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**The effect of background knowledge on comprehension
monitoring of learning disabled students**

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The University of Arizona, 1987

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THE EFFECT OF BACKGROUND KNOWLEDGE ON COMPREHENSION
MONITORING OF LEARNING DISABLED STUDENTS

by

Niva Levin

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In Partial Fulfillment of the Requirements
For the Degree of

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In the Graduate College

THE UNIVERSITY OF ARIZONA

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To Udi and Shy-Lee for what they are.

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ABSTRACT

The purpose of this study was to examine the effect of background knowledge on comprehension monitoring of learning disabled students when reading expository texts with inconsistencies and when topic interest was controlled.

Eight fifth- and sixth-grade learning disabled students were asked to rate their levels of knowledge and interest for 30 topics and then answered a background knowledge survey to determine three high background knowledge and three low background knowledge topics, both of medium interest. An expository passage was adopted for each of the six topics, controlling for readability, length, and structure. Each passage contained inconsistencies in the main idea and in the details, and each was followed by ten probe questions.

Responses to text inconsistencies were analyzed with percentages, and a non-parametric statistical method was performed on the use of strategies.

The results from the study provided additional support for the conceptualization of learning disabled students as inactive learners.

CHAPTER 1

STATEMENT AND BACKGROUND OF THE PROBLEM

Metacognition applies to knowledge about cognition, i.e., knowledge about what we know, what we can know, and the flexible use of strategies (Brown and Campione, 1980). Metacognition is a developmental phenomenon. The child acquires the metacognitive skills through learning and experiences. Flavell and Wellman (1977) explained that the child becomes aware of specific cognitive strategies and of the knowledge and skills required to apply them appropriately in a variety of situations. Brown (1978) suggested that all meta skills, i.e., metalinguistic, metamnemonic, metacomprehension, etc., serve the role of executive routine for all cognitive processes. These meta skills are the essence of intelligent activity.

One specific meta skill is comprehension monitoring. This skill has been studied primarily in relation to reading comprehension in order to monitor ongoing activities to determine whether comprehension is occurring (Brown, 1980).

According to Flavell (1981), there are two ways that we can fail to understand what we read: we cannot achieve any coherent understanding, or we can understand incorrectly. The types of comprehension failure can be: 1) the appropriate schemata are not available so the reader cannot interpret the text, 2) the author does not convey ideas

clearly, or 3) the reader understands the text incorrectly (Baker and Brown, 1980).

However, realizing that one has failed to understand is only part of comprehension monitoring. The reader must also know what to do when comprehension failures occur--whether to take strategic action, i.e., to reread, jump ahead in the text, look in the dictionary, ask a knowledgeable person, etc.; or to continue reading without taking a remedial action.

The ability to monitor comprehension activities requires learning and development, and there is evidence that young children and poor readers have deficiencies in comprehension monitoring (Garner, 1980, 1981; Garner and Kraus, 1982; Garner and Taylor, 1982; Markman, 1977, 1979; Owings et al., 1980). The general conclusion from these studies is that a young and poor reader is often unaware of the existence of a problem in the text, while a good reader is more likely to detect problems spontaneously and activate strategies to overcome them.

Learning disabled students are expected to demonstrate difficulties in comprehension monitoring similar to those demonstrated by young and poor readers. This assumption is derived from Torgesen's (1977) theory characterizing the learning disabled student as an "inactive learner" who does not participate actively in his own learning. Wong's (1980) research with learning disabled students indicated a general trend: the learning disabled student does not effectively use the metacognitive skills, he lacks awareness of his own cognitive processes, and he fails to use efficient, task-appropriate learning strategies.

Several researchers have applied the inactive learner theory to comprehension monitoring skills (Bos and Filip, 1984; Wong, 1979, 1980; Wong and Jones, 1982; Wong and Wilson, 1984). These studies found that learning disabled students do not monitor their comprehension spontaneously. However, they have comprehension monitoring strategies in their repertoire and with minimal training or cueing they can be activated to produce task-appropriate strategies.

Because reading is a complex cognitive process, in order for comprehension to be adequate, the reader must be involved in thinking activities with respect to the text and then must relate the text to his own background knowledge (Anderson, 1977; Goodman, 1976). Several studies examined the effect of background knowledge on reading comprehension (Pearson, Hansen, and Gordon, 1979; Stevens, 1980). These studies found that students who had knowledge of a topic read a passage concerning that topic better than students with little knowledge.

Background knowledge also allows the reader to fill in gaps not completely specified in the text. In addition, when there are ambiguous situations, the reader must rely on his background knowledge to solve them. A group of studies showed that, when manipulating the schematic knowledge, the subjects used the background information provided to clarify the ambiguity and vague situations in the passage (Brown et al., 1977; Sulin and Dooling, 1974). Hare (1981) examined groups of good and poor readers' abilities to become aware of their own comprehension monitoring when the readers' high and low knowledge about given passages was controlled. Results showed that the good readers demonstrated more awareness of their own reading problems in both the high and low

knowledge articles, while the poor readers were more aware of their failures to understand in the high knowledge article.

To date, the research on learning disabled children has not examined the effect of background knowledge on their awareness and spontaneous comprehension monitoring strategies in reading. According to the results derived from studies with normal adults and children using their background knowledge to solve passage difficulties, it seems worthwhile to conduct an investigation of the effect of background knowledge on comprehension monitoring of expository materials read by learning disabled students.

Purpose of the Study

This study proposed to investigate the effect of background knowledge on the reading awareness of learning disabled students as well as on their spontaneous activation of strategies to understand a text.

Statement of the Problem

The following research questions were formulated to address the aims of the study:

1. Are learning disabled students more aware of text inconsistencies when reading high background knowledge expository passages than when reading low background knowledge expository passages?
2. How do learning disabled students monitor their comprehension when confronted with high background knowledge expository passages containing inconsistencies?

3. How do learning disabled students monitor their comprehension when confronted with low background knowledge expository passages containing inconsistencies?
4. Are learning disabled students significantly more effective in monitoring their comprehension when confronted with high background knowledge expository passages containing inconsistencies than when confronted with low background knowledge passages containing inconsistencies?

Assumptions Underlying the Study

Several assumptions were made which underly the present study. These were necessary as a result of the chosen procedures for data analysis and the generalization of the findings. They are as follows:

1. The expository text topics selected for use in the study are typical of topics encountered by upper elementary school, learning disabled students.
 - a. In the present study, the student's own background knowledge will subsequently appear in his retelling to solve false information presented in the texts.
 - b. The retellings produced by subjects in this experiment reflect the type of constructive strategies which are used in real-life reading situations.
2. The process of retelling is a way to gain insight concerning comprehension. It shows what the reader adds to or infers from the text and also indicates how the reader creates a text for his own understanding.

3. The specific comprehension monitoring questions that were given in the study foster the activation of the reader's schema.

Limitations

This study was subject to the following limitations:

1. Sample size was small due to the limited availability of elementary school students who met subject selection criteria in the two districts being investigated.
2. The two school districts represent students whose families are in the middle to upper class levels. Caution must be used before generalizing the findings to all learning disabled students in other socioeconomic levels.
3. The sample of reading passages administered to the students limits generalization to other types of reading texts.
4. The procedure for scoring the retelling data was designed to detect comprehension monitoring strategies used when students were confronted with text inconsistencies. The scoring procedure did not analyze other aspects of the retellings, such as the correlation between the quality of the retellings and the degree of comprehension monitoring strategies used, or the reading comprehension of the readers as reflected in their retellings.

Definition of Terms

The following terms were defined for use in this study:

Metacognition is knowledge about what we know, what we can know, and the flexible use of strategies (Brown and Campione, 1980).

Comprehension monitoring, in relation to reading, involves two aspects of cognitive activities, the evaluation and the regulation of one's ongoing comprehension processes.

Background knowledge is knowledge a person learned previous to encountering novel information.

CHAPTER 2

REVIEW OF THE LITERATURE

Four major areas of research will be examined in this chapter. First, certain aspects of metacognition will be discussed as crucial to the cognitive tasks. Second, the importance of research in comprehension monitoring with relation to listening and reading activities will be explored. Third, the conceptualization of the learning disabled child as an inactive learner who fails to spontaneously employ appropriate comprehension monitoring strategies will be reviewed, and fourth, the role of background knowledge in reading comprehension will be analyzed.

Metacognition

The following section highlights the significant areas of research concerning the topic of metacognition and is provided as an overview to illustrate the different areas of cognitive development and to provide a structured background for the topic of cognitive monitoring, one part of metacognition.

Flavell (1976) defined metacognition as "one's knowledge concerning one's own cognitive processes and products or anything related to them" (p. 232). Metacognition is a developmental phenomenon. A child acquires the metacognitive skills through learning and experiences. Flavell, in his broad work in the area of metacognition, introduced the development and the variety of possible forms of metacognition

by considering memory development. According to Flavell (1971), memory development is largely applied cognitive development, the development of "intelligent structuring and storage of input of intelligent search and retrieval operations, and of intelligent monitoring and knowledge of these storage and retrieval operations--a kind of 'metamemory'" (p. 277). Later, Flavell (1976) termed the development of all the "metas" as "metacognition," in order to describe their hypothesized relationships to cognitive development in general.

Brown (1978) combined all the meta skills, such as metalinguistic, metamnemonic, and metacomprehension, under one generalized, problem-solving type. Brown concluded that all of the meta skills combined serve the role of executive functioning for all cognitive processes. These meta skills are the essence of intelligent activity. Brown and Campione (1980) suggested that no theory of intelligence can be complete unless it includes "second-order knowledge," i.e., knowledge about what we know, what we can know, and the flexible use of strategies.

Flavell and Wellman (1977) have distinguished the whole of memory-related phenomena into four broad categories that are partially overlapping. The first category is the most basic operation and consists of processes such as recognition, cueing, representation, etc. The second category is knowing, and usually has unconscious effects of one's attained level of general cognitive development on one's memory behavior. The third category incorporates a variety of potentially conscious behaviors that an individual may carry out and are referred to as strategies. The fourth category refers to the individual's knowledge

and awareness of memory, or, as Flavell (1971) had called it in his earlier work, "metamemory." Brown (1975, 1978) labeled the second, third, and fourth categories of memory phenomena as "knowing," "knowing how to know," and "knowing about knowing."

Flavell, Brown, and other developmental psychologists (Brown, 1975, 1978, 1980; Brown et al., 1977; Brown and DeLoach, 1978; Flavell, 1976, 1978; Flavell and Wellman, 1977; Markman, 1977, 1979) have tried to describe the development of the meta skills. For example, Flavell and Wellman (1977) classified the major categories and subcategories of metamemory that a growing child would acquire. One type of metamemory is sensitivity. The growing child develops a sensitivity to strategies designed to get information into memory and to strategies designed to get information out of memory. The child develops an active intentional effort toward remembering, and knowledge of when one does and when one does not need to engage in such efforts.

According to Flavell and Wellman, a second major type of metamemory is called variables. The child could develop intuitions about the variables that influence memory performance. Flavell and Wellman (1977) have distinguished three categories of such variables: person, task, and strategy.

Person variables include all the things that a growing child could learn or know about self and others as mnemonic beings. Flavell and Wellman have distinguished two types of metamemory concerning person variables. One type refers to knowledge that self and others have about their enduring abilities and limitations in the area of memory functioning. The second type refers to the ability of the person to monitor

and interpret his or her own immediate experiences in specific memory situations.

Task variables include the knowledge of what makes some memory problems harder than others. The storage and retention tasks can be harder or easier according to the amount and kind of information that must be remembered. With the retrieval task, the growing child can learn which retrieval demands are more difficult to meet than others, and that is usually easier to recognize than recall.

The strategy variables include the growing child's knowledge and awareness of the existence of relevant strategies that can help the memory system to achieve memory goals as well as the recognition of the need to apply them.

Flavell and Wellman (1977) stressed that knowledge about the interaction among person, task, and strategy must also be acquired.

Brown's work in the area of metacognition has also incorporated a problem-solving paradigm in the broad sense (Brown, 1975, 1978; Brown and DeLoach, 1978; Brown and Lawton, 1977). Brown emphasized that many skills of metacognition are "trans-situational" and they apply to all forms of problem-solving activity (Brown, 1978).

Brown has identified two types of metacognitive activities: knowledge about cognition and regulation of cognition (Baker and Brown, 1980). Knowing about cognition is a relatively stable form and a late developmental skill which reflects the learner's knowledge concerning his or her own cognitive processes and activities in various learning tasks. This is the information that was described by Flavell and Wellman (1977) as "person, task, and strategy." The information is

stable because a child who already knows facts about the learning situation will continue to know these facts and they will be available whenever needed.

The second type of metacognitive knowledge, regulation of cognition, consists of activities of self-regulation used by the learner during ongoing attempts to learn or solve problems. These activities include checking, planning, monitoring, testing, revising, and evaluation (Brown, 1978). This regulation-type activity is not a stable feature of the learner and will vary according to other aspects of the learning situation, such as familiarity and difficulty of the task, the expertise of the learner, motivation, etc. (Brown and Campione, 1980).

The third component of metacognition, according to Baker and Brown (1980), is the development and use of remedial strategies that the learner introduces to overcome a problem.

The investigations of Flavell, Brown, and their colleagues have illustrated the development of metacognitive competencies and their importance to cognitive tasks and development.

Comprehension Monitoring

"Metacognition" and "cognitive monitoring" apply to knowledge about cognition in general, while comprehension monitoring is considered to apply mainly to reading comprehension (Wagner, 1983).

Most of the skills and activities that reading requires involve metacognition. One metacognitive skill that affects reading is comprehension monitoring, monitoring ongoing activities to determine whether comprehension is occurring (Brown, 1980).

Reading is a complex cognitive process that requires the interaction of the reader with the text (Anderson, 1977; Goodman, 1976). The reader must become involved in thinking activities about the text and relate the text to background knowledge, otherwise comprehension will not be adequate. Comprehension monitoring induces this interactive process that involves the evaluation and the regulation of one's ongoing comprehension process (Baker, 1979). According to Baker (1979), to evaluate comprehension, the reader must keep track of the success with which comprehension is proceeding and also be aware of the task demands. Varying degrees of comprehension are acceptable depending on the purpose of reading. For example, reading a novel for enjoyment and reading a science textbook for a test have different intentions. To regulate comprehension, the reader must activate appropriate strategies when comprehension fails to meet desired levels. For example, several studies have found that the good reader employs strategies such as looking back at the text or skimming it when attempting to regulate and improve comprehension (Baker and Anderson, 1981; DiVesta, Hayward, and Orlando, 1979).

Brown (1978), Flavell (1981), and Markman (1977, 1979) tried to explain the conditions under which comprehension failures occur. Flavell (1981) explained that we can fail to understand in two ways: we cannot achieve any coherent understanding, or we can understand incorrectly. The types of comprehension failures can be: 1) the appropriate schemata are not available (this kind of failure can happen when the reader does not have enough knowledge about the topic to interpret the text), 2) the author does not convey ideas clearly enough, or 3) the reader

"understands" the text, but not as the author intended (Baker and Brown, 1980).

The reader who understands incorrectly has the same satisfied feeling (or lack of feeling) that correct understanding produces. This reader can hardly be expected to take remedial action when comprehension fails since he/she does not recognize that comprehension has been inadequate. The mature reader will have few conscious metacognitive processes when comprehension is proceeding smoothly. However, when progress is blocked and something interferes with comprehension, the metacognitive experiences are more likely to become conscious (Flavell, 1981).

Realizing that one has failed to understand is only a part of comprehension monitoring; the reader must also know what to do when comprehension failures occur. The reader must first decide whether or not remedial action is necessary, a decision that will depend on the purpose of reading. If the reader decides to take strategic action, it can be in a variety of ways. For example, the reader can reread, jump ahead in the text, look in the dictionary, or ask a knowledgeable person. Markman (1981) suggested that the one who fails to comprehend may look back or look forward at the presented information. The reader may look back to see if earlier information coincides with present information, or may look forward to see if upcoming information will be consistent with, or can be predicted by, present understanding.

The ability to monitor comprehension activities requires considerable learning and development. There is evidence that young children and poor readers have deficiencies in comprehension monitoring.

According to Flavell's (1978, 1981) theory about "messages" in the broad

sense, it is possible that young children are likely to accept all sorts of "messages" uncritically. They do not evaluate the "messages" completely and carefully for possible ambiguities and contradictions. In addition, Markman (1977) believed that a passive approach to comprehension may cause unawareness of one's own failure to understand the information.

The following section will discuss research concerning children's knowledge of monitoring comprehension activities and their ability to monitor their own comprehension, both in listening and reading. In most of these studies, an element of confusion was deliberately introduced into the "message" and failures to notice the disruptions were considered to be ineffective comprehension monitoring.

Comprehension Monitoring While Listening

The first group of studies focused on the young child's difficulty in monitoring his own comprehension while listening. According to these studies, the child is unaware that he does not understand a message.

In 1977, Markman presented two studies of listening tasks designed to assess at what point young children become aware that directions are inadequate. In the first study, first through third graders were asked to serve as consultants to someone who was writing instructions for children about playing a card game and performing a magic trick. The instructions were deliberately made incomprehensible by omitting information needed to understand how to perform the task. Results indicated that third graders noticed the inadequacy of the

instructions with minimal probing. However, first graders claimed to "understand the instructions." For example, for the card game, children were shown cards with letters of the alphabet on them. The children were told that an equal number of cards were dealt to each player. Then, the children listened to the following instructions (Markman, 1977, p. 988):

We each put our cards in a pile. We both turn over the top card in a pile. We look at the cards to see who has the special card. Then we turn over the next card in our pile to see who has the special card this time. In the end, the person with the most cards wins the game.

There was no mention of what the "special card" might be, nor of how players accumulated cards.

In the second study, children were asked to carry out the instructions, and they viewed a partial demonstration of the task. The execution and the demonstration could serve as a substitute for mental processing because children could see some of the transformation practiced rather than having to infer everything. With this manipulation, children more readily indicated that they recognized the need for more information before attempting the task.

Markman (1977) concluded that the reason children did not notice the problem was that they were failing to mentally execute the instructions and evaluate them with respect to the goal. It seems the first graders did not actively evaluate the validity of instructions as they listened.

Flavell et al. (in press) examined the development of comprehension, monitoring, and knowledge about communication. Kindergarten and second-grade students were asked to follow taped instructions given by a

girl, and try, on the basis of her instructions, to make an exact duplicate of the girl's model building. A few of the instructions consisted of one or another type of comprehension problem: unfamiliar terms, ambiguous instructions, or instructions that were impossible to execute. Failure to notice the confusions was taken as evidence of ineffective comprehension monitoring.

The children were shown how to use the tape recorder and were told to stop and replay the instructions as often as they wished. The children's behavior in performing the block-building tasks was videotaped, and non-verbal behavior, such as looking puzzled or replaying the tape, was analyzed. When they had finished the tasks, the children were asked whether they thought that their building was exactly like the instructor's and whether the girl did a good or a bad job of telling them how to make the building exactly like hers.

Significantly more second-grade students noticed the inadequacies in the message as compared to the younger children. They were able to verbalize that their building was unlike that described in the directions, and were able to explain why. Both kindergartners and second graders gave non-verbal signs of puzzlement during the task, but the kindergartners were unable to report that some of the messages were inadequate following the instruction period.

Results indicated that young children, when faced with a comprehension problem, may have achieved satisfying closure by making an unwarranted inference or by adopting a criterion less adequate than what was presented to them.

According to Markman's (1979) second study, the effectiveness of comprehension monitoring may also depend on the nature of the materials and not only on the age of the subjects.

Third and sixth graders were asked to serve as consultants to help evaluate essays. Children in all grades judged the essays to be comprehensible, even though the essays contained inconsistencies. Although third graders reported failures to understand instructions in the card game previously described (Markman, 1977), children of the same age and older failed to report inconsistencies in these essays. For example, children often claimed that an essay about fish made sense and was easy to understand, although it contained the following information (Markman, 1979, p. 646):

Fish must have light in order to see. There is absolutely no light at the bottom of the ocean. It is pitch black down there. When it is that dark the fish cannot see anything. They cannot even see colors. Some fish that live at the bottom of the ocean can see the color of their food; that is how they know what to eat.

Half the students were informed that there was a problem with each essay and they were told that their job was to find this inconsistency. The other half were asked to evaluate the essays but were not warned about the problem. Sixth graders did perform better than the third graders, who still failed to notice inconsistencies even after being instructed to investigate the problem.

Results indicate that comprehension monitoring is much easier when the criteria for evaluation are more explicit (Baker and Brown, 1980). Markman (1979) concluded that comprehension monitoring is a set

of subprocesses which may be learned according to individual or developmental expertise.

From research reviewed about children's ability to monitor their comprehension while listening, it appears that there are developmental differences favoring older children in ability to monitor their understanding effectively and identify comprehension failures, while young children are poor at analyzing oral messages for consistency, clarity, and completeness.

Baker and Brown (1980) suggested some other factors for failures to report message inadequacies other than poor comprehension monitoring. Perhaps the children believed they understood the message, but not as the author intended, or they were unable to explain verbally their inference to resolve the confusion. Children may also refuse to say they did not understand the message.

Comprehension Monitoring While Reading

The following studies considered children's comprehension monitoring during reading. This group of studies demonstrated not only the developmental differences found in the listening studies, but also reader ability differences. A poor reader is often unaware of the existence of a problem in the text, while a good reader is more likely to detect problems spontaneously. However, the reader needs to know what monitoring strategies are available and also know how to use them efficiently.

There is some evidence to suggest that younger and less experienced readers have little awareness that they must attempt to make sense

of the text. Instead, they are likely to process at a word-by-word level, rather than focus on meaning-obtainment processes (Canney and Winograd, 1979; Denney and Weintraub, 1963, 1966; Johns and Ellis, 1976; Myers and Paris, 1978; Reid, 1966).

Canney and Winograd (1979) studied children's schemata of reading. They hypothesized that failure to comprehend the text might be related to a student's schema for reading; instead of trying to make sense of the text, the poor reader might be attending primarily to calling words fluently in the mistaken belief that reading is a process of decoding words fluently.

In part of a two-phase study, three good and three poor readers in each of grades two, four, six, and eight were presented with passages that were either intact or disrupted at four levels of severity:

- 1) correct syntax, but some semantically inappropriate words;
- 2) semantic and syntactic violations, but some semblance to connected discourse;
- 3) the lexical alteration, strings of random words; and
- 4) a graphic form, strings of random letters.

Children were asked to state if each passage was readable or not and to explain their answer. Most good readers found most altered passages to be "unreadable," while most poor readers often reported that all but the passage containing letter strings could be read. Since these children believed that reading means decoding, a passage of unrelated words seemed readable for them.

Myers and Paris (1978) examined another aspect of children's metacognitive knowledge about reading. Second- and sixth-grade students were asked a series of questions assessing their awareness about person, task, and strategy variables (Flavell and Wellman, 1977) which relate to

metacognitive aspects of reading. Although young children were aware of the influence of some reading dimensions, such as interest, familiarity, and length, they were less sensitive to goals of reading and strategies for resolving comprehension failures than sixth-grade children.

More studies have focused on the comprehension monitoring of good and poor readers (Garner, 1980, 1981; Garner and Kraus, 1982; Garner and Taylor, 1982; Owings et al., 1980). In these studies, students were asked to evaluate inconsistent passages for comprehensibility. In general, good readers identified inconsistency more quickly and accurately and provided more adequate justifications for their choices. When additional assistance was provided and the students were explicitly prompted to identify confusing inconsistencies, the poor readers usually improved in their awareness of the existence of a comprehension problem.

The Use of Comprehension Monitoring Strategies

It is not enough to realize that a comprehension problem exists. The good reader should utilize necessary "fix-up" strategies to solve the problem. The following studies focused on readers' use of comprehension monitoring strategies.

DiVesta et al. (1979) investigated the development of comprehension monitoring strategies in high school and middle school, good and poor readers by using a Cloze technique. They constructed passages that required two different contextual strategies. One set of paragraphs omitted five key words near the beginning of each paragraph, while another set omitted similar words near the end of each paragraph. The

subject either needed to read ahead for relevant contextual information or could rely on previous context.

Results showed that the older and better readers performed equally well on both Cloze tasks, while younger, poor readers had difficulty when they were required to make use of subsequent context. The authors concluded that being able to use strategies such as rereading and searching subsequent text for clarification of information is an important development in the ability to monitor one's comprehension. Rereading strategy is an efficient method to facilitate comprehension (Alessi, Anderson, and Goetz, 1979; Garner and Reis, 1981). In general, good comprehension monitors will select a strategy that is most appropriate to the situation.

Assessing Comprehension Monitoring in Experienced Readers

Few empirical studies have investigated the assumption that experienced readers do monitor their comprehension activity. Two studies by Baker and her colleagues have shown that even among college students there are difficulties in comprehension monitoring skills.

In her first study, Baker (1979) investigated college students' ability to detect several different kinds of expository passages, each containing informational confusions either in main ideas or in details with ambiguous references and with inappropriate logical connectives. Subjects were asked to answer questions requiring recall of the deficient sections of text to reveal whether they modified the confusion in some way so it would make sense. Next, subjects were informed that the text contained confusions and were asked to identify them. The subjects

were also asked to report retrospectively some information regarding problem identification and fix-up strategies that had been used. Across all subjects and passages, only 38 percent of the confusions were correctly identified. However, subjects had a wide repertoire of strategies for dealing with the confusion section of the text. Baker concluded that most students did evaluate and regulate their understanding, even if they were not consciously aware of the confusion.

In a later attempt to obtain evidence for ongoing comprehension monitoring, Baker and Anderson (1981) presented undergraduates with passages that contained inconsistencies and that were displayed sentence by sentence on a computer terminal, with the speed of the display under the control of the reader. The computer automatically recorded the amount of time it took the reader to read a sentence and the pattern of movement through the text. The extensive exposure times of sentences containing inconsistencies provided evidence that these sentences were processed more slowly and that inconsistencies were noticed. In addition, students looked back at these sentences more often than at consistent sentences. This evidence suggests that when difficulty is experienced the reader slows down and pays more attention to the problem. Contrary to studies with young and poor readers (Bos and Filip, 1984; Markman, 1979), college students who were informed about inconsistencies did not differ in their comprehension monitoring from uninformed readers.

Baker and Anderson interpreted these findings as indicative of the fact that adults are able to monitor their comprehension effectively, with or without instructions. Finally, an examination of

individuals' responses yielded no consistent pattern of processing strategies used by the successful comprehension monitor. Experienced readers have a wide variety of monitoring activities available to them to be used with flexibility and effectiveness.

The preceding studies of comprehension monitoring examined the executive processes involving the reader's awareness of having comprehended and his ability to employ strategies that facilitate comprehension. These studies showed fairly similar patterns across age and ability groups. Younger children and poor readers seem to be unaware of the existence of a problem in a message; they seem to lack "sensitivity" (Flavell and Wellman, 1977) to the demands of reading for meaning. Older children and good readers are more likely to notice a problem spontaneously and activate strategies to overcome it. From analyzing individual responses of mature readers to text confusion, it appeared that no inconsistent pattern of using strategies was found. A good reader used a variety of available strategies in a flexible and effective way.

Comprehension Monitoring in Learning Disabled Students

According to a recent theory characterizing learning disabled students as "inactive learners" (Torgesen, 1977), it is expected that these students will demonstrate difficulty in spontaneous comprehension monitoring.

According to Torgesen's conceptualization, the learning disabled child appears to be an inactive learner who does not participate actively in his own learning. According to Torgesen and Licht (1983),

the basic context for the theory is derived from the development of information-processing theories which have led to a general conceptualization of learning in which the "planful activity of the learner is of central importance" (p. 6).

Flavell and Wellman (1977) explained the growing child's process as metacognition. The child gradually becomes aware of specific cognitive strategies and of the knowledge and skills required to apply them appropriately in a variety of situations.

Research with learning disabled children proposes that many of the performance failures of these children may be due to their inefficient processing, their failure to actively engage in the task through the use of efficient strategies. Most of the studies about inefficient processing in learning disabled children focused on selective attention and memory tasks (Tarver et al., 1976; Tarver et al., 1977; Torgesen, 1977; Torgesen and Goldman, 1977; Torgesen and Houck, 1980; Torgesen, Murphy, and Ivey, 1979; Wong, 1978). These studies found that learning disabled children, as a group, are consistently less active, planful, and organized in their approach to memory tasks than children who learn normally.

At first, it appeared that learning disabled students did not have the appropriate learning strategies such as verbal rehearsal, labeling, or categorizing and inferencing. However, several studies demonstrated that, when manipulating the research tasks, learning disabled students have the appropriate strategies but fail to employ them spontaneously (Haines and Torgesen, 1979; Torgesen, 1977; Torgesen and Goldman, 1977; Wong, 1980). The learning disabled students have shown a

"production deficiency," a phenomenon described by Flavell (1970) with regard to certain kinds of activities necessary for efficient memory. With production deficiency, the learner does not apply effective learning strategies spontaneously but, with a minimal amount of time and effort, he can be trained to do so. Basically, the learning disabled student does not effectively use the metacognitive skills; he lacks awareness of his own cognitive processes and fails to use efficient, task-appropriate learning strategies (Wong, 1980).

The inactive learner framework tries to distinguish between deficiencies in basic abilities, in basic psychological processes, and in performances caused by a failure to efficiently and effectively apply those abilities which are present (Torgesen, 1977). Torgesen stressed, with his "inactive learner" theory, that this is not an explanation for all of the learning problems among all learning disabled children. There are learning disabled children who have specific problems related to processing skills.

Several researchers have applied the inactive learner theory to reading comprehension and comprehension monitoring skills (Bos and Filip, 1984; Wong, 1979, 1980; Wong and Jones, 1982; Wong and Wilson, 1984). Wong (1979) tested the inactive learner hypothesis involving the retention of the main idea of a story. She found the learning disabled students to be cognitively inactive in regulation of their comprehension processes. Subjects were 60 fifth graders, half of whom had been identified as learning disabled. The students followed a written text as the story was read aloud. Half of each group received the story and were asked questions concerning the most thematically important

material. The other half of each group received the story without the questions. After listening to the story, all students wrote free recalls.

Results indicated that, in the no-question condition, learning disabled readers recalled fewer thematically important units than average readers did. But, when questions were provided, the retention of main ideas among learning disabled readers increased and the differences between the two groups disappeared. However, the questions had little effect on the retention of main ideas in normally achieving children. Results indicated that the average reader automatically regulated strategies to retain the main ideas of the narrative text, while the learning disabled student remained cognitively inactive until prompted to activate such strategies.

Similar conclusions were drawn from a study by Wong and Jones (1982) investigating the hypothesis that insufficient metacomprehension can be one explanation for learning disabled adolescents' comprehension problems. Subjects were eighth- and ninth-grade learning disabled students and sixth-grade normally achieving students. Half of the subjects received a five-step, self-questioning training in which they learned to monitor their understanding of important textual units. Results showed that the training provided increased awareness of important textual units for the learning disabled as well as increased ability to ask better questions about those units. However, as in Wong's (1979) study, training did not increase normally achieving sixth graders' metacomprehension or comprehension performance.

Wong and Wilson (1984) investigated learning disabled and average readers' sensitivity to monitor passage organization. Subjects were presented with organized and disorganized passages and were asked to recall them. After recalling the passages, subjects were asked, "How are the two passages different?" If a subject answered, "I do not know," he/she was given a more explicit probe such as, "Is everything in order in one passage and mixed up in the other?" Finally, subjects were asked to reorganize the disorganized passage. Results indicated that the learning disabled group was less sensitive to the passage organization and less able to reorganize the disorganized passage. Wong and Wilson, in a second step in their research, taught the learning disabled students who were unable to organize a passage to complete this task. Results indicated that the learning disabled students learned how to organize a passage and that the acquisition of this metacognitive skill increased their retention of the passage.

Bos and Filip (1984) also found that learning disabled students are cognitively inactive when required to evaluate their comprehension processes. Bos and Filip exposed seventh-grade learning disabled and average achieving students to a reading task similar to those used by Markman (1979), and asked them to evaluate the passages with text inconsistencies for comprehensibility. Results showed that average readers judged the disruptive passages as "not making sense" and were able to explain the inconsistencies, while the learning disabled readers judged such passages as "making sense." It is suggested that the learning disabled students did not monitor their comprehension. In a second step, subjects were asked to read another passage with text inconsistencies,

but this time they were cued before reading that "something in the passage did not make sense." With such a cue, the learning disabled students located and explained the inconsistency. Results support the belief that the learning disabled students lack spontaneous comprehension monitoring.

The above studies demonstrate that the learning disabled student possesses a "production deficiency" rather than a specific ability deficit. Indeed, learning disabled students have comprehension monitoring strategies in their cognitive repertoire, but they fail to apply them spontaneously and appropriately. However, the learning disabled student can be activated to produce task-appropriate strategies with relatively minimal training or cueing.

The Role of Background Knowledge in Reading

The ability to comprehend a text depends on, among other factors, the relationship between the information in the text and the prior knowledge that is brought to the text. Such knowledge has been referred to as schema theory (Bartlett, 1932; Rumelhart and Ortony, 1977). Schema theory provides an explanation of how prior knowledge interacts with new information. And, the more knowledge the reader has about the materials he reads, the better he will be able to comprehend the text.

Several studies examined the effect of background knowledge on reading comprehension (Pearson et al., 1979; Stevens, 1980). Pearson et al. (1979) investigated the effect of background knowledge on second-grade students. They introduced explicit and implicit information in a text about spiders. It was found that students who had knowledge of the

topic read a passage concerning that topic better than students with little knowledge. Pearson et al. (1979, p. 207) concluded that "prior knowledge facilitates comprehension."

Raphael et al. (1981) examined the effect of three variables on comprehension: accessing word meaning, integrating prior knowledge, and using text structure to organize ideas. Each of 127 seventh-grade students read a text which differed in its level of familiarity, quality of structure, and difficulty of vocabulary. The students then evaluated the comprehensibility of each text. Results showed that scores were higher for passages using familiar topics and high quality structure.

Schema theory also suggests that schemata allow the reader to fill in gaps not completely specified in the text. The reader must rely on prior knowledge to solve ambiguous situations, to distinguish the unfamiliar from the familiar, and to clarify the vague concepts.

When material is open to several interpretations, as in the study of Sulin and Dooling (1974), the reader interprets the text using prior knowledge and applying his or her values. Sulin and Dooling tested readers with short biographical passages either about a famous person or a fictitious person (e.g., Adolph Hitler versus Gerald Martin). Sulin and Dooling (1974) assumed that the subjects "who read the famous main character version of a passage would be working with a more richly elaborated schema" (p. 256). Results showed that those subjects who were led to believe that the passages were about a famous character made more false positive errors. When the subjects read about Adolph Hitler, they relied on their prior knowledge about Hitler and called upon information that was not specifically stated.

Brown et al. (1977) investigated whether young children comprehend and reconstruct a story in relation to their background knowledge. Two experiments were conducted, each providing different background information which could be used to assist the students in vague or ambiguous sections of the passages. In the first experiment, third, fifth, and seventh graders listened to a passage concerning an escape; half of them were told that the main character was the chimpanzee hero of the popular television program "Planet of the Apes." After listening to the passage, the students were given a recognition task consisting of questions either congruent or incongruent with their given orientation. In the second experiment, groups of students from second, fourth, and sixth grades were led to believe that the Targa tribe was either of Eskimo or Desert Indian origin. Other groups had no information concerning the tribe. A week later, the students listened to a culturally vague passage about Tor, a member of the Targa tribe, engaged in a hunt. In this experiment, intrusions in recall and post-recall interviews were used to measure the role of the given information on story comprehension and recall. Results from both experiments showed an absence of developmental trends in the influence of background knowledge on recognition and recall of the passage. The children used the background information that was provided to clarify and elaborate upon the passages.

These aforementioned studies investigated the influence of background knowledge on the interpretation of the text while this background knowledge was experimentally provided for the subjects. Another type of study uses schema theory as a framework for examining the way in which readers become aware of their own comprehension monitoring. These

studies involved groups of good and poor readers. Hare (1981) distinguished between good and poor readers by their reading proficiency and defined reading proficiency not only by achievement test scores, but also when the reader possesses "the requisite schema for understanding a given passage" (p. 360).

Hare (1981) investigated the ability of good and poor undergraduate readers to discuss reading problems and problem-solving strategies when the readers' high and low knowledge about given passages was controlled. Two articles were used: one of high knowledge and one of low knowledge. The students were asked to observe what they did as they were reading and were instructed to write down everything they noticed about their progression through the passage. Results showed that there was a difference between good and poor readers when reading the high and low knowledge articles. The good readers, as a group, demonstrated more awareness of their own reading problems in the low knowledge article. However, they were uncertain of how to solve these problems when the text was too difficult to understand. The poor readers were more aware of failures to understand the high knowledge article, but they would not apply useful, problem-solving strategies.

In a study by Winograd and Johnson (1980), it was hypothesized that if an appropriate schema was provided for poor readers their comprehension monitoring abilities would improve. Four intentionally ambiguous passages were given to 20 sixth-grade good and poor readers. Two of the paragraphs had a circus theme and two had a church theme. There were two conditions in the study: no preparation and prior preparation. In the preparation task, students were asked to look at a

picture of two children walking to either a church or a circus, and then to tell what the children might see in the church or the circus. After the students finished reading, they were asked a series of problem questions to discover whether they realized that one line did not make sense in the paragraph. In this way, the readers with the preparation condition had certain expectations that mismatched the incoming information from the text. Winograd and Johnson examined whether these students became more aware of their comprehension failure. Results did not provide evidence to support the hypothesis that when poor readers are provided with the appropriate schema their comprehension monitoring awareness improves. Winograd and Johnson (1980) explained these results as the limitation of the error detection paradigm and not as the subject's comprehension monitoring abilities.

In summary, background knowledge of text content allows the formation of inference and interpretation, and makes the text more comprehensible. For the educator, schema theory suggests the value of providing and manipulating background knowledge for improving reading comprehension. For example, prior to applying a text (for understanding and memory), it might possibly be helpful to assist the reader by offering the appropriate background knowledge so he/she may be encouraged to make inferences and become aware of comprehension failure.

CHAPTER 3

DESIGN OF THE STUDY

The purpose of this study was to examine the effect of high and low background knowledge on the comprehension monitoring of learning disabled children when reading expository text and when topic interest is controlled.

To achieve the goals of this research, an experiment was designed and implemented. The independent variables investigated in the study focused on the level of background knowledge: high background versus low background knowledge. Comprehension monitoring of the text acted as the dependent variable. The variables that were controlled in the study were: interest in the topics of the reading passages, readability, structure, and length of the reading passages.

This chapter discusses the subjects, materials, procedures, and scoring systems used in the study and the method of data analysis.

Sample

The subjects were eight learning disabled boys from the fifth and sixth grades. Several criteria for subject selection were employed.

Mental Ability Criterion

The criterion for level of intelligence for the learning disabled students was an I.Q. score at or between 90 and 115 (Table 1) on one of the following individually administered intelligence tests:

Table 1. Individual Student Characteristics.

Student	Age	Grade Placement	I.Q. Score	Reading Comprehension Achievement
Adam	11.4	5.8	WISC-R 94	ITBS 3rd stanine
Ben	11.2	5.8	WJPEB 104	ITBS 3rd stanine
Bob	10.0	5.8	K-ABC 104	ITBS 3rd stanine
Calvin	11.2	5.8	WISC-R 92	ITBS 3rd stanine
David	12.3	6.8	K-ABC 95	Woodcock 1st percentile
Gerry	10.0	5.8	WISC-R 104	Woodcock 10th percentile
Jack	12.1	6.8	WJPEB 100	ITBS 3rd stanine
Sam	13.1	6.8	WISC-R 91	ITBS 3rd stanine

1. Wechsler Intelligence Scale for Children--Revised (WISC-R) (Wechsler, 1977).
2. Woodcock-Johnson Psycho-Educational Battery, Part I (WJPEB) (Woodcock and Johnson, 1977).
3. Kaufman Assessment Battery for Children (K-ABC) (Kaufman and Kaufman, 1983).

Reading Achievement Criterion

Reading achievement was measured on the Iowa Test of Basic Skills (ITBS, 1986) using the comprehension subtest. The reading achievement criterion for the learning disabled students was a score of first to third stanine on the ITBS comprehension subtest, or at least two years below grade placement in reading comprehension. In two cases, learning disabled students were exempted from group testing because the district did not give the test to students in self-contained classes for learning disabled students. In the case of students who were exempt from the ITBS, scores below the 23rd percentile on the Woodcock Reading

Mastery Tests, Passage Comprehension Subtest (Woodcock, 1973), served as evidence of a reading difficulty (Table 1).

Subject Selection

The students were recruited from three elementary schools in two Southwestern metropolitan school districts. The elementary schools were composed primarily of students from the middle to upper class level. The ethnic backgrounds of the students in these schools were representative of the overall ethnic balance in the district.

The records of over 25 fifth and sixth graders in learning disability resource programs were reviewed. Approximately 60 percent of these records showed data which failed to meet the subject selection criteria for mental ability or reading achievement. All eight of the students remaining in the subject pool were included in the study. No female students met the criteria. On the Iowa Test of Basic Skills (ITBS) reading comprehension subtest, six students scored at the third stanine. Two learning disabled students who took the Woodcock Reading Mastery Test achieved scores at the tenth and first percentile in passage comprehension (Table 1).

Materials

To study the effect of background knowledge on comprehension monitoring of expository materials, a number of assessment instruments and experimental texts were developed.

Pre-Experimental Inventory

A pre-experimental inventory was designed for the purpose of determining topics for which the subjects had high and low interest and high and low background knowledge. The inventory was administered individually prior to the actual study and provided data which were used to select the ten topics of the expository passages that were investigated. The inventory consisted of a list of 30 specific expository text topics.

The inventory of topics was set up to allow the students to indicate their prior degree of knowledge and interest in the suggested topics. A large fabric board was placed in front of the student. The board was divided in half, the left side indicating the extent of the student's background knowledge on a five-point scale, and the right side indicating his level of interest, also on a five-point scale (1 indicated a high level, while 5 indicated a low level). Each topic was written on a separate card and the cards were placed in a pile on the table. The student placed each card on the board under the statement that represented his knowledge or interest about the topic. The researcher recorded the responses. The Pre-Experimental Inventory appears in Appendix A.

To clarify the inventory for the subjects, an example was given showing how to rate and rank three topics which were not included among those listed.

Data from the pre-experimental inventory were analyzed to develop a list of ten topics that subjects chose as high and low background knowledge and medium interest. Table 2 shows the frequencies for

Table 2. Frequencies of Rating Topics as One of Five Background Knowledge Levels and One of Five Interest Levels.

Background Knowledge Level:

1 = I know everything
 2 = I know a lot
 3 = I know something
 4 = I know a little
 5 = I don't know anything

Interest Level:

1 = I am extremely interested
 2 = I am very interested
 3 = I am somewhat interested
 4 = I am a little interested
 5 = I am not interested at all

Background Knowledge Level					Topic	Interest Level				
1	2	3	4	5		1	2	3	4	5
1	0	4	3	0	Spiders	0	1	5	2	0
0	0	1	1	6	Sally Ride	0	3	1	2	2
0	3	4	0	1	The Great Whale	1	2	3	2	0
1	2	1	3	1	George Washington	2	5	0	1	0
0	0	3	4	1	Tornadoes	1	2	4	1	0
0	0	0	4	4	The History of Money	3	1	0	2	2
1	4	2	0	1	The Statue of Liberty	4	2	1	1	0
1	2	5	0	0	Sunlight	1	3	3	1	0
0	3	1	4	0	Martin Luther King, Jr.	0	3	3	2	0
0	2	1	1	4	Flying Fish	2	2	0	3	1
0	3	1	2	2	UFO's	3	3	0	1	1
0	2	0	4	2	The Loch Ness Monster	1	2	1	3	1
2	1	0	3	2	Termites	2	2	1	0	2
0	0	0	1	7	The Elephant Bird	2	1	2	1	2
2	1	2	3	0	Skunks	1	3	2	1	1
2	3	1	2	0	Roller Skating	0	5	0	2	1
1	3	2	2	0	Earthquakes	1	3	2	2	0
1	0	4	2	1	Police Dogs	0	4	2	2	0
0	1	1	0	6	The Yeti	3	0	1	2	2
0	1	2	3	2	The Magician	1	3	2	2	0
2	2	1	3	0	Fireman and His Work	0	2	2	2	2
2	2	0	4	0	The Sun	2	3	1	2	0
3	3	0	1	1	Monster Movies	3	1	2	0	2
0	1	1	3	3	A Forest Ranger's Life	0	1	3	2	2
1	3	1	2	1	Pioneers	0	4	3	1	0
0	0	0	4	4	The History of Salt	1	0	0	4	3
0	0	2	0	6	Indian Boy	0	1	1	4	2
0	2	1	0	5	Wheels in Our Life	1	2	3	0	2
0	3	0	3	2	A Cowboy and His Clothes	2	1	2	1	2
2	1	1	3	1	The History of the Car	3	0	4	1	0

each rating on knowledge and interest for each of the 30 topics. The ten topics selected for the study represent:

1. Five topics of high background knowledge, medium interest: The Great Whale, Sunlight, Fireman and His Work, Skunks, and Earthquakes.
2. Five topics of low background knowledge, medium interest: Sally Ride, Indian Boy, The Elephant Bird, The Yeti, and A Forest Ranger's Life.

Background Knowledge Survey

For each of the ten selected topics, a set of five multiple-choice questions was prepared to measure whether the actual background knowledge matched the subjects' reported rating on the pre-experimental inventory. The questions sampled general and specific knowledge of the topic. The background knowledge survey appears in Appendix B, and the results from the survey are shown in Table 3.

Two topics from the ten that did not yield high or low knowledge scores on the multiple-choice survey and did not discriminate between high and low background knowledge were dropped from the study. Two other topics were used for interference passages. The six remaining topics were used in the study. The Earthquake topic, for which the subjects claimed to have high background knowledge, actually tested as low background knowledge; therefore, it was grouped with the low background knowledge topics. The Indian Boy topic, for which the subjects claimed to have low background knowledge, actually tested as high background

Table 3. Results of the Background Knowledge Survey.

	Raw Score	Percentage	Correct Answers for Each Question				
High Background Knowledge Topics:							
Indian Boy	40	100	8	8	8	8	8
Fireman and His Work	38	95	8	7	7	8	8
Skunks	37	92.5	8	7	8	8	6
The Great Whale	35	87.5	5	8	6	8	8
A Forest Ranger's Life	33	82.5	8	1	8	8	8
Low Background Knowledge Topics:							
The Elephant Bird	27	67.5	7	8	5	2	5
Sunlight	26	65	8	7	2	4	5
The Yeti	26	65	5	5	6	4	6
Earthquakes	25	62.5	4	0	7	6	8
Sally Ride	25	62.6	2	5	6	6	6

knowledge; therefore, it was grouped with the high background knowledge topics. The six topics finally selected were as follows:

1. Three topics of high background knowledge, medium interest:
Indian Boy, Skunks, and Fireman and His Work.
2. Three topics of low background knowledge, medium interest:
Earthquakes, Sally Ride, and The Yeti.

Expository Text Passages

For each of the topics selected, an expository text passage was adapted. Passages used in the study appear in Appendix C. The text passages were highly similar in structure, predicted readability, and length. The passages about Earthquakes, A Fireman and His Work, and the Skunks were adapted from passages appearing in the book New Practice

Readers, B (Grover and Anderson, 1960). The passage about the Indian Boy was adapted from the book New Practice Readers, C (Stone, 1962). The passage about The Yeti was adapted from the book Getting the Facts, C (1964). The passage about Sally Ride was adapted from an article appearing in Stars magazine ("Sally Ride Spacewoman," 1983).

Predicted readability levels were estimated by the publishers of the books and the magazine that were used in the study. According to these estimations, predicted reading levels ranged from third to fourth grade. Since the reading achievement criterion for the learning disabled students in the study was at least two years below grade placement, the selected passages were appropriate for their reading comprehension level. The average length of each of the six passages was 127 words.

Each passage was adapted so that it contained two inconsistencies, one in the main idea and one among the details. The inconsistency in the main idea was placed in the third sentence of the first paragraph and the inconsistency among the details was placed in the first sentence of the third paragraph. In the three high background knowledge passages, the inconsistencies presented information that was assumed to be inconsistent with the students' background knowledge. In the three low background knowledge passages, the inconsistencies presented information that was assumed not to be inconsistent with their background knowledge.

Comprehension Monitoring Instruments

The comprehension monitoring instruments for each of the passages consisted of ten probe questions. The first three were general probes and were introduced to supply information concerning the subject's awareness of the passage inconsistencies. The first question was, "What do you think about the passage?" The second was, "Do you have any questions?" The third was, "Did everything make sense?" The next probe requested that the student tell the investigator everything he remembered about what he had read in his own words. This was followed by the general question, "Did everything make sense?" The next four probes were questions concerning elements of the passage and two of these were specific probes involving the inconsistencies. The last question was, "Do you think other students would like to read the passage, and in what grade level?" The Comprehension Monitoring Instruments appear along with corresponding reading passages in Appendix C.

Practice Passage

A practice passage served as an indication that the subjects had the ability to read and recall a passage. The topic of this passage was Spiders, and it was taken from the New Practice Readers, B (Grover and Anderson, 1960; see Appendix D).

Interference Passages

The purpose of two passages was to interfere with the effect of the repeated passage anomalies of the six experimental expository passages. The two interference passages were similar to the six expository passages in their length, predicted readability, and structure; they

were different in the sense that they did not contain passage inconsistencies. The interference passages (Appendix E) were about the whale, "Meet Mister Big," from Getting the Facts, C (1964), and about sunlight, "Now You See Them, Now You Don't," from New Practice Readers, B (Grover and Anderson, (1960).

Procedure

Data collection for the study took place on six different occasions and the subjects were seen individually by the investigator. On the first occasion, data from the pre-experimental inventory were collected to assess the subjects' background knowledge and interest in 30 topics. On the second occasion, each potential subject received the Background Knowledge Survey and the practice passage for word recognition and recall. Students whose performance met the subject selection criteria were then chosen to participate in the main study. On the third and subsequent occasions, two passages were read and the comprehension monitoring instruments were collected. On the third and fifth occasions, either a high background knowledge or a low background knowledge passage was given along with an interference passage. On the fourth and sixth occasions, a high background knowledge passage and a low background knowledge passage were given.

Pre-Experimental Data Collection

Pre-experimental data were collected prior to the experiment. Each subject rated 30 topics to ascertain his relative interest and background knowledge. Subjects were given a fabric board with a five-point scale on it and they were given 30 topics written on separate

cards. The subjects were asked to indicate their level of background knowledge and their level of interest by placing each topic under the statement that represented their knowledge or interest level. To control for possible order effect, the topics on the Background Knowledge Survey were presented randomly.

Data from the pre-experimental inventory determining topic interest and background knowledge were analyzed to select the ten topics the subjects indicated were of high and low background knowledge and low to medium interest.

In the second component of the pre-experimental data collection, subjects answered multiple-choice questions on each of the ten chosen topics to verify the subjects' previous prior knowledge. After the analysis of these data, the six topics that showed the highest relationship between what the subjects implied about their knowledge and their actual knowledge were selected, and two other passages were chosen to serve as interference passages.

Experimental Data Collection

Students who satisfied all criteria for inclusion in the main study met with the investigator individually to read and answer the probe questions over each passage. To control for order effects, the order of administration of the six passages and the two interference passages was randomly assigned to the subjects.

The following procedure took place for each of the passages. Subjects were given a passage and were told, "Here is a short passage. Read it to yourself and take as much time as you want. After you finish

your reading, I will turn on the tape, and you will answer some questions and tell the passage as you remember it." The probe questions and answers including the recalls were taped.

Scoring the Data

Primary data consisted of a subject's recall of six expository passages. Supplementary data consisted of the subject's responses to general probe questions and specific probe questions.

Recall of the Passages

The subject's recall attempts were transcribed and then rated as to those which maintained the passage inconsistencies, those which omitted the passage inconsistencies, and those which showed distortion of the original text by resolving the inconsistencies. A list of the text inconsistencies appears in Table 4. The scoring procedure was adapted from Filip (1982).

Recall was first scored as to whether each unit was maintained, omitted, restructured, or presented in light of new information:

1. Maintained. An inconsistency was considered as maintained if it was explicitly or implicitly stated in the retelling.
2. Omitted. An inconsistency was considered as omitted if there was no mention of the inconsistency in the retelling.
3. Restructured. Restructuring was defined as partially resolving the passage inconsistency. For instance, a retelling about the Skunk contained the statement, "Their scent, well, they have a good scent when they are not spraying." The student omitted the inconsistency that the skunk has a "pleasant smell" but he also

Table 4. A List of Text Inconsistencies.

Passage	Inconsistency	
Skunks	Main idea	Skunks are known to have a very pleasant smell or scent.
	Details	When skunks are afraid they shoot out a very strong smelling spray that lasts for a few minutes.
Fireman and His Work	Main idea	Working as slowly as possible has saved many lives.
	Details	When firemen arrive at a fire, some connect the hose, while others aim their weapon.
Indian Boy	Main idea	To learn these things, the Indian boy went to school just like boys and girls do today.
	Details	Daily practice in shooting with a rifle might be part of the Indian boy's life.
The Yeti	Main idea	People who live in Tibet have caught the Yeti.
	Details	The Yeti has only one toe.
Sally Ride	Main idea	Sally is famous as the first Russian woman to go into outer space.
	Details	Sally Ride is a piano player.
Earthquakes	Main idea	Earthquakes that occur under the sea cause the most damage.
	Details	Luckily, not many earthquakes happen in a year.

tried to lessen it by adding an explanation that their smell is good only when they are not spraying.

4. New Information. New information was defined as if additional information was added in place of the inconsistency in order to resolve the passage inconsistency. For instance, a retelling about the Indian Boy contained the statement, "Indian boys from long ago had to learn things from their fathers." The student omitted the inconsistency "to learn these things, the Indian boy went to school just like boys and girls do today"; instead, he added new information that did not appear in the original text.

Comprehension Monitoring Probes

In addition to scoring the recall, the general and specific probe questions were also scored. The first three and fifth questions were general questions designed to check the subject's awareness of text inconsistency. These four questions were scored under two categories of responses:

1. No expressed awareness of inconsistency. In this category, scored responses indicated that there was no conflict between the student's background knowledge and the text inconsistency. For example, a general response to the first question, "What do you think about the passage?," a negative answer to the second probe, "Do you have any questions?," or a positive answer to the third question, "Did everything make sense to you?," indicated no conflict with the inconsistency.

2. Expressed awareness of inconsistency. A question was scored as "expressed awareness of inconsistency" if the student's response indicated a conflict between his background knowledge and the text inconsistency. For instance, when a student was asked, "Did everything make sense?," in reference to the the skunk passage, he answered, "No. When they say that he [the skunk] has a very pleasant smell or scent, which they don't, their scent stinks, and they say that the smell stays for a few minutes, which it doesn't."

The seventh and ninth specific probes that directly questioned the inconsistency in the main idea and in the details were scored in the same manner as the recall of the passage.

Interscorers Reliability

Reliability for scoring the passage recalls and the probes was determined. The passages were first scored by the investigator. A second scorer, a teacher, was trained by the investigator to use the scoring system and then scored the data. If there was a disagreement between the investigator and the second scorer, the scoring sheet was given to a third trained scorer to determine final score.

For the Earthquakes passage, the Indian Boy passage, and the Skunk passage, there was initial agreement between the investigator and second scorer on the category assignment for passage retelling of 11 of the 12 inconsistencies that were checked (91.6 percent). The difference between scorers was in reference to the restructured category and the

new information category. Agreement between the two scorers on the other three passages was 100 percent.

Data Analysis

The purpose of the study was to compare the comprehension monitoring skills of learning disabled students when reading high background knowledge expository text versus low background knowledge expository text. The first data, the expressed awareness of text inconsistencies, were categorized as to whether the students expressed awareness or did not express awareness. Due to lack of evidence of awareness responses in both the high and the low background knowledge passages, a statistical test was not applied to analyze the data.

Frequencies and percentages were used to analyze the responses of the students in one of three categories: maintaining, omitting, or resolving the text inconsistencies during retelling, specific probes, and retelling and specific probes together in both high and low background knowledge passages.

Finally, a non-parametric statistical method, the Signed Rank Test (WILCOXON) (Hollander and Wolfe, 1973) was applied to analyze differences between the above categorical data from the retelling and specific probes in high background knowledge passages as compared with those in low background knowledge passages.

By comparing the differences of the results scored on the text material including "prior knowledge" to the results scored on the text material without "prior knowledge" (pretreatment), the statistical studies showed whether or not the pretreatment had any significant

effect on the scores. If an effect was observed, the significance of the difference between scores was determined.

In addition, the statistical study showed the confidence interval in which the difference between the two categories of scores fell (with a certain probability). The specific confidence interval was based on the Signed Rank Test (WILCOXON).

CHAPTER 4

RESULTS

This study investigated whether learning disabled students differ in their comprehension monitoring while reading high background knowledge expository text versus low background knowledge expository text. The theoretical support for the research questions was derived from the conceptualization of the learning disabled student as an inactive learner who does not employ task-appropriate strategies.

Four research questions, as posed in Chapter 1, Statement of the Problem, were formulated for investigation. Eight learning disabled fifth and sixth graders read and produced retellings of six expository passages which contained informational inconsistencies in the main idea and details. Three were high background knowledge passages and three were low background knowledge passages. For each passage, three general comprehension monitoring probes were given before the retelling probe and another general probe. In addition, three specific comprehension monitoring probes were given, as well as a probe in which students were asked to evaluate whether other students would like to read the passage.

The general probes were analyzed as to whether students expressed awareness of text inconsistencies. The retelling and specific probes were analyzed to determine if students maintained text inconsistencies, omitted them, or resolved the inconsistencies by activating their schema. The results of these analyses are presented in this

chapter. Data from general comprehension monitoring probes will be discussed first, followed by results from the strategies being used in high and low background knowledge passages.

Question 1

The first research question asked whether learning disabled students showed more awareness of text inconsistencies when reading high background knowledge passages than when reading low background knowledge passages. The first three general probe questions that were given to the students immediately after they read each passage and the general probe that was given immediately after students retold each passage were categorized as to those which 1) expressed awareness of text inconsistencies and 2) did not express awareness of text inconsistencies. As discussed in Chapter 3, Procedures, each of the eight learning disabled students read three high background knowledge passages, which allowed a total of 24 possible responses from all of the students. Each of the same eight students read three low background knowledge passages, which allowed a total of 24 responses.

Only two of the eight students expressed awareness of text inconsistencies after they read the high background knowledge passages. These two students claimed that the passages did not make sense and provided an explanation of what did not make sense in three responses (Table 5). One of the two students expressed awareness only in the Skunks passage, while the other one expressed awareness in two passages, Skunks and Fireman and His Work.

Table 5. Frequencies of Expressed Awareness Responses.

Passage	Expressed Awareness	Did Not Express Awareness
High background	3	21
Low background	1	23

In the three low background knowledge passages, only one of the eight students expressed awareness of text inconsistencies, in The Yeti passage (Table 5). This was the same student who questioned the two high background knowledge passages.

In summary, when responses of expressed awareness for text inconsistencies in high background knowledge passages (3 out of 24) were compared to responses of expressed awareness in low background knowledge passages (1 out of 24), there was not enough evidence to indicate a significance between the awareness of learning disabled students who read either high background knowledge passages or low background knowledge passages. In both cases, the learning disabled students generally did not express awareness.

Question 2

The second research question asked how learning disabled students monitor their comprehension when confronted with high background knowledge passages with inconsistencies. The results were analyzed to determine if subjects maintained text inconsistencies, omitted them, or resolved them with the support of their background knowledge. Each of

the eight students read three high background knowledge passages, each containing two inconsistencies. The total possible responses for all the students was 48. Table 6 presents frequencies of responses used in retelling probes and specific probes.

When retelling the passages, the students tended to omit the text confusions. This strategy was used in 27 responses (56.2 percent). In only 10 responses (20.8 percent) did students try to resolve the inconsistencies, mainly restructuring the passage (nine responses) rather than supplying new information (one response).

In contrast to the retelling, when answering specific probe questions, students had to interact directly with the inconsistencies and provide an answer. Therefore, no omission responses were expected. However, results showed seven omitted responses (14.6 percent) and those responses were given for only one passage, Fireman and His Work, due to incorrect prediction of the responses to the question "What do firemen

Table 6. Frequencies and Percentages of Responses in Retelling, Specific Probes, and Both Retelling and Specific Probes When Reading High Background Knowledge Passages.

		Maintained	Omitted	Resolved
Retelling	Raw score	11	27	10
	Percentage	22.9	56.2	20.8
Specific probes	Raw score	15	7	26
	Percentage	31.2	14.6	54.2
Retelling and specific probes	Raw score	26	34	36
	Percentage	27.0	34.4	37.5

do when they arrive at the fire?" When answering this question, the students could have omitted the inconsistency and still have given a correct answer.

Results indicated that, when given specific probes, students used resolution strategies in more than 50 percent of the responses (26 responses out of 48). The major difference between the two types of resolution strategies under specific probes and retelling was the difference between new information responses: 16 responses in specific probes versus one response in retellings.

Across retellings and specific probes, students used a variety of strategies to deal with text inconsistencies. Omitted and resolved strategies were used almost equally (33.4 and 37.5 percent, respectively). Only 27 percent of the overall responses maintained text anomaly.

Question 3

The third research question asked how learning disabled students monitor their comprehension when confronted with low background knowledge expository passages containing inconsistencies. Each of the eight students read three low background knowledge passages, each containing two inconsistencies. Therefore, 48 responses were expected to be provided from all the students. However, in two cases, the students could not offer responses and the final total was 46 responses. The results were analyzed in the same manner as for Question 2. Data presented in this section are shown in Table 7.

Table 7. Frequencies and Percentages of Responses in Retelling, Specific Probes, and Both Retelling and Specific Probes When Reading Low Background Knowledge Passages.

		Maintained	Omitted	Resolved
Retelling	Raw score	16	27	5
	Percentage	33.3	56.2	10.4
Specific probes	Raw score	37	0	9
	Percentage	80.4	0.0	19.6
Retelling and specific probes	Raw score	53	27	14
	Percentage	56.4	28.7	14.9

Results indicate that when retelling the passages more than 50 percent of the responses (27 responses) omitted the text inconsistency, while only five responses (10.4 percent) resolved the text inconsistencies and all of these five involved restructuring of the inconsistencies. In comparison, during specific probing, when omission could not be used as a response, only nine responses (19.6 percent) resolved the text anomaly, while 37 responses (80.4 percent) maintained the text anomaly.

Across retelling and specific probes, the majority of the responses maintained the text inconsistencies when students read low background knowledge passages. Results also showed that when students dealt with text inconsistencies the most commonly used strategy was omittance (28.7 percent), whereas in only 14.9 percent of the responses did students resolve the text anomaly.

Shifting Omitted Strategies

From visual analysis of Tables 6 and 7, the same percentage (56.2) of omitted responses was provided during retelling in both high and low background knowledge passages. These data could not indicate whether omission in retelling was a result of a strategy for resolving text inconsistencies, or whether omission was due to the subject's perception of some inconsistencies as being unimportant. Therefore, a question was formulated to verify the change of the individual omitted responses under specific probes when students were forced to either resolve the text anomaly and use their schema, or to maintain the text anomaly.

A closer look at the individual protocols indicated that there was a difference between shifting the omitted strategy from retelling to specific probes in high background knowledge passages as compared with low background knowledge passages. Table 8 shows how the omitted

Table 8. Frequencies for Changing Omitted Strategy from Retelling to Specific Probes by Students Reading High Background Knowledge Passages versus Low Background Knowledge Passages.

	Omitted	
	High Background Knowledge Passages	Low Background Knowledge Passages
Maintained	7	20
Omitted	5	0
Resolved	15	6

strategy changed. When retold the high background knowledge passages, 15 omitted responses were provided and were changed to resolved responses under specific probe conditions; whereas, when retold the low background knowledge passages, 20 omitted responses were provided and were changed to maintain the text confusion under specific probe conditions.

Question 4

The fourth research question asked if learning disabled students were significantly more effective in monitoring their comprehension when confronted with high background knowledge expository passages containing inconsistencies than when confronted with low background knowledge passages containing inconsistencies.

To answer this question, a non-parametric statistical method was used. Data were analyzed using the Signed Rank Test (WILCOXON) (Hollander and Wolfe, 1973), and the level of significance was set at $\alpha = 0.05$. The results from the Signed Rank Test are summarized in Table 9. Specific test results for each strategy are presented in Appendix F.

After analyzing the frequency data of the comprehension monitoring responses in both high and low background knowledge passages (as presented in Questions 2 and 3 above), it became obvious that there was a difference between the responses during retelling and during specific probe conditions. Therefore, data were analyzed to answer the fourth question as to the retelling and specific probe conditions for both the high and the low background knowledge passages.

Table 9. Source Table for Comparing the Use of Comprehension Monitoring Strategies in High Background Knowledge Passages versus Low Background Knowledge Passages.

		T^+ ^a	N^b	α
Retelling	Maintained	11.5	5	0.19
	Omitted	10.0	6	No evidence to reject the null hypothesis
	Resolved	8.0	4	0.18
Specific probes	Maintained	36.0	8	0.004
	Resolved	36.0	8	0.004

^a T^+ = the sum of the positive signed ranks.

^b N = the number of positive differences between high background knowledge and low background knowledge.

Under the retelling condition, there were no significant differences between strategies being used either in high background knowledge passages or in low background knowledge passages. For maintained strategy the α level was 0.19, and for omitted strategy there was not enough statistical evidence to reject the null hypothesis. The resolved strategy yielded an α of 0.18. Results indicated that students equally used maintained, omitted, and resolved strategies in both high and low background knowledge passages.

As was mentioned when presented with the results for Question 2, during specific probing, students could not omit text inconsistencies as a response. Therefore, the omitted category was not included in the following analysis.

Under the specific probe condition, there was a significant difference ($\alpha < 0.004$) between maintained responses in high background knowledge passages as compared to low background knowledge passages. In other words, when reading low background knowledge passages with inconsistencies, students maintained the inconsistencies with a significantly greater number of responses than in the high background knowledge passages.

Results of the resolved responses during the specific probe condition also showed a significant difference ($\alpha < 0.004$) between high background knowledge passages and low background knowledge passages. These results indicate that significantly more resolved responses were provided in high background knowledge passages than in low background knowledge passages.

Summary

When comparing student expressed awareness of text anomaly in high background knowledge passages as compared to low background knowledge passages, no difference was found. The students did not verbally express awareness in either type of passage.

When reading high background knowledge passages with inconsistencies, in more than 50 percent of their responses the students omitted the inconsistencies in their retellings, while in more than 50 percent of the responses students resolved the text inconsistencies when answering specific probes. Overall, students equally omitted and resolved the inconsistencies.

When reading low background knowledge passages with inconsistencies, in more than 50 percent of their responses the students omitted the text inconsistencies from their retellings. In 80 percent of their responses, the students maintained the inconsistencies when answering specific probes. Overall, students maintained the text anomaly.

When analyzing the individual protocols, there was a difference between strategies changed from omission in retelling to resolution in specific probes in high background knowledge passages and from omission in retelling to maintained in specific probes in low background knowledge passages.

There were no significant differences in the strategies used in the retellings of students who read high background knowledge passages as compared with low background knowledge passages.

There were significant differences between high background knowledge passages as compared with low background knowledge passages in the use of strategies under specific probe conditions. In the low background knowledge passages, students maintained significantly more text inconsistencies, and in the high background knowledge passages students resolved significantly more text inconsistencies.

CHAPTER 5

DISCUSSION

The results of the present study provide additional support for Torgesen's conceptualization of the learning disabled student as an inactive learner. The results clearly demonstrate what has been found in previous research that showed the learning disabled student as having production deficiencies in comprehension monitoring when evaluating text with inconsistencies. The subjects in this research failed to spontaneously activate their schema by using comprehension monitoring strategies to evaluate both high and low background knowledge expository texts with inconsistencies. Nevertheless, when the subjects were specifically probed to deal with the inconsistencies, they were able to activate their schema and use the necessary processing strategies to resolve the text confusions in the high background knowledge passages. The results suggest that these students had comprehension monitoring in their repertoire, but that they failed to spontaneously apply these skills.

An exceptional behavior observed in one student can illuminate the other students' passive interaction with the text. This student questioned three of the six passages in the study (two high background knowledge and one low background knowledge passage). This student expressed much more confidence in himself than the rest of the students expressed, and he was aggressive in his responses. Some examples of his behavior when detecting an inconsistency were: "Tell the person who

wrote this passage that he made a mistake," or "Ask the person who wrote this to read more about the topic," and finally, "Next time, bring me something to read without mistakes."

One explanation for the absence of expressed awareness of text anomaly can be related to the fact that, rather than evaluating and criticizing the passage, the students did not question the integrity of the text and instead accepted the passages in a manner desired by the author, even if the information being presented conflicted with their own schema, and despite the fact they were encouraged to criticize the passage. An example from the present study can support this explanation. One student who read the Skunks passage said that the passage made sense to him. When prompted directly about the smell that the skunk has, the student said, "It is written that the skunk has a good smell but it is not true. Once, a skunk sprayed my dog and its smell stunk and it stayed for a few days." In other words, this student did not infer from his previous experience and evaluate or critique the passage. For him, what the author stated made sense although he knew something different. It appeared that, for the students in the study, it was acceptable for a text not to make sense. In support of the above, prior research that studied a reader's schemata for reading found that poor readers have little awareness of the fact that they must attempt to make sense of text material. Canney and Winograd (1979) showed that the poor reader's schemata for reading is a process of decoding rather than a meaning-obtainment process.

Three alternative explanations, other than the lack of a general awareness of cognitive process in the learning disabled student, may be

related to the absence of expressed awareness of text confusions. It is possible that the students had a lack of confidence in their own reading ability and, therefore, were less willing to criticize the passages. A closer look at the subjects' protocols showed that, as "consultants," the students did criticize the passages in general, but did not criticize the passage confusion. Some of the students claimed that the passage was not interesting enough, or that the passage was appropriate for younger children and not for their grade level. Another possibility can be related to the student's personality, as Holt (1964) suggested. Some students will not admit that they have failed to understand and they frequently will not ask questions for fear of appearing ridiculous. Baker and Brown (1980) added that the students might be unable to verbally explain their inference to resolve the confusion.

Finally, another possible explanation may come from the concept of "learned helplessness" (Seligman, 1975). Repeated failure and frustration may teach children that there is little they can do to be successful in an academic setting. Research with learning disabled children suggests that the experience of failure can lead children to believe that they do not have the ability to overcome their difficulties (Weiner, 1974). Wong (1980) added that these children increasingly rely on the teacher for help to learn and remember materials.

Additional results in the present study indicate the absence of a difference between the strategies used by students in retelling the high versus the low background knowledge passages. A question remains as to why omission was a more commonly used strategy in the students' retellings in both the high and low background knowledge passages.

Future research with the process of retelling is needed to investigate the use of omitted strategies in retelling a text with inconsistencies.

In conclusion, the present study demonstrates that learning disabled children do not automatically activate their schema with comprehension monitoring strategies. This is not to suggest that they lack the cognitive abilities to activate such strategies. The results show that the students have the cognitive abilities and that they demonstrate them only under structured instructions. This poor performance basically reflects a "production deficiency" and, because the learning disabled students are "inactive learners" who lack cognitive awareness and do not adopt task-appropriate strategies, it is understandable that they would not spontaneously activate their schema.

Implications

The results of this study suggest that learning disabled students do not spontaneously activate their schema by applying comprehension monitoring strategies. Therefore, the first educational implication focuses on the need for instructions from the teacher to strengthen the importance of attempting to use and integrate any relevant background knowledge to become more effective readers. In addition, specific instructions should be given in class to foster the students' evaluation of their own understanding of the text. Furthermore, learning disabled students should be trained to know when to activate the monitoring strategies they have in their repertoire. One technique that was used successfully in improving the comprehension monitoring skills of learning disabled students is self-questioning during reading

(Wong and Jones, 1982). A second strategy that has proven to be useful is Multipass (Schumaker et al., 1982). Also, further research is needed to determine additional conditions which foster the spontaneous activation of the student's background knowledge.

Researchers will need to assess the effect of background knowledge on the comprehension monitoring skills of learning disabled students in texts and settings other than those which are school related. Finally, there is a need to investigate the effect of the interest level and motivation of the reader on effective reading.

APPENDIX A

PRE-EXPERIMENTAL INVENTORY

This appendix contains the Pre-Experimental Inventory used in the study. The following instructions were given orally to the individual students:

You have a stack of cards with topics written on them. In front of you is a board with answers to two questions. I would like you to ask yourself about the topics on the cards. The left side of the board shows five possible answers to the question "How much do you know about the topic?" The right side shows possible answers to the question "How interested are you in the topic?" Place each card under the answer that is most true for you.

The following example was also provided for each student:

1. The first card is Ants of the Jungle. How much do you know about the topic? [The student answers.] So, you should place the card under [the appropriate statement].
2. Now, how interested are you in the topic? [The student answers.] So, place the card under [the appropriate statement].
3. Now put the Ants of the Jungle card facedown in front of the board and take the next card.

After completion of the example, the student was told:

Continue on your own with the rest of the cards and I will record your answers.

PRE-EXPERIMENTAL INVENTORY: EXAMPLE

I know everything	I know a lot	I know something	I know a little	I don't know anything	Topic	I am extremely interested	I am very interested	I am somewhat interested	I am a little interested	I am not interested at all
1	2	3	4	5	Ants of the Jungle	1	2	3	4	5
1	2	3	4	5	Abraham Lincoln	1	2	3	4	5
1	2	3	4	5	Baseball	1	2	3	4	5

PRE-EXPERIMENTAL INVENTORY

I know everything	I know a lot	I know something	I know a little	I don't know anything	Topic	I am extremely interested	I am very interested	I am somewhat interested	I am a little interested	I am not interested at all
1	2	3	4	5	Spiders	1	2	3	4	5
1	2	3	4	5	Sally Ride	1	2	3	4	5
1	2	3	4	5	The Great Whale	1	2	3	4	5
1	2	3	4	5	George Washington	1	2	3	4	5
1	2	3	4	5	Tornadoes	1	2	3	4	5
1	2	3	4	5	The History of Money	1	2	3	4	5
1	2	3	4	5	The Statue of Liberty	1	2	3	4	5
1	2	3	4	5	Sunlight	1	2	3	4	5
1	2	3	4	5	Martin Luther King, Jr.	1	2	3	4	5
1	2	3	4	5	Flying Fish	1	2	3	4	5
1	2	3	4	5	UFO's	1	2	3	4	5
1	2	3	4	5	The Loch Ness Monster	1	2	3	4	5
1	2	3	4	5	Termites	1	2	3	4	5
1	2	3	4	5	The Elephant Bird	1	2	3	4	5
1	2	3	4	5	Skunks	1	2	3	4	5

I know everything	I know a lot	I know something	I know a little	I don't know anything	Topic	I am extremely interested	I am very interested	I am somewhat interested	I am a little interested	I am not interested at all
1	2	3	4	5	Roller Skating	1	2	3	4	5
1	2	3	4	5	Earthquakes	1	2	3	4	5
1	2	3	4	5	Police Dogs	1	2	3	4	5
1	2	3	4	5	The Yeti	1	2	3	4	5
1	2	3	4	5	The Magician	1	2	3	4	5
1	2	3	4	5	Fireman and His Work	1	2	3	4	5
1	2	3	4	5	The Sun	1	2	3	4	5
1	2	3	4	5	Monster Movies	1	2	3	4	5
1	2	3	4	5	A Forest Ranger's Life	1	2	3	4	5
1	2	3	4	5	Pioneers	1	2	3	4	5
1	2	3	4	5	The History of Salt	1	2	3	4	5
1	2	3	4	5	Indian Boy	1	2	3	4	5
1	2	3	4	5	Wheels in Our Life	1	2	3	4	5
1	2	3	4	5	A Cowboy and His Clothes	1	2	3	4	5
1	2	3	4	5	The History of the Car	1	2	3	4	5

APPENDIX B

BACKGROUND KNOWLEDGE SURVEY

This appendix contains the Background Knowledge Survey that was administered during the second data collection period. The sets of questions for each of the ten topics are included. The oral instructions were:

Please follow along very carefully with me as I read each of the multiple-choice questions. Then, draw a circle around the number that best answers the question. You have been chosen to represent other students in your grade. That is why I would like you to answer the questions using the knowledge you already have about the topics. Remember, this is not a test. You are helping me understand how much students in your grade know about these topics.

Earthquakes

1. Most earthquakes happen
 - a) next to big cities.
 - b) where there are mountains.
 - c) under the sea.
2. Which statement is true?
 - a) All earthquakes cause damage.
 - b) Earthquakes happen often but we don't feel them.
 - c) Earthquakes happen only outside of the United States.
3. One reason for earthquakes might be
 - a) clouds cover a full moon.
 - b) floating glaciers shake the earth.
 - c) the rocks under the surface of the earth shake.
4. Damage from earthquakes can be stopped by
 - a) building stronger buildings.
 - b) living on the water.
 - c) sleeping in your car.
5. When earthquakes happen near large cities,
 - a) many people may be killed and many buildings knocked down.
 - b) all the dogs and cats will survive.
 - c) old gold mines will be discovered.

Sunlight

1. A rainbow is made by the sun shining through
 - a) a mirror.
 - b) raindrops.
 - c) smoke.

2. Sunlight is made of
 - a) only the white color.
 - b) red, orange, yellow, green, blue, and violet.
 - c) the dark colors.

3. When the colors of the sunlight are all together we see
 - a) all the colors.
 - b) white light.
 - c) we don't see anything.

4. When sunlight goes through water
 - a) it enters the water and turns black.
 - b) the light rays are bent and breaks up into different colors.
 - c) it stays there.

5. To see a rainbow you should
 - a) look directly at the sun.
 - b) look at the earth.
 - c) stand with your back to the sun.

Fireman and His Work

1. A fireman has to work
 - a) as fast as he can.
 - b) at a regular pace.
 - c) wearing shorts and sandals.

2. Which statement is true?
 - a) The faster firemen work, the less damage there is likely to be.
 - b) A fireman does not need any special training.
 - c) A fireman can give parking tickets.

3. Part of a fireman's job is
 - a) to find someone in the street who can help him put out the fire.
 - b) to talk with the people who watch the fire.
 - c) to help people who are hurt.

4. Firemen must know how to help people
 - a) by giving them help in breathing.
 - b) by telling them about the weather.
 - c) by teaching them how to drive the fire trucks.

5. When fighting a fire firemen use
 - a) pens and pencils.
 - b) skis, bells, and ropes.
 - c) ladders, hoses, and axes.

Indian Boy

1. The Indian boy of long ago
 - a) went to school.
 - b) learned those things he would need to use later on.
 - c) played games all the time.
2. What are those things that an Indian boy learned long ago?
 - a) How to play baseball with his friends.
 - b) How to read and write.
 - c) How to hunt.
3. Indian boys were trained to be
 - a) warriors and hunters.
 - b) car drivers.
 - c) bicycle riders.
4. The Indian boy had to learn to follow the tracks of
 - a) visitors from outer space.
 - b) dogs and cats.
 - c) people and wild animals.
5. The Indian boy had to learn how to use
 - a) a bow and arrow.
 - b) a pen and pencil.
 - c) a toothbrush and toothpaste.

Skunks

1. Skunks are best known for their
 - a) beautiful fur.
 - b) their bad smell.
 - c) their nice voice.

2. The skunk is about as big as a
 - a) cat.
 - b) horse.
 - c) lizard.

3. When skunks are afraid they
 - a) don't move until the danger is over.
 - b) run away.
 - c) shoot out a bad-smelling spray.

4. The smell from the skunk stays for
 - a) days and days.
 - b) does not stay.
 - c) a few minutes.

5. The skunk is a friend to the farmer because
 - a) it eats bugs and mice which hurt growing things.
 - b) the farmer's children like the skunks.
 - c) its smell drives away people the farmer doesn't like.

A Forest Ranger's Life

1. The forest ranger's job is to care for
 - a) only the trees in the forest.
 - b) the cabins people build in the forest.
 - c) the trees, the soil, and the animals in the forest.

2. Part of a ranger's work is to
 - a) cut and plant trees.
 - b) make sure no trees are cut.
 - c) watch for new leaves.

3. Many beautiful forests are being destroyed by
 - a) animals.
 - b) fires.
 - c) rain.

4. The ranger watches in the lookout for
 - a) birds.
 - b) rainbows.
 - c) smoke.

5. At the first sign of smoke the ranger
 - a) turns on the television and watches the weather program.
 - b) uses the telephone or radio to tell other rangers where the fire is.
 - c) looks for rain that can put out the fire.

The Yeti

1. A Yeti means
 - a) a wild man of the mountains.
 - b) a name for a new movie.
 - c) a kind of dinosaur.

2. Those who wish to find the Yeti go to
 - a) the zoo.
 - b) Tibet.
 - c) Spain.

3. So far, a Yeti has not been
 - a) caught.
 - b) searched for.
 - c) talked about.

4. A Yeti is said to be the size of a
 - a) dog.
 - b) tall man.
 - c) small man.

5. From pictures of the Yeti's tracks we can learn that
 - a) the Yeti has one toe.
 - b) the Yeti walks with bare feet.
 - c) the Yeti has feet similar to those of a small child.

The Great Whale

1. The largest animal that ever lived is the
 - a) dinosaur.
 - b) elephant.
 - c) whale.

2. A whale weighs as much as
 - a) fifty cars.
 - b) ten toys.
 - c) the moon.

3. The whale eats
 - a) other whales.
 - b) plants.
 - c) tiny animals in the sea.

4. The coat of fat around the whale is
 - a) green and pink.
 - b) two feet thick.
 - c) new.

5. The whale must keep away from
 - a) cold water.
 - b) waves.
 - c) people that hunt.

The Elephant Bird

1. An elephant bird is
 - a) an elephant with wings.
 - b) a giant bird.
 - c) the name of a new book.

2. Bones of the elephant bird have been
 - a) found.
 - b) made.
 - c) painted.

3. The elephant bird lived near
 - a) Africa.
 - b) China.
 - c) New York.

4. The elephant bird weighed
 - a) 1,000 pounds.
 - b) 100 pounds.
 - c) 10 pounds.

5. The egg of the elephant bird was as large as a
 - a) basketball.
 - b) big rock.
 - c) mountain.

Sally Ride

1. Sally Ride is
 - a) a famous tennis pro.
 - b) the first American spacewoman.
 - c) a piano player.

2. Which statement is true?
 - a) Sally got her start in the space program by answering an ad in a newspaper.
 - b) Sally quit school to play tennis.
 - c) Sally was not accepted to America's space program.

3. The name of Sally's spaceship is
 - a) California.
 - b) Challenger.
 - c) Columbia.

4. One important reason Sally was picked to fly in the Challenger was
 - a) her last name Ride sounded good for a spacewoman.
 - b) her mother and father said she could go.
 - c) she was a space scientist.

5. How many people went with Sally into space?
 - a) Four men.
 - b) She was the only one.
 - c) Two other women and one man.

APPENDIX C

EXPOSITORY TEXT PASSAGES AND COMPREHENSION

MONITORING INSTRUMENTS

This appendix displays the expository text passages and comprehension monitoring instruments for each of the topics. Oral instructions for each student were given in each of the third through sixth occasions of data collection. The instructions were:

Please read the following passage to yourself. When you are finished, I will ask for your opinion about the passage, then I will ask you to tell me the passage as you remember it in your own words. Finally, I will ask you some questions about the passage. Your retelling and answers will be recorded.

Indian Boy

The Indian Boy of long ago had many things to learn. He had to learn to walk in the woods without making any noise so he would not frighten away the deer his father was trying to kill. To learn these things, the Indian boy went to school just like boys and girls do today.

The Indian boy had to learn to make a fire by rubbing sticks together. He had to learn to follow the tracks of wild animals. He also had to learn the hiding places of animals and birds.

Daily practice in shooting with a rifle might be part of the Indian boy's life. In many tribes an Indian boy was trained to become a warrior. He was also trained to be a good hunter.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What kinds of things did the Indian Boy of long ago have to learn?
7. Where did the Indian boy learn how to be a good warrior and hunter?
8. How did the Indian boy start a fire?
9. What did the Indian boy use to shoot animals?
10. Do you think other students would like to read it?

A Fireman and His Work

Firemen have a difficult job. When the fire bell rings, they have to jump up, get on their truck, and get to the fire. Working as slowly as possible has saved many lives and many thousands of dollars.

As soon as the firemen arrive at the fire, they must spring into action and get to work. These firemen work to put out fires and give help to people who are burned or hurt. They must know how to help people who are overcome by smoke.

When firemen arrive at a fire, some connect the hose, while others aim their weapons. Others get ready to climb up the ladders with hoses and axes. Each fireman has a job to do, and each job has to be done well.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What must the firemen do when the fire bell rings?
7. How fast do the firemen have to work?
8. What kinds of people do the firemen help?
9. What kinds of things do the firemen do when they arrive at the fire?
10. Do you think other students would like to read it?

Skunks

Skunks are pretty little animals whose fur is black and shiny. They have white stripes on their backs and bushy black and white tails. Skunks are known to have a very pleasant smell or scent.

The skunk often makes its home in a hole in a tree. It is more of a friend than an enemy to the farmer because it eats bugs and mice which hurt growing things. This saves the farmer time and money.

When skunks are afraid they shoot out a very strong-smelling spray that lasts for a few minutes. This is how they keep their enemies away. Skunks are as big as cats and can make good pets after they have been fixed so they cannot spray their scent.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What color is the skunk's fur?
7. What kind of smell does the skunk make?
8. Where does the skunk live?
9. When the skunk shoots its spray, how long does it last?
10. Do you think other students would like to read it?

The Yeti

The people of Tibet call the Wild Man of the Mountains a Yeti.

A Yeti is an animal that is part man and part beast. People who live in Tibet have caught the Yeti, and they tell strange stories about him.

People say the Yeti is the size of a tall man and is covered with reddish-brown hair. He has a face flat like a monkey's, a very loud voice, and he walks on two legs. When he is frightened, he runs on all fours.

The Yeti has only one toe and he walks with bare feet in the cold mountain snow. His feet are very large and he leaves large footprints. Most people in Tibet are afraid of the Yeti because he is so different from any other animal.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. Where does the Yeti live?
7. How do the people know what a Yeti looks like?
8. How big is the Yeti?
9. How many toes does a Yeti have?
10. Do you think other students would like to read it?

Earthquakes

Earthquakes are one of the worst things that can happen on our earth. When earthquakes happen near large cities, many people may be killed and many buildings knocked down and many fires may be started. Earthquakes that occur under the sea cause the most damage.

Earthquakes come from a shaking of the rocks under the surface of the earth. Forces within the earth push against the rocks until they break. Sometimes, the earth above the break will split open.

Luckily, not many earthquakes happen in a year, and some of these are stronger than others. We cannot tell when an earthquake is coming. But we do know the places on the earth where they happen most often, and stronger buildings may help save lives in these places.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What happens when earthquakes occur near large cities?
7. Which earthquakes cause the most damage, those under the sea or those on the land?
8. How are earthquakes made under the surface of the earth?
9. How many earthquakes can occur in one year, many or very few?
10. Do you think other students would like to read it?

Sally Ride

Sally Ride has gone around the world. Sally rode in the spaceship Challenger and went on a very long ride. Sally is famous as the first Russian woman to go into outer space.

When Sally was 25 years old she read a newspaper ad. The ad was for women who wanted to be in the space program. More than 1,000 women answered the ad and Sally Ride is the woman who made it into space first.

Sally Ride is a piano player, and everyone was proud of her when she went into space. She had a lot of fun on her flight, but hard work led up to it. Sally worked harder than most men to get into space, and when she made it, Sally Ride made her place in history.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What was the name of Sally's spaceship?
7. Where is Sally Ride from?
8. How did Sally get her job?
9. What is Sally Ride's occupation?
10. Do you think other students would like to read it?

APPENDIX D

PRACTICE PASSAGE

Subjects were given the following practice passage and asked to read it aloud:

Spiders

Spiders are small animals that spin silk webs. They use their webs to trap the insects which they eat. Spider web silk is very strong. We use it for cross hairs in the eyepieces of telescopes and microscopes. We could use it for making clothes, if we could get enough of it. But it is hard to put spiders to work making silk for us. When many spiders are placed together, they eat each other.

Spiders eat different kinds of insects. This makes them very helpful to farmers. Some of the insects that spiders eat would do much harm to crops.

In this country, only a few spiders hurt people. One is a small black spider with a red spot on its underside. It is called the black widow.

APPENDIX E

INTERFERENCE PASSAGES

The same procedure described in Appendix C was used with the interference passages.

Sunlight

Sunlight is made of red, orange, yellow, green, blue, and violet. The colors are always there when the sun shines, but we cannot see them most of the time. When these different colors of light rays are all together, we see white light.

When sunlight goes through water, the light rays are bent. As each ray passes through a raindrop, it breaks up into the different colors of light. Then we can see red, orange, yellow, green, blue, violet, and many colors between.

After it rains, the air is full of raindrops. When the sun comes out and begins to shine, the sunbeams hit these drops. The sunlight is bent, and we see the colors of a rainbow in the sky.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What six different colors make up sunlight?
7. What color light is the sunlight that we see?
8. What happens to the light rays when the sunlight goes through water?
9. How is a rainbow made?
10. Do you think other students would like to read it?

The Great Whale

The largest animal that ever lived is alive today. Mister Big of all times is the great blue whale. He is as big as ten elephants standing head to tail, and he weighs as much as fifty cars.

Even the "small" parts of Mister Big are large. The heart of Mister Big weighs as much as six men. His fat tongue weighs as much as an elephant and his mouth is so large that a car can fit inside.

This large whale feeds on the smallest living things in the sea. These tiny animals, called plankton, are so small that they cannot be easily seen by the human eye. Mister Big, of course, must eat many of these to stay alive and he is still hungry after a one thousand pound meal.

Probe Questions

1. What do you think about the passage?
2. Do you have any questions?
3. Did everything make sense?
4. Tell me the story in your own words.
5. Did everything make sense?
6. What is the largest animal that ever lived?
7. How much does the whale weigh?
8. How much does the whale's tongue weigh?
9. What does the whale eat?
10. Do you think other students would like to read it?

APPENDIX F

SIGNED RANK TEST

The following tables display the results of the Signed Rank Test for the strategies used in the retellings (maintained, omitted, and resolved) and in specific probes (maintained and resolved).

Table F1. Signed Rank Test for Maintained Strategy Used in the Retellings.

$T^+ = 11.5$; $N = 5$.

Subject	Background Knowledge		Z_i	R_i	ψ_i	$R_i \psi_i$
	High	Low				
Adam	2	2	0	-	-	-
Ben	1	1	0	-	-	-
Bob	0	2	2	3.5	1	3.5
Calvin	2	2	0	-	-	-
David	0	1	1	1.5	1	1.5
Gerry	3	4	1	1.5	1	1.5
Jack	3	1	-2	3.5	0	0
Sam	0	3	3	5	1	5

Table F2. Signed Rank Test for Omitted Strategy Used in the Retellings.

$T^+ = 10$; $N = 6$.

Subject	Background Knowledge		Z_i	R_i	ψ_i	$R_i\psi_i$
	High	Low				
Adam	4	3	1	2	1	2
Ben	4	5	-1	2	0	0
Bob	2	4	-2	4.5	0	0
Calvin	4	4	0	-	-	-
David	4	4	0	-	-	-
Gerry	3	2	1	2	1	2
Jack	2	4	-2	4.5	0	0
Sam	4	1	3	6	1	6

Table F3. Signed Rank Test for Resolved Strategy Used in the Retellings.

$T^+ = 8$; $N = 4$.

Subject	Background Knowledge		Z_i	R_i	ψ_i	$R_i\psi_i$
	High	Low				
Adam	0	1	-1	2	0	0
Ben	1	0	1	2	1	2
Bob	4	0	4	4	1	4
Calvin	0	0	0	-	-	-
David	2	1	1	2	1	2
Gerry	0	0	0	-	-	-
Jack	1	1	0	-	-	-
Sam	2	2	0	-	-	-

Table F4. Signed Rank Test for Maintained Strategy Used in Specific Probes.

$T^+ = 36; N = 8.$

Subject	Background Knowledge		Z_i	R_i	ψ_i	$R_i\psi_i$
	High	Low				
Adam	3	5	2	2.5	1	2.5
Ben	1	5	4	7.5	1	7.5
Bob	2	4	2	2.5	1	2.5
Calvin	1	4	3	5.5	1	5.5
David	1	3	2	2.5	1	2.5
Gerry	3	6	3	5.5	1	5.5
Jack	3	5	2	2.5	1	2.5
Sam	1	5	4	7.5	1	7.5

Table F5. Signed Rank Test for Resolved Strategy Used in Specific Probes.

$T^+ = 36; N = 8.$

Subject	Background Knowledge		Z_i	R_i	ψ_i	$R_i\psi_i$
	High	Low				
Adam	2	0	2	4	1	4
Ben	4	1	3	6.5	1	6.5
Bob	3	0	3	6.5	1	6.5
Calvin	4	1	3	6.5	1	6.5
David	4	3	1	2	1	2
Gerry	2	1	1	2	1	2
Jack	2	1	1	2	1	2
Sam	4	1	3	6.5	1	6.5

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