fragile. /B Gorillas build their nests at dusk every evening. Then they climb into the nests and sleep

until morning. Gorillas arise at dawn and begin to search for food at night. /W

Gorillas spend most of their lives eating plants and sleeping in their nests. They eat tender vines, ferns, herbs, and leaves. Gorillas use their hands to break leaves into small bite-size pieces. They rarely bite off plants directly with their jaws. Gorillas have large stomachs so they must eat a lot of food. Gorillas eat large amounts of green plants daily, to fill their tiny /B stomachs. Gorillas do not like to eat meat. Although gorillas eat green plants, most gorillas eat meat. /B

In the wild, gorillas take a rest in the middle of the day. During this rest time, it is too hot to go searching for food. The gorillas get into their nests to sleep, doze, or sit around. Since gorillas like to have clean fur, they clean themselves, and they also groom each other daily. Gorillas are dirty /B animals. Young gorillas use the rest period for playing and exploring. Active young gorillas run and play among the resting adults. They play games with other young ones. Young gorillas seldom rest during the middle of the day because they spend their entire rest time sleeping. /W Favorite games are playing catch or keep-away with some object. Some young gorillas like to play war games and defend a tree stump or hill against the invasion of others. Many gorilla games are like the games played by children.

APPENDIX A

Experimental Passage B

Note: Embedded Errors have been marked with a slash

Within Sentence Embedded Errors = W

Between Sentence Embedded Errors = B

Monk Seals

The monk seals of Hawaii are almost extinct. Once, thousands of these seals played along the shore of the Hawaiian islands. Less than a hundred monk seals are alive today. People, sharks, and diseases have caused problems for the monk seals.

Monk seals are disappearing because they have not learned how to live around people. Monk seals once lived in safety on islands far out in the ocean. These islands were their mating areas and were never /B safe places to raise their young. Monk seals living on these islands were tame and they did not learn to fear humans. The monk seals were unfriendly /B to people. They did not learn to run away from people, and hunters killed them easily. Thousands of seals were killed for food and hunters sold their skins. Finally, laws were passed to stop the hunters. These laws were too late to save the seals from extinction, so now, monk seals are plentiful. /W

Monk seals cannot live around people for another reason. Mother monk seals react badly to people. When monk seals are feeding their babies, people disturb the mother seals. When seals see people, they reject their babies, and they start /W taking care of their young. Mother seals watch the visitors.

The disturbed mother seals will bellow for hours. They are so disturbed that they forget to feed their young, and the baby seals die because they are not fed. Now the whole species is in danger, because so many baby seals over-eat. /B

People are the greatest enemy of monk seals. At least, the seals have learned to avoid people. When people invade the seals' territory, the seals move to islands farther out in the sea. Now seals avoid many of their safe breeding grounds.

People are not the only threat to monk seals. Sharks are an enemy, too. Sharks are a great friend to seals. /B Many seals have survived shark attacks. These seals have scars from shark bites. Often, sharks kill seals before they can swim to shore. Sometimes, seals may be wounded so badly that they die on the beach. Since people have taken over the safe islands, many seals are born on offshore sandbars. These baby seals are not safe, because sharks lurk nearby in the deep waters. When the tide changes, the sharks kill the newborn seals. People have driven the seals closer to their natural enemy, the shark.

Monk seals have another enemy, too. A strange disease has killed thousands of these seals. The monk seals catch a disease from eating sick fish. Seals get sick when they eat fish that are infected with this deadly disease, because seals are immune to the disease. /w Many seals die from eating these sick fish.

Monk seals are doomed to disappear, because people, sharks, and disease have made their future hopeful. /w The monk seals will be extinct within 10 years.

APPENDIX B

Statement Identification Tasks

.

Adapted from: Bowman, J. E., & Davey, B. (1986). Effects of
presentation mode on the comprehension-
monitoring behaviors of LD adolescents.
Learning Disability Quarterly, 9, 250-257.

160

APPENDIX B

READ ALOUD

<u>Experimental Passage A</u>

<u>Gorillas</u>

Statement Identification Task (SIT) #1

SET 1   Question: Which statements were in the passage you just read?

Directions: Follow along as each of these statements is read to you.

o   Place a + in the box <u>if</u> the statement was in the passage.

o   Place a - in the box <u>if</u> the statement was <u>not</u> in the passage.

Error
<u>Type</u>   <u>Key</u>

NTB/T   -   ☐   *1. Female gorillas usually weigh
                            200 pounds.

TB/VEE   +   ☐   2. Gorillas have large stomachs, so
                            they must eat a lot of food.

TB/T   +   ☐   3. Scientists say that gorillas are
                            not savage beasts.

TB/VEE   +   ☐   4. Gorillas arise at dawn to search
                            for food.

NTB/T   -   ☐   *5. Most gorillas live in Africa.

TB/EE   +   ☐   6. Most gorillas eat meat.

TB/EE   +   ☐   7. Gorillas are dirty animals.

NTB/T   -   ☐   8. Gorillas are the largest type of great apes.

TB/T   +   ☐   9. Many gorilla games are like the games played by children.

NTB/F   -   ☐   *10. Most male gorillas are 9 feet tall.

TB/T   +   ☐   11. Gorillas live in family groups in the wild.

NTB/F   -   ☐   12. Male gorillas care for the young gorillas.

NTB/T   +   ☐   *13. Gorillas from different families avoid each other.

TB/EE   +   ☐   14. Gorillas like to live alone.

TB/VEE   +   ☐   15. Adult male gorillas are called silver-backs.

TB/T   +   ☐   16. Gorillas use their hands to break leaves into small bite-size pieces.

TB/VEE   +   ☐   17. Young gorillas spend their entire rest time sleeping.

NTB/F   -   ☐   18. Gorillas have long tails.

TB/VEE   +   ☐   19. Gorilla nests are strong and will support the weight of several gorillas.

NTB/F   -   ☐   20. Mountain gorillas are in danger of becoming extinct.

---

* Additional item added to original SIT task.

APPENDIX B

READ ALOUD

<u>Experimental Passage A</u>

<u>Gorillas</u>

Statement Identification Task (SIT) #2

SET 2   Question: Which statements are <u>TRUE</u> about gorillas?

Directions: Follow along as each of these statements is read to you.

   o   Place a T in the box <u>if</u> the statement is <u>TRUE</u>

   o   Place a F in the box <u>if</u> the statement is <u>FALSE</u>

Error Type	Key		
TB/T	T	☐	1. Young gorillas like to play war games.
TB/T	T	☐	2. Gorillas are pictured as savage beasts in many books and movies.
TB/T	T	☐	3. Gorillas eat vines and leaves.
TB/EE	F	☐	4. Gorilla nests are very fragile.
NTB/T	T	☐	5. Gorillas do not have hair on their face, hands, and feet.
TB/EE	F	☐	6. Silver-backs are females over 10 years of age.
NTB/F	F	☐	*7. Gorillas stay in the same nests each night.

TB/T	T	☐	*8. Many gorilla games are like the games played by children.
NTB/T	T	☐	9. There are two types of gorillas in tropical Africa.
TB/VEE	T	☐	10. Gorillas pass up chances to eat meat.
TB/EE	F	☐	11. Gorillas search for food at night.
NTB/F	F	☐	12. Female gorillas gather food for the gorilla family.
TB/VEE	T	☐	*13. Gorillas clean their fur daily.
TB/EE	F	☐	*14. Gorillas like to live alone.
NTB/F	F	☐	15. Gorillas have six toes on each back foot.
TB/EE	F	☐	16. Gorillas eat large amounts of green plants daily, to fill their tiny stomachs.
TB/VEE	T	☐	17. It is rare to see a single gorilla.
NTB/F	F	☐	*18. Gorillas are noisy animals.
TB/T	T	☐	19. Gorillas spend most of their lives eating and sleeping.
TB/VEE	T	☐	20. Young gorillas seldom rest during the middle of the day.

---

* Additional item added to original SIT task.

APPENDIX B

READ ALOUD

Experimental Passage B

Monk Seals

Statement Identification Task (SIT) #1

SET 1   Question: Which statements were in the passage you just read?

Directions: Follow along as each of these statements is read to you.

o   Place a + in the box if the statement was in the passage.

o   Place a - in the box if the statement was not in the passage.

Error Type	Key		
NTB/T	+	☐	*1.Some seals live 40 years or more.
TB/T	+	☐	2. Monk seals have three main enemies.
TB/T	+	☐	3. Mother monk seals react badly to people.
NTB/T	-	☐	4. Monk seals have no natural defenses against enemies.
TB/EE	+	☐	5. The whole species is in danger, because so many baby seals overeat.

TB/VEE	+	☐	6. Seals catch a disease from eating sick fish.
TB/EE	+	☐	7. Monk seals have a hopeful future.
NTB/F	-	☐	*8. The largest seal is the monk seal.
TB/T	+	☐	9. Thousands of monk seals were killed for food.
NTB/F	-	☐	*10. Some seals dive underwater to avoid their enemies.
TB/VEE	+	☐	11. When monk seals see people, they reject their babies.
TB/VEE	+	☐	12. Sharks are an enemy to monk seals.
TB/EE	+	☐	13. Islands were never safe places for monk seals to raise their young.
TB/T	+	☐	14. Many seals are born on offshore sandbars.
NTB/T	-	☐	*15. Seals rarely have hair on their bodies.
NTB/F	-	☐	16. Monk seals hunt and kill dolphins.
NTB/F	-	☐	17. Now monk seals are seen off the coast of California.

TB/EE   +   ☐   18. Monk seals were unfriendly to
                                people.

TB/VEE   +   ☐   19. Laws were passed too late to save
                                the seals from extinction.

NTB/T   -   ☐   20. Monk seals have webbed flippers,
                                and they can swim rapidly.

---

* Additional item added to original SIT task.

APPENDIX B

READ ALOUD

<u>Experimental Passage B</u>

<u>Monk Seals</u>

Statement Identification Task (SIT) #2

SET 2   Question: Which statements are <u>TRUE</u> about monk seals?

Directions: Follow along as each of these statements is read to you.

o   Place a T in the box <u>if</u> the statement is <u>TRUE</u>

o   Place a F in the box <u>if</u> the statement is <u>FALSE</u>

Error Type	Key		
TB/EE	F	☐	1. When monk seals see people, they start taking care of their young.
TB/VEE	T	☐	2. Islands were once safe places for monk seals to raise their young.
NTB/T	T	☐	3. Monk seals sometimes kill and eat sea birds.
NTB/T	T	☐	4. Monk seals have large brains and are intelligent.
NTB/F	F	☐	*5. Monk seals are usually killed for food.
TB/EE	F	☐	6. Monk seals are immune to disease.

TB/T	T	☐	7. Monk seals were used for food.
NTB/F	T	☐	*8. Monk seals have gray coats.
TB/VEE	T	☐	9. Many baby seals die because they are not fed.
TB/T	T	☐	10. Less than a few hundred monk seals are alive today.
NTB/F	F	☐	11. Monk seals are used in the circus.
TB/EE	F	☐	*12. Monk seals were unfriendly to people.
TB/EE	F	☐	13. Monk seals are now plentiful.
NTB/F	F	☐	14. Monk seals have four to six babies each year.
TB/T	F	☐	*15. Laws were passed to stop the hunters.
TB/T	T	☐	16. Monk seals once lived on the Hawaiian Islands.
TB/VEE	T	☐	17. At one time, monk seals were tame.
TB/EE	F	☐	18. Sharks are a great friend to monk seals.

TB/VEE   T   ☐   19. Monk seals are doomed to disap-
pear.

TB/T   F   ☐   20. Monk seals will be extinct
within 10 years.

---
* Additional item added to original SIT task.

APPENDIX C

Sight Word List

Appendix C

Sight Word List

1. extinct	32. sold	62. islands	92. disappear
2. once	33. laws	63. less	93. learned
3. along	34. save	64. hundred	94. fear
4. diseases	35. young	65. alive	95. people
5. problems	36. species	66. people	96. hunters
6. monk	37. over-eat	67. hopeful	97. doze
7. killed	38. enemy	68. dirty	98. clean
8. easily	39. green	69. use	99. groom
9. thousands	40. meat	70. period	100. daily
10. pieces	41. middle	71. exploring	101. react
11. jaws	42. searching	72. ferns	102. when
12. stomachs	43. gorillas	73. leaves	103. feeding
13. extinction	44. pictured	74. small	104. safety
14. plentiful	45. savage	75. ocean	105. safe
15. reason	46. beasts	76. places	106. offshore
16. weight	47. sleeping	77. young	107. sandbars
17. fragile	48. favorite	78. care	108. tide
18. changes	49. games	79. mother	109. swim
19. natural	50. rare	80. disturbed	110. shore
20. thousands	51. single	81. forget	111. wounded
21. territory	52. because	82. spend	112. badly
22. sharks	53. typical	83. naps	113. beach
23. scars	54. paint	84. simple	114. search
24. infected	55. different	85. feed	115. tender
25. immune	56. animal	86. build	116. climb
26. grass	57. scientists	87. dusk	117. sleep
27. bushes	58. branches	88. evening	118. morning
28. several	59. sturdy	89. strongest	119. catch
29. males	60. called	90. family	120. object
30. leaders	61. over	91. seals	121. war
31. food			

APPENDIX D

Passage Development Procedures

APPENDIX D

Passage Development Procedures

The two expository passages used in this study were developed by Bowman and Davey (1986). The following information on the development of the passages was modified from Bowman (1984). Each passage contains a brief beginning paragraph of approximately four sentences and the passages contain six paragraphs. Each passage has an average of 43 sentences and contains approximately 26 simple sentences, 8 compound sentences and 9 complex sentences. These passages were generated using the following pre-piloting and validation procedures (Bowman & Davey, 1986).

Passage Topic

Passages about animals were chosen by Bowman (1984) since they proved to be of interest to high school students. She verified interest level by interviewing 20 adolescent LD students. The following sources of information were used in the development of the passages: World Book Encyclopedia, National Geographic World magazines, and Grzimek's Animal Life Encyclopedia.

Passage Readability

The readability of each passage was determined to be within a range of 5.0 and 5.5 grade level using the Fry Readability Graph (1977 revised). Decodability was established and val-

idated with a sample of 10 average sixth-grade students who read each of the six original passages orally while a teacher-observer recorded words which students could not pronounce. Words which were difficult to pronounce were replaced with familiar synonyms suggested by the teacher-observer.

Validation of Passage Comparability

Adult and student judges were used to validate comparability of specified passage features for the original passages. The adult judges were trained reading specialists. These judges were asked to rate the original six passages which did not contain embedded inconsistencies. They rated each passage using a four point rating scale with 1 indicating a low rating and 4 indicating a high rating. Each passage was rated on a) interest, b) clarity, c) imagability and d) organization. The following means were reported by the adult raters on the two passages:

	Interest	Clarity	Imageability	Organization
Gorillas	3.16	3.83	4.0	3.33
Monk Seals	3.16	3.33	3.5	2.83

Ten sixth grade student judges read the initial six pre-pilot passages without embedded inconsistencies. They were asked to respond orally to four questions. Their responses to the four questions about monk seals and gorillas are included below.

	Monk Seals	Gorillas
1) Which passage was the most interesting?	3	1
2) Which passage was least interesting?	0	0
3) Which passage was hardest to read?	1	1
4) Which passage was easiest to read?	2	0

Passage Inconsistencies

Bowman (1984) embedded each passage with eight contradictory errors. Each passage had four intra-sentence and four inter-sentence errors. No embedded errors were placed in the first paragraphs of passages. Embedded errors were placed throughout the passages so they would not interfere with other error placements. Care was taken to insure comparability of form class features of embedded errors across passages. Embedded errors belong to the following form class: nouns, verbs, adjectives, and adverbs.

Passage A Monk Seals		Passage B Gorillas	
Embedded Errors	Form Class	Embedded Errors	Form Class
never	adverb	alone	adverb
unfriendly	adverb	females	noun
plentiful	adjective	fragile	adverb
start	verb	night	noun
over-eat	verb	tiny	adjective
friend	noun	meat	noun
immune	adjective	dirty	adjective
hopeful	adverb	sleeping	adverb

```
        nouns = 1                nouns = 3
        verbs = 2                verb = 0
      adverbs = 3              adverbs = 3
    adjectives = 2           adjectives = 2
```

APPENDIX E

Development of Statement Identification Tasks

APPENDIX E

Development of Statement Identification Tasks

The statement identification tasks used in this study were adapted from Bowman and Davey (1986). Two statement identification tasks were used for each of the two experimental passages in this study. Each statement identification task contains twenty statements, sixteen developed by Bowman and Davey (1986) and four developed by the investigator in this study. The following validation procedures were used by Bowman (1984) to assess the appropriateness of the SIT categories and items.

SIT Item Validation

A panel of three reading specialists rated Bowman's (1984) SIT items to determine the appropriateness of the statement items for each category type. Judges read the passages containing the marked embedded errors and then matched the statements to the five error types. Agreement of judges is depicted below for the two SIT tasks.

Proportion of Agreement by Judges Rating SIT Categories:

Passage	Statement Identification Task	
	(SIT #1)	(SIT #2)
Gorillas	95.83	95.83
Monk Seals	85.33	91.66

APPENDIX F

Examiners' Script

EXAMINERS' SCRIPT

GORILLA PASSAGE

Necessary Materials

The following materials are needed to gather the data:

1) Labeled subject envelopes: (Includes: gorilla and monk seal passages; gorilla and monk seal SIT items; probe recording sheet; structured overview/question recording sheet; plain paper as necessary for each condition; and tapes).

2) Scripts for the three conditions.

3) Researcher Packets: (Includes title cards, question card, structured overview, structured overview puzzles, and pencils for subjects.)

4) Watch or clock with second-hand.

5) Tape-recorder.

6) Do Not Disturb sign for door.

Directions to Investigator

(Read instructions [in capital letters] to subjects in a conversational tone. The remainder of the text contains directions that will be used in conducting the activity. The entire session, beginning with the general introduction, will be tape-recorded.)

Initial Directions to Subjects in all Conditions

YOU WILL BE TAKING PART IN A STUDY WHICH WILL HELP TEACHERS PLAN INSTRUCTION FOR STUDENTS. MORE INFORMATION WILL BE SHARED WITH YOU IN FOUR TO SIX WEEKS AND I (MRS. BILLINGSLEY) WILL ANSWER YOUR QUESTIONS THEN. YOUR NAMES WILL NOT BE RELEASED TO OTHERS OR REPORTED IN THIS STUDY. THIS IS NOT A TEST AND THE RESULTS WILL NOT RAISE OR LOWER ANY OF YOUR GRADES. I APPRECIATE YOUR HELP IN THIS STUDY. THESE ACTIVITIES WILL BE TAPE-RECORDED.

Warm-Up Activity for all Conditions

(Allow the subject to listen to himself/herself on the tape-recorder.)

General Introduction for All Conditions

YOU WILL BE SERVING AS A CONSULTANT. I WOULD LIKE YOU TO HELP ME DETERMINE WHETHER TWO SHORT READING PASSAGES MAKE SENSE AND ARE UNDERSTANDABLE TO HIGH SCHOOL (OR JUNIOR HIGH) STU-DENTS (subjects will be given same school level that they are in). I WANT YOU TO EVALUATE THESE PASSAGES CAREFULLY TO DE-TERMINE IF THEY MAKE SENSE. THESE PASSAGES MAY HAVE SOME PROBLEMS.

Self-Questioning Condition

(Point to the title card).

YOU ARE GOING TO READ A STORY ABOUT GORILLAS AND HOW THEY LIVE. THINKING OF YOUR OWN QUESTIONS BEFORE AND AS YOU READ OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

(Point to the title card).

WHAT ARE SOME QUESTIONS THAT YOU WOULD LIKE TO ASK ABOUT THIS TOPIC?

(Point to list of question starters).

HERE ARE SOME QUESTION STARTERS. QUESTIONS OFTEN BEGIN WITH WHO, WHAT, WHEN, WHERE, HOW, AND WHY. YOU CAN ALSO USE OTHER STARTERS IF YOU LIKE. TAKE A MINUTE TO THINK TO YOURSELF ABOUT SOME QUESTIONS YOU WOULD LIKE TO ASK.

(Investigator waits one minute. The investigator can pro-ceed before the one minute limit if the subject clearly seems ready to proceed).

O.K., NOW ASK AS MANY QUESTIONS AS YOU CAN ABOUT THIS TOPIC AND I WILL RECORD YOUR QUESTIONS HERE.

(The investigator records the questions that the subject says. When the subject appears to be finished, the inves-tigator will ask:)

ARE THERE ANY OTHER QUESTIONS THAT YOU WOULD LIKE TO ASK?
GOOD JOB. THINKING OF YOUR OWN QUESTIONS BEFORE AND AS YOU
READ OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

   (The questions will remain within the view of the subject
   while he/she reads the passage).

Structured Overview + Self-Questioning Condition

   (Point to title card).

YOU ARE GOING TO READ A STORY ABOUT GORILLAS AND HOW THEY
LIVE.

   (Point to overview).

THIS OVERVIEW SHOULD HELP YOU UNDERSTAND WHAT YOU READ ABOUT
GORILLAS. PLEASE FOLLOW ALONG THIS OVERVIEW AS I DISCUSS IT.
I WILL ASK YOU TO PUT AN OVERVIEW LIKE THIS ONE TOGETHER WHEN
I FINISH.

   (Point to box 1).

THIS PASSAGE IS ABOUT GORILLAS AND HOW THEY LIVE. GORILLAS
LEAD SIMPLE LIVES. THIS PASSAGE DESCRIBES SEVERAL DIFFERENT
AREAS OF GORILLA LIFE.

   (Point to box 2).

THIS PASSAGE DESCRIBES HOW GORILLAS LIVE IN FAMILY GROUPS.

   (Point to box 3).

IT ALSO DESCRIBES THEIR EATING HABITS.

   (Point to box 4).

AND THEIR SLEEPING HABITS.

   (Point to box 5).

FINALLY, THIS PASSAGE DESCRIBES HOW ADULT AND YOUNG GORILLAS
SPEND THEIR DAY. THIS PASSAGE TELLS US ABOUT THE DAILY LIFE
OF THE GORILLA. PLEASE STUDY THIS OVERVIEW FOR ONE MINUTE.

(Investigator waits one minute. The investigator can proceed before the one minute limit if the subject clearly seems ready to proceed).

(Next, the investigator will remove the overview and title card and give the subject the overview pieces and a blank form to reconstruct the overview and will say:)

PLEASE PUT THE OVERVIEW BACK TOGETHER.

(When the subject can correctly reconstruct the overview, the investigator will proceed. If the subject cannot correctly reconstruct the overview, the investigator will again briefly present the overview and allow the subject to reconstruct it. When the overview is correctly reconstructed say:)

THAT'S RIGHT.

(Put the blank overview and pieces away and take out the structured overview to use in recording questions and continue:)

(Point to the structured overview).

WHAT ARE SOME QUESTIONS THAT YOU WOULD LIKE TO ASK ABOUT THIS TOPIC? THINKING OF YOUR OWN QUESTIONS BEFORE AND AS YOU READ OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

(Point to the list of question starters).

HERE ARE SOME QUESTION STARTERS. QUESTIONS OFTEN BEGIN WITH WHO, WHAT, WHEN, WHERE, HOW, AND WHY. YOU CAN ALSO USE OTHER STARTERS IF YOU LIKE.

(Point to the overview and question starters).

USE THIS OVERVIEW AND THESE QUESTION STARTERS TO HELP YOU THINK OF QUESTIONS. TAKE A MINUTE TO THINK TO YOURSELF ABOUT SOME QUESTIONS YOU WOULD LIKE TO ASK.

(Investigator waits one minute. The investigator can proceed before the one minute limit if the subject clearly seems ready to proceed.)

O.K., NOW ASK AS MANY QUESTIONS AS YOU CAN ABOUT THIS TOPIC AND I WILL RECORD YOUR QUESTIONS HERE.

(The investigator records the questions by the area on the overview that the stated question relates to. Questions that do not directly relate to any area of the overview will be written at the bottom of the sheet of paper. When the subject appears to be finished, the investigator will ask:

ARE THERE ANY OTHER QUESTIONS THAT YOU WOULD LIKE TO ASK?

GOOD JOB. THIS OVERVIEW AND YOUR QUESTIONS SHOULD HELP YOU UNDERSTAND THIS PASSAGE ABOUT GORILLAS.

(Remove the list of question starters. The overview with added questions will remain within view of the subject while he/she reads the passage).

Control Condition

(Point to the title card):

YOU ARE GOING TO READ A STORY ABOUT GORILLAS AND HOW THEY LIVE BEFORE WE BEGIN, THERE ARE SOME QUESTIONS I WOULD LIKE TO ASK YOU:

(One of the following two sets of questions will be randomly assigned to the gorilla passage).

SET #1:

WHAT GRADE ARE YOU IN?

WHAT COURSES ARE YOU TAKING?

WHAT SCHOOL DID YOU ATTEND BEFORE _____? (add name of school student is presently attending).

WHAT IS YOUR FAVORITE COURSE?

WHICH COURSE IS EASIEST FOR YOU?

WHICH COURSE IS THE HARDEST?

WHAT ARE YOUR PLANS WHEN YOU FINISH SCHOOL?

THANK YOU FOR ANSWERING THESE QUESTIONS.

SET #2:

DO YOU HAVE BROTHERS AND SISTERS?
HOW MANY?
HOW OLD ARE THEY?
WHAT DO YOU DO IN YOUR SPARE TIME?
WHAT ARE YOU FAVORITE TELEVISION SHOWS?
IF YOU COULD MEET ANY FAMOUS PERSON, WHO WOULD IT BE? WHY?
WHAT ARE YOUR PLANS FOR THE SUMMER?
THANK YOU FOR ANSWERING THESE QUESTIONS.

General Directions for all Gorilla Conditions:

   (Place gorilla passage and pencil in front of subject and
   say:)

I WANT YOU TO LISTEN AND FOLLOW MY DIRECTIONS CAREFULLY.
REMEMBER, YOU ARE A CONSULTANT. YOUR JOB IS TO EVALUATE THIS
PASSAGE CAREFULLY.   PLEASE READ THIS PASSAGE SILENTLY TO
YOURSELF.   I WANT YOU TO UNDERLINE, AS YOU READ, ANYTHING
THAT YOU THINK DOES NOT MAKE SENSE OR THAT NEEDS TO BE
CHANGED. AFTER YOU HAVE FINISHED READING IT, YOU WILL BE
ASKED TO ANSWER SOME QUESTIONS ABOUT THIS PASSAGE. YOU MAY
ASK FOR HELP ON ANY WORDS THAT YOU CANNOT PRONOUNCE.

Gorilla SIT Directions for all Conditions

NOW I WILL GIVE YOU SOME STATEMENTS ABOUT THIS PASSAGE.

   (Hand SIT # 1 on gorillas to subject).

HERE ARE TWENTY SENTENCES.   I WANT YOU TO DECIDE WHICH
STATEMENTS WERE IN THE PASSAGE YOU READ. LET'S READ THE DI-
RECTIONS TOGETHER BEFORE WE BEGIN.

   (Read aloud).

DIRECTIONS:

FOLLOW ALONG AS EACH OF THESE STATEMENTS IS READ TO YOU.
PLACE A + IN THE BOX "IF" THE STATEMENT WAS IN THE PASSAGE.
PLACE A - IN THE BOX "IF" THE STATEMENT WAS NOT IN THE PAS-
SAGE.

USE YOUR PENCIL TO MARK YOU + OR - IN THE BOX.

   (Read each statement aloud once. Move at a steady pace so
   that subject must move decisively through the task. Check
   to see that subject records a clearly written + or - in each
   box. At the end of the task, remind subject to clearly mark
   the boxes, "if" any answers appear to be unclear.)

GOOD--NOW I WILL GIVE YOU MORE STATEMENTS ABOUT THIS PASSAGE.

   (Hand subject SIT #2 items.)

HERE ARE TWENTY SENTENCES.   I WANT YOU TO DECIDE WHICH
STATEMENTS ARE "TRUE" ABOUT THE GORILLA IN THE PASSAGE YOU
JUST READ. LET'S READ THE DIRECTIONS TOGETHER BEFORE WE BE-
GIN.

   (Read aloud).

DIRECTIONS:

FOLLOW ALONG AS EACH OF THESE STATEMENTS IS READ TO YOU.
PLACE A "T" IN THE BOX <u>IF</u> THE STATEMENT IS <u>TRUE</u>.
PLACE A "F" IN THE BOX <u>IF</u> THE STATEMENT IS <u>FALSE</u>.
USE YOUR PENCIL TO MARK THE T OR F IN THE BOX.

   (Read each statement aloud once. Move at a steady pace so
   that subject must move decisively through the task. Check
   to see that subject records a clearly written T or F in each
   box. At the end of the task, remind subject to clearly mark
   the boxes, <u>if</u> any answers appear to be unclear.)

OK--YOU HAVE DONE VERY WELL.

<u>Transition Statement</u>

NOW WE WILL GO ON TO THE NEXT PASSAGE.

                    SCRIPT FOR MONK SEAL PASSAGE

<u>Self-Questioning Condition</u>

   (Point to the title card).

YOU ARE GOING TO READ A STORY ABOUT A CERTAIN KIND OF SEAL.
THESE SEALS ARE CALLED MONK SEALS. THE PASSAGE YOU WILL READ
IS ABOUT WHY MONK SEALS MAY BE EXTINCT SOMEDAY. DO YOU KNOW
WHAT EXTINCT MEANS?

    (If subject correctly states what extinct means, the in-
    vestigator will reinforce the correct definition and con-
    tinue).

THAT'S RIGHT.

    (If subject is "unable" to say what extinct means, the in-
    vestigator will supply the following explanation).

IF MONK SEALS BECOME EXTINCT, THIS MEANS THAT THEY WILL NO
LONGER EXIST. THINKING OF YOUR OWN QUESTIONS BEFORE AND AS
YOU READ OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

    (Point to the title card).

WHAT ARE SOME QUESTIONS THAT YOU WOULD LIKE TO ASK ABOUT THIS
TOPIC?

    (Point to list of question starters).

HERE ARE SOME QUESTION STARTERS. QUESTIONS OFTEN BEGIN WITH
WHO, WHAT, WHEN, WHERE, HOW AND WHY. YOU CAN ALSO USE OTHER
STARTERS IF YOU LIKE. TAKE A MINUTE TO THINK TO YOURSELF
ABOUT SOME QUESTIONS YOU WOULD LIKE TO ASK.

    (Investigator waits one minute. The investigator can pro-
    ceed before the one minute limit if the subject clearly
    seemed ready to proceed).

O.K., NOW ASK AS MANY QUESTIONS AS YOU CAN ABOUT THIS TOPIC
AND I WILL RECORD YOUR QUESTIONS HERE.

    (The investigator records the questions that the subject
    says. When the subject appears to be finished, the investi-
    gator will ask):

ARE THERE ANY OTHER QUESTIONS THAT YOU WOULD LIKE TO ASK?
GOOD JOB. THINKING OF YOUR OWN QUESTIONS BEFORE AND AS YOU
READ OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

(The questions will remain within view of the subject while he/she reads the passage.)

Structured Overview + Self-Questioning Condition

(Point to title card).

YOU ARE GOING TO READ A STORY ABOUT A CERTAIN KIND OF SEAL. THESE SEALS ARE CALLED MONK SEALS. THE PASSAGE YOU WILL READ IS ABOUT WHY MONK SEALS MAY BE EXTINCT SOMEDAY. DO YOU KNOW WHAT EXTINCT MEANS?

(If subject correctly states what extinct means, the investigator will reinforce the correct definition and continue).

THAT'S RIGHT.

(If subject is unable to say what extinct means, the investigator will supply the following explanation).

IF MONK SEALS BECOME EXTINCT, THIS MEANS THAT THEY WILL NO LONGER EXIST. THINKING OF YOUR OWN QUESTIONS BEFORE AND AS YOU READ OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

(Point to overview).

THIS OVERVIEW SHOULD HELP YOU UNDERSTAND WHAT YOU READ ABOUT MONK SEALS. PLEASE FOLLOW ALONG THIS OVERVIEW AS I DISCUSS IT. I WILL ASK YOU TO PUT AN OVERVIEW LIKE THIS ONE TOGETHER WHEN I FINISH.

(Point to box 1).

FIRST OF ALL, THIS PASSAGE DESCRIBES WHY MONK SEALS ARE IN DANGER OF BECOMING EXTINCT. THERE USED TO BE THOUSANDS OF MONK SEALS. LESS THAN A HUNDRED ARE ALIVE TODAY.

(Point to box 2).

THIS PASSAGE DESCRIBES HOW THREE ENEMIES OF MONK SEALS ARE KILLING OFF THE ENTIRE SPECIES.

(Point to box 3).

MONK SEALS HAVE THREE MAIN ENEMIES. THESE ENEMIES ARE

   (point to box 4)

PEOPLE,

   (point to box 5)

SHARKS, AND

   (point to box 6)

DISEASE. THIS PASSAGE DESCRIBES HOW THESE THREE ENEMIES MAY
KILL OFF THE ENTIRE SPECIES OF MONK SEALS. PLEASE STUDY THIS
OVERVIEW FOR ONE MINUTE.

   (Investigator waits one minute. The investigator can pro-
   ceed before the one minute limit if the subject clearly
   seems ready to proceed). Next, the investigator will re-
   move the overview and the title card and give the subject
   the overview pieces and a blank form to reconstruct the
   overview and will say:

PLEASE PUT THE OVERVIEW BACK TOGETHER.

   When the subject can correctly reconstruct the overview,
   the investigator will proceed. If the subject cannot cor-
   rectly reconstruct the overview, the investigator will
   again briefly give an overview and allow the subject to
   reconstruct it. When the overview is correctly recon-
   structed say:

THAT'S RIGHT.

   Put the blank overview and pieces away and take out the
   structured overview sheet to use in recording questions and
   continue:

   (Point to the structured overview).

WHAT ARE SOME QUESTIONS THAT YOU WOULD LIKE TO ASK ABOUT THIS
TOPIC? THINKING OF YOUR OWN QUESTIONS BEFORE AND AS YOU READ
OFTEN HELPS TO UNDERSTAND THE PASSAGE BETTER.

   (Point to list of question starters).

HERE ARE SOME QUESTION STARTERS. QUESTIONS OFTEN BEGIN WITH
WHO, WHAT, WHEN, WHERE, HOW, AND WHY. YOU CAN ALSO USE OTHER
STARTERS IF YOU LIKE.

   (Point to overview and question starters.)

USE THIS OVERVIEW AND THESE QUESTION STARTERS TO HELP YOU
THINK OF QUESTIONS ABOUT THIS TOPIC. TAKE A MINUTE TO THINK
TO YOURSELF ABOUT SOME QUESTIONS YOU WOULD LIKE TO ASK.

   (Investigator waits one minute. The investigator can pro-
   ceed before the one minute limit if the subject clearly
   seems ready to proceed).

O.K., NOW ASK AS MANY QUESTIONS AS YOU CAN ABOUT THIS TOPIC
AND I WILL RECORD YOUR QUESTIONS HERE.

   (The investigator records the questions by the area on the
   overview that the stated question relates to. Questions
   that do not directly relate to any area of the overview
   will be written at the bottom of the sheet of paper. When
   the subject appears to be finished, the investigator will
   ask:)

ARE THERE ANY OTHER QUESTIONS THAT YOU WOULD LIKE TO ASK?

GOOD JOB. THIS OVERVIEW AND YOUR QUESTIONS SHOULD HELP YOU
UNDERSTAND THIS PASSAGE ABOUT MONK SEALS.

   (Remove the list of question starters. The overview with
   added questions will remain within view of the subject
   while he/she reads the passage.)

Control Condition

   (Point to title card).

YOU ARE GOING TO READ A STORY ABOUT A CERTAIN KIND OF SEAL.
THESE SEALS ARE CALLED MONK SEALS. THE PASSAGE YOU WILL READ
IS ABOUT WHY MONK SEALS MAY BE EXTINCT SOMEDAY. DO YOU KNOW
WHAT EXTINCT MEANS?

   (If subject correctly states what extinct means, the in-
   vestigator will reinforce the correct definition and con-
   tinue).

THAT'S RIGHT.

    (<u>If</u> subject is <u>unable</u> to say what extinct means, the investigator will supply the following explanation).

IF MONK SEALS BECOME EXTINCT, THIS MEANS THAT THEY WILL NO LONGER EXIST.

BEFORE WE BEGIN, THERE ARE SOME QUESTIONS I WOULD LIKE TO ASK YOU:

    (One of the following two sets of questions will be randomly assigned to the monk seal passage).

SET #1:

WHAT GRADE ARE YOU IN?

WHAT COURSES ARE YOU TAKING?

WHAT SCHOOL DID YOU ATTEND BEFORE _____? (add name of school student is presently attending).

WHAT IS YOUR FAVORITE COURSE?

WHICH COURSE IS EASIEST FOR YOU?

WHICH COURSE IS THE HARDEST?   school student is presently attending).

WHAT ARE YOUR PLANS WHEN YOU FINISH SCHOOL.

THANK YOU FOR ANSWERING THESE QUESTIONS.

SET #2:

DO YOU HAVE BROTHERS AND SISTERS?

HOW MANY?

HOW OLD ARE THEY?

WHAT DO YOU DO IN YOUR SPARE TIME?

WHAT ARE YOU FAVORITE TELEVISION SHOWS?

IF YOU COULD MEET ANY FAMOUS PERSON, WHO WOULD IT BE?   WHY?

WHAT ARE YOUR PLANS FOR THE SUMMER?

THANK YOU FOR ANSWERING THESE QUESTIONS.

General Directions for All Monk Seal Conditions:

(Place monk seal passage and pencil in front of subject and say:)

I WANT YOU TO LISTEN AND FOLLOW MY DIRECTIONS CAREFULLY. REMEMBER, YOU ARE A CONSULTANT. YOUR JOB IS TO EVALUATE THIS PASSAGE CAREFULLY. PLEASE READ THIS PASSAGE SILENTLY TO YOURSELF. I WANT YOU TO UNDERLINE, AS YOU READ, ANYTHING THAT YOU THINK DOES NOT MAKE SENSE OR NEEDS TO BE CHANGED. AFTER YOU HAVE FINISHED READING IT, YOU WILL BE ASKED TO ANSWER SOME QUESTIONS ABOUT THIS PASSAGE. YOU MAY ASK FOR HELP ON ANY WORDS THAT YOU CANNOT PRONOUNCE.

Monk Seal SIT Directions for All Conditions:

NOW I WILL GIVE YOU SOME STATEMENTS ABOUT THIS PASSAGE.

(Hand SIT # 1 on monk seals to subject).

HERE ARE TWENTY SENTENCES. I WANT YOU TO DECIDE WHICH STATEMENTS WERE IN THE PASSAGE YOU READ. LET'S READ THE DIRECTIONS TOGETHER BEFORE WE BEGIN.

(Read aloud).

DIRECTIONS:

FOLLOW ALONG AS EACH OF THESE STATEMENTS IS READ TO YOU.
PLACE A + IN THE BOX IF THE STATEMENT WAS IN THE PASSAGE.
PLACE A - IN THE BOX IF THE STATEMENT WAS NOT IN THE PASSAGE.
USE YOUR PENCIL TO MARK YOU + OR - IN THE BOX.

(Read each statement aloud once. Move at a steady pace so that subject must move decisively through the task. Check to see that subject records a clearly written + or - in each box. At the end of the task, remind subject to clearly mark the boxes, if any answers appear to be unclear.)

GOOD--NOW I WILL GIVE YOU MORE STATEMENTS ABOUT THIS PASSAGE.

(Hand subject SIT #2 monk seal items.)

HERE ARE TWENTY SENTENCES. I WANT YOU TO DECIDE WHICH STATEMENTS ARE "TRUE" ABOUT THE MONK SEALS IN THE PASSAGE YOU

JUST READ. LET'S READ THE DIRECTIONS TOGETHER BEFORE WE BE-
GIN.

(Read aloud).

DIRECTIONS:

FOLLOW ALONG AS EACH OF THESE STATEMENTS IS READ TO YOU.
PLACE A "T" IN THE BOX IF THE STATEMENT IS TRUE.
PLACE A "F" IN THE BOX IF THE STATEMENT IS FALSE.
USE YOUR PENCIL TO MARK THE "T" OR "F" IN THE BOX.

(Read each statement aloud once. Move at a steady pace so
that subject must move decisively through the task. Check
to see that subject records a clearly written T or F in each
box. At the end of the task, remind subject to clearly mark
the boxes, "if" any answers appear to be unclear.)

OK--YOU HAVE DONE VERY WELL.

Interview Questions for all Conditions

(Ask the following interview questions at the end of the
second and final passage and after both SITs have been
completed. Read aloud.)

NOW I HAVE A FEW QUESTIONS TO ASK YOU ABOUT THE TASKS AND
PASSAGES THAT YOU JUST COMPLETED:

1.   WHAT DID YOU DO WHILE YOU WERE READING TO UNDERSTAND
     THESE PASSAGES ABOUT MONK SEALS AND GORILLAS?

2.   WHAT DO YOU DO IF YOU HAVE DIFFICULTY UNDERSTANDING WHAT
     YOU READ?

3.   WHAT SHOULD TEACHERS DO TO HELP STUDENTS UNDERSTAND WHAT
     THEY READ?

Final Comments for All Conditions

YOU HAVE DONE VERY WELL. THANK YOU FOR YOUR HELP. I (MRS.
BILLINGSLEY) WILL BE BACK AGAIN IN FOUR TO SIX WEEKS EXPLAIN
THE STUDY AND ANSWER QUESTIONS.

Immediately Following Study:

1. Make a written record of any unusual circumstances or problems with the data collection process.

2. Label the tape with the school name, student's name and researcher's name (Example: John Doe, Fleming, Billingsley)

3. Place all subject materials (including the tape and any notes) into the original envelopes.

APPENDIX G

List of Question Starters

APPENDIX G

List of Question Starters

QUESTION STARTERS

WHO?

WHAT?

WHEN?

WHERE?

HOW?

WHY?

APPENDIX H

Structured Overviews of Passages

APPENDIX H

HOW GORILLAS LIVE

| Family Groups | Eating Habits | Sleeping Habits | How They Spend Their Day |

WHY MONK SEALS MAY BECOME EXTINCT

THREE ENEMIES OF MONK SEALS

| PEOPLE | SHARKS | DISEASE |

APPENDIX I

Subjects' Reasons for Underlining Non-Target Text

Appendix I

Subjects' Reasons for Underlining Non-Target Text

Types of Non-Target Information Marked:

1) Unfamiliar words (n=15)

   Gorilla passage:

   paint (n=3)
   dusk (n=2)
   platform (n=1)

   Monk Seal Passage:

   bellow (n=4)
   infected (n=2)
   doomed (n=2)

2) Contradicted subjects' beliefs or passage information not
   believable to subject (n=47).

   Gorilla passage:

   gorillas do not play games (n=13)
   they would not build nest every night (n=5)
   gorillas do eat meat (n=3)
   gorillas would not need to break leaves, they eat them
   whole (n=2)
   gorillas are not gentle, they kill and are harmful (n=2)
   young ones would not play among the sleeping gorillas
   (n=2)
   gorillas do not make nests (n=2)
   trees cannot hold gorilla nests (n=1)
   gorillas play by hanging around on vines (1)
   they could not groom themselves (n=1)
   they do not lead simple lives--they fight in the jungle
   (n=1)
   gorillas would not use their hands to eat leaves (n=1)
   they would use their mouths (n=1)

   Monk Seal passage:

   seals would not survive shark attacks (n=3)
   people would not disturb the seals (n=2)
   seals would not avoid safe breeding ground (n=2)
   seals would not forget to feed their babies (n=2)
   Scientists do not know when seals will be extinct (n=2)
   Seals do not live on the Hawaiian islands (n=2)

3) Passage information viewed as contradictory (n=16)

   <u>Gorilla passage:</u>

   young gorillas cannot rest and play (3)
   if gorillas build nests at dusk, how can they spend the
   day taking naps in the nest? (2)
   if gorillas were kind and gentle, they would not play war
   games (1) gorillas do not sleep during the day (1)

   <u>Monk seal passage:</u>

   the seals were not tame (9)

4) Subject could not state reason for underlining non-target
   words and phrases (n=11)

5) Made sense upon second reading (n=11)

6) Non-categorizable and miscellaneous (n=25)

APPENDIX J

Embedded Error Analysis by Item

APPENDIX J

Embedded Error Analysis by Item*

(Proportion of Errors Identified by Subjects by Condition)

Specific Error	Control	Self-Questioning	Structured Overview + Self-Questioning	Total
Gorilla Passage Key				
B1** fragile	.61	.66	.61	.63
B2 tiny	.55	.83	.89	.76
B3 meat	.88	.67	.83	.80
B4 dirty	.61	.83	.83	.76
W1*** alone	.55	.61	.83	.67
W2 females	.33	.50	.83	.56
W3 night	.33	.39	.67	.46
W4 sleeping	.38	.61	.61	.54
Monk Seal Passage Key				
B1 never	.16	.33	.51	.33
B2 unfriendly	.33	.38	.61	.44
B3 over-eat	.55	.78	.89	.74
B4 friend	.72	.67	.89	.76
W1 plentiful	.44	.22	.61	.43
W2 start	.38	.56	.78	.57
W3 immune	.38	.39	.61	.46
W4 hopeful	.22	.44	.61	.43

   * Specific errors in text are marked in Appendix A
  ** Between or inter-sentence errors
*** Within or intra-sentence errors

The two page vita has been removed from the scanned document. Page 1 of 2