THE EFFECTS OF INFORMED STRATEGY VS. MAPPING STRATEGY TRAINING ON READING COMPREHENSION PERFORMANCE IN LEARNING DISABLED AND AVERAGE STUDENTS

by

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B. A., Simon Fraser University, 1985

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in the Faculty of

Education

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Simon Fraser University

April, 1989

APPROVAL

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Degree: Master of Arts (Education)

Title of Thesis: The Effects Of Informed Strategy vs.
Mapping Strategy Training On Reading
Comprehension Performance In Learning
Disabled And Average Students

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THE EFFECTS OF INFORMED STRATEGY VS. MAPPING STRATEGY TRAINING ON READING

COMPREHENSION PERFORMANCE IN LEARNING DISABLED AND AVERAGE STUDENTS

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Abstract

The comparative effects of Informed Strategies for Learning (ISL) and semantic mapping strategies training on reading comprehension in learning disabled (LD) and average students were investigated in this study. Subjects were 74 public school students in grades 4 and 5. Of these, 35 were LD and the remaining were average students. Both types of strategies focussed on reading for meaning, attending to important text elements, linking information in the text to information outside the text (i.e. pictures, prior knowledge), and recognizing different types of discourse structures. Students in both training groups also were provided with a rationale for using the strategies and instructed about when and where to apply them. The study included pretests, 10 instructional sessions, and posttests. Both standardized and criterion referenced measures of reading comprehension were administered. As well, students completed measures of strategy use, an error detection task, and an interview. Of interest were differences between training and ability groups in terms of strategy use, reading comprehension, strategy awareness, and strategy value.

The results indicated that students used the strategies they were taught, and students in the ISL group used their strategies more. All students increased their awareness of strategy use from pretest to posttest. However, students in the ISL group increased their awareness more than students in the mapping group. LD students increased their awareness of strategies as much as average students. Small increases in value of strategies also were observed

for all students, with average students valuing strategies more than LD students. All students, except average students in the mapping condition, increased their scores on comprehension questions, and all students increased their scores on the free recall exercises from pretest to posttest. Scores on the Gates MacGinitie and the error detection task remained unchanged. Students in the ISL group recognized more discourse structures than students in the mapping group during training. However this superiority was not maintained at posttest. Average students scored higher on recognizing discourse structures than LD students at pretest and posttest.

For my dad.

Acknowledgements

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Chapter 1

Introduction

A strategy is a procedure or plan for completing a task. Strategies involve a sequence of activities, as opposed to single events, and require the deliberate, planful behavior of learners (Garner, 1987). Paris (1983) agrees that strategic behavior connotes intentionality and purpose on the part of the learner. Strategic behavior is under the learner's control; it does not happen by accident.

Skilled Versus Unskilled Readers

Skilled readers are strategic in their approach to reading comprehension tasks. They are aware of a task's requirements and they are aware of the strategies available to them, as well as their ability to employ such strategies, to meet the task requirements. Skilled readers ask more questions and take more notes than unskilled readers. They focus on the topic and attend to important text elements. They read for understanding, monitor their comprehension and apply effective strategies to repair breakdowns in comprehension. Moreover, they are able to distinguish between easy and difficult, organized and disorganized passages and they apportion their reading time appropriately (Palmer & Goetz,1988; Paris & Jacobs, 1984; Paris, Lipson, & Wixon, 1983; Paris & Oka, 1986a; Wong, 1987; Wong & Wong, 1986).

Skilled readers have content knowledge, strategy knowledge and metaknowledge. They have adequate factual information and vocabulary to cope with the content they read. They have knowledge about general strategies, which help them to study effectively, and about specific strategies, which help them to identify main ideas and summarize text. Finally, they are able to regulate their use of content and strategy knowledge. They recognize conditions in which to use certain strategies and apply appropriate content knowledge.

As well as these cognitive characteristics, skilled readers have affective characteristics that are related to their strategic behavior. They perceive themselves as able to handle reading tasks and they attribute their successes to effort and to the use of effective strategies (Palmer & Goetz, 1988). They have a constructive orientation toward failure (Clifford, 1984) in that they attach blame to ineffective or inappropriate strategy use. This results in persistence when tasks are difficult or failure occurs. Skilled readers are motivated to succeed and they realize that effective use of strategies can lead to success. They have both the skill and the will (Paris, 1983, 1988a) to behave strategically.

In contrast, unskilled and learning disabled (LD) readers have strategic deficits. They lack awareness of the range of reading strategies available to them as well as knowledge about when and how to use strategies. They lack understanding about the value of strategic behavior and often employ strategies ineffectively or inappropriately.

Unlike skilled readers, unskilled and LD readers are unaware of the purpose for reading and do not focus on important text elements. This results in poor recall and impedes their ability to paraphrase. LD readers, in particular, do not monitor their comprehension or self-correct and they do not vary their reading speed or allocate more study time to accommodate difficult passages. They do not apply strategies such as skimming, scanning or re-reading. Nor do they integrate information, plan ahead, take notes, make references or selectively study. Finally, they do not recognize inadequate or incomprehensible instructions and disorganized text (Baker & Brown, 1984; Paris, Lipson, & Wixson, 1983; Paris & Oka, 1986b; Wong, 1987; Wong & Wong, 1986).

Unskilled and LD readers do not share the cognitive and affective characteristics of skilled readers. They have insufficient knowledge in content areas and are unaware of strategies. Research has also shown that they don't exercise metacognition about reading. They are unaware of their strengths and weaknesses as readers and they do not regulate and coordinate their use of content and strategy knowledge to meet the requirements of reading tasks. Often, these readers have low levels of self-efficacy and they tend to attribute learning outcomes to factors that are out of their control (i.e. task difficulty). Expectations for failure as a result of perceived incompetence (Palmer & Goetz, 1988) lead to feelings of helplessness and to a lack of persistence when failure occurs. These readers are often not motivated to expend effort and to employ strategies to aid comprehension. They do not perceive the utility of

strategic behavior (Paris, 1988b; Paris, Lipson, & Wixson, 1983; Winne & Marx, 1989).

Instruction Influences Strategic Behavior

Differences between skilled and unskilled readers reflect not only learner characteristics but also instructional characteristics (Garner, 1987). Even though research documents the success of direct instruction for teaching and improving reading comprehension skills (Brophy & Good, 1986; Pressley, Snyder & Cariglia-Bull, 1988; Rosenshine & Stevens, 1986), very little direct instruction about strategies for reading is observed in classrooms (Doyle, 1983). Goetz (1984) speculates that possible reasons for this lack of direct instruction include the assumption that students will develop strategic behavior on their own and the lack of knowledge teachers have about reading comprehension strategies and how to teach them.

Research has shown that skilled readers develop a repertoire of reading strategies independent of instruction but less skilled readers do not. Unskilled readers need very stringent and systematic instructional procedures in order to acquire and apply [reading] strategies (Deshler, 1981). This fact reinforces the need for strategy intervention research in classrooms. Researchers need to demonstrate the value of strategic behavior to both students and teachers, and teachers need to be provided with methods and materials for teaching strategies effectively.

Direct instruction has several characteristics which make it work. The most salient of these seems to be the detailed

explanation of what strategies exist, how they work, why they are useful, and when and where to apply them. Students are given extensive instruction about how to use strategies through modeling and guided practice. When students become confident about their ability to perform a strategy, guidance is faded so that independence is achieved and mastery is demonstrated. In all phases of instruction, student performance is assessed and feedback that is performance based and corrective is provided (Garner, 1987; Paris, 1988b; Pressley, Snyder & Cariglia-Bull, 1988; Winograd & Hare, 1988).

Two Examples of Strategy Training

Informed strategies for learning. Paris (1987) has designed a package of instructional materials called The Reading and Thinking Strategies Kit (also referred to in the literature as Informed Strategies for Learning, ISL). This package contains eighteen reading comprehension strategies that teachers can use to instruct students about how to determine reading purposes, focus on important text elements, make inferences, and monitor comprehension. The Reading and Thinking Strategies Kit includes instructional materials for students (posters and workbooks) and detailed lesson plans for teachers. Lessons follow a direct instruction format, beginning with direct explanation and then moving from guided to independent practice. Paris advocates interaction between teachers and students through discussion about strategy use. He emphasizes the importance of students' participation in instruction to enhance awareness of strategies as

well as motivation and attributions toward using strategies. Suggestions for transfer activities are provided to promote durable and flexible strategy use.

Paris has tested his package in approximately 75 regular classrooms. The results of these studies indicate that his materials do increase strategy awareness and improve performance on comprehension exercises. Garner (1987) refers to Paris' program as "most ambitious." She commends the length of training and the variety of procedural conditions in natural settings. She notes that this research provides quite a contrast to the large number of relatively short-term experiments in the literature.

Mapping meaning. Concept mapping has also been used as a strategy for enhancing reading comprehension. Students have been taught to make schematic representations of text. These representations consist of nodes, containing keywords and phrases, and links, indicating relationships between nodes. The linking of related ideas has been used to teach students how to distinguish between main ideas and details in a passage and to help students to link information in the text to their existing knowledge. Also, particular arrangements of ideas on maps have been used to teach students to understand different structures of text (Flood & Lapp, 1988; Johnson, Pittelman, & Heimlich, 1986; Novak & Gowin, 1984; Sinatra, Stahl-Gemake, & Wyche-Morgan, 1986).

Maps can be made before reading a passage to activate prior knowledge about the topic and to facilitate students' understanding,

assimilation, and evaluation of the information in the passage. Alternatively, maps can be an interactive part of reading a passage, or they can be a postreading activity that helps students to organize and synthesize information in a passage (Johnson, Pittelman, & Heimlich, 1986; Sinatra, Stahl-Gemake, & Wyche-Morgan,1986).

Like ISL, concept mapping can be taught through direct instruction and discussion. It provides a good alternative to traditional reading activities and has proven to be a good motivational tool (Stice & Alvarez, 1987).

An Overview of the Study Described in This Thesis

This study compared the efficacy of a subset of ISL and concept mapping for enhancing reading comprehension in LD and average students.

Two ISL were selected and taught to average and LD students in small groups. This was done to provide a stringent measure of the efficacy of the ISL, given the characteristics of unskilled and LD readers. This study also magnified Paris' lesson plan by devising more detailed teaching scripts to facilitate the 'informed' instruction of these strategies and to promote their self-controlled use by students.

The first strategy provided students with three general executive skills for reading. Students were taught to set reading goals and purposes before they read, to monitor their comprehension while they read, and to think about important elements in a passage

after they had read it. The second strategy was more specific. It taught students to focus on the main ideas in a passage and to recognize different types of discourse structures.

As a contrast to the ISL, another group of students was taught to use concept mapping to find meaning in text. Like the students being trained to use the ISL, these students were taught to set reading goals, to identify important elements in text and to recognize different discourse structures. Also, students in the mapping group were encouraged to relate information from reading passages to their existing knowledge and to show these relationships in their maps.

Instruction for both groups was direct and extensive. Each session began with a teacher-guided discussion. Topics included: what the strategy was, why it was useful, how it could be employed, and when and where it might be used. This was done to promote strategy awareness, motivation and attributions toward strategy use, and self-efficacy about using strategies. First the instructor modeled the strategy and helped students to evaluate its effectiveness. Then the instructor guided students in their use of the strategies, gradually fading prompts to encourage students' independent use of the strategy. Students received feedback about their performance and engaged in discussion with the experimenter about how using or not using the strategy was related to their performance outcome. Students were also encouraged to think about how the use of a strategy might influence their performance in the future. This feedback was designed to promote self-efficacy in

students about their ability to use strategies and to encourage them to attribute their performance outcomes to effort and strategy use.

Research Questions

This study addressed four sets of questions. The first set of questions focussed on the efficacy of training. Did students use the strategies they were taught? If so were some components of the strategies used more than others, suggesting that students perceived them to have more utility (Paris, Lipson, & Wixson, 1983; Winne & Marx, 1989). Also, was there a relationship between strategy use and performance on comprehension measures?

The second set of questions addressed students' strategy awareness. Were students more aware of the reading comprehension strategies available to them after training and did they recognize appropriate situations in which to apply them? Was awareness related to competence in using the strategy?

The third set of questions focussed on whether students valued the behaviors involved in performing a strategy, whether value increased as a result of training, and whether the value placed on strategic behavior was related to strategy use.

Finally, and of primary interest, was whether readers became more skilled in reading as a consequence of training. Specifically, did strategy training improve reading comprehension? If so, did training in a strategy increase the amount of information recalled from a passage in general, or were changes in performance more

specific? Did training in strategies help students to focus on important text elements, facilitating recall of main ideas and facts; or did training in strategies lead to students making elaborations of text, or inferences based on the text? Also did students learn to recognize different discourse structures and did training result in increased comprehension monitoring?

The preceding questions were investigated by comparing students, before and after training, who were assigned to one of four groups. Each of these questions was applied to both treatment groups and both ability groups so that differences between groups could be explored during analyses. Did treatments differ in terms of training outcomes? Was one treatment generally more effective than the other, or were treatments differentially effective (i.e. concept mapping resulted in more inferencing and the main idea strategy from the ISL resulted in greater recall of important text elements)? Did one ability group benefit more from training than the other?

These questions will be addressed in the following chapters. Chapter two will review literature which points to the characteristics learners need to develop in order to behave strategically, and to the efficacy of direct strategy instruction for facilitating this development. Chapters three and four will describe the methodology and results of the study outlined in this chapter. Chapter five will discuss the implications of this study's findings for research and practice and make suggestions for future research.

Chapter 2

Review of the Literature

In chapter one, the characteristics of skilled readers were described. These include: adequate amounts of content knowledge, strategy knowledge, and metacognition about reading and strategy use; the belief that effort and effective strategy use will lead to successful task performance; belief in one's own ability to perform tasks successfully; and the will to do so. These characteristics will be elaborated here to determine their specific roles in strategic reading. This chapter will also focus on direct strategy instruction as a means for promoting the development of awareness, value, and use of strategies in unskilled readers. The purpose of reviewing the literature on these two topics, learner characteristics and instructional variables, is to shed some light on the question of how strategy instruction can benefit learners.

Learner characteristics

Knowledge. One of the reasons posited for the strategic behavior observed in skilled readers is that they possess adequate amounts of declarative and procedural knowledge about content and strategies, and they are able to access and apply that knowledge to facilitate their acquisition of new knowledge and retrieval of prior knowledge. Sternberg's componential model (1985) of knowledge representation provides a useful reference for thinking about how content knowledge, strategy knowledge and metacognition interact

and function while students are performing tasks. This model describes mental mechanisms underlying intelligent performance. It contains three categories of knowledge components: metacomponents, performance components, and knowledge acquisition components. Metacomponents are the executive control structures. They are responsible for planning, monitoring, and decision making. These components mediate communication between the other components, providing direct feedback to and receiving direct feedback from the performance and knowledge acquisition components. Performance components encode and manipulate information. They also are used in executing strategies for task performance. Knowledge acquisition components are responsible for acquiring and storing knowledge. Together, these knowledge components form an integrated, intelligent system. The metacomponents make a decision about a problem to be solved or a task to be performed and then select and combine the performance and knowledge acquisition components necessary to solve the problem or perform the task. As work on the problem proceeds, the metacomponents monitor the solution internally and process feedback from external sources. All three categories of components communicate with one another during problem solving and task performance.

In the past decade, researchers have emphasized the important role "executive" knowledge plays in learning. Flavell (1978) referred to this knowledge as metacognition and defined it as learners' knowledge about which factors or variables interact in what ways to

affect the course and outcome of cognitive enterprises. He identified three categories of variables perceived by metacognition: person, task and strategy. Person variables refer to abilities possessed by learners for performing tasks successfully. Task variables refer to the parameters or conditions (Winne, 1985) associated with a particular task. Strategy variables refer to the sets of procedures or techniques that learners can employ to perform tasks (Deshler, 1981).

Other researchers (Baker & Brown, 1984; Wong, 1985) distinguish between two dimensions of metacognition: knowledge about cognition and regulation of that knowledge. Knowledge about cognition refers to learners' awareness of their own cognitive resources, the compatibility between these resources and the learning situation, and the strategies available to them for performing tasks. Regulation of cognition refers to behaviors such as planning, checking, monitoring, testing, and evaluating which govern use of strategy and content knowledge. In short, metacognition is learners' knowledge about what they know, what they don't know and, perhaps, what they need to know. Also, it is the mechanism by which learners access and regulate the use of strategy and content knowledge for the performance of tasks.

Learners need declarative and procedural knowledge as well as metacognition to successfully meet task requirements. They need declarative knowledge in the form of propositions about strategies and content, they need procedural knowledge about how to execute strategies and apply content, and they need metacognition in order

to understand why and recognize when to apply strategy and content knowledge (Jacobs & Paris, 1987; Paris, Lipson, & Wixson, 1983).

Borkowski, Johnson, and Ried (1985) identify four kinds of strategy knowledge. Specific strategy knowledge, according to Borkowski et al., is knowledge of particular strategies for processing information (i.e., for rehearsal, organization or elaboration). Relational strategy knowledge helps learners recognize distinguishing features of specific strategies and to form strategy classification systems. Relational strategy knowledge also helps learners to compare and contrast specific strategies according to their strengths and weaknesses. This enables students to make decisions about which strategy to use in performing a particular task. General strategy knowledge refers to the awareness that effort is required to apply strategies and that an effortful, strategic approach will lead to successful performance. Borkowski et al. believe that general strategy knowledge is closely linked to motivation and to subsequent use of strategies once they have been learned. They suggest that a lack of general strategy knowledge may explain why some students who are aware of appropriate strategies for a given task fail to use them. The fourth level of strategy knowledge, proposed by Borkowski et al., includes procedures which enhance the development of lower-level specific strategy knowledge and provide implementation and monitoring routines for strategy use (i.e., self-checking, self-questioning). These memory acquisition procedures (MAPS) are believed to be important for the development of self-controlled behavior in young or developmentally delayed

students. Self-controlled behavior has been found to be an important variable in strategic behavior (Brown & Palinscar, 1982; Schunk, 1986).

Borkowski et al. (1985) distinguish between general strategies that can be applied to a wide variety of tasks and specific strategies which apply to particular kinds of content. Brown and Palinscar (1982) also distinguish between general executive and task specific strategies. General executive strategies, such as planning, monitoring, or evaluating, are almost always content free. Task specific strategies may be directed at particular subject domains, such as summarization strategies for use with social studies and science materials (Wong, Wong, Perry, & Sawatsky, 1986).

In order to make effective use of specific strategy knowledge, learners must possess adequate amounts of domain specific or content knowledge (Chi, 1983; Wong, 1985). Chi (1983) found that students with "expert" knowledge about dinosaurs were able to use sophisticated classification strategies that resembled those of adults. Specifically, they categorized dinosaurs according to whether they were meat eaters or plant eaters. In contrast, students with less content knowledge classified the dinosaurs according to physical resemblances. Another study (Wong et al., 1986) taught LD adolescents a summarization strategy for use with social studies materials. All of the students mastered the strategy. Their performance on training materials was excellent, but the degree to which they could effectively use the strategy with their

social studies materials was influenced by the difficulty of the vocabulary and concepts related to the social studies domain. These two studies suggest that it is necessary but insufficient to teach students to use strategies. Attention must also be paid to increasing their stores of content knowledge. "To develop strategies for use in a particular domain, children require sufficient knowledge of that domain" (Wong, 1987).

Deficiencies in metacognition, strategy knowledge, and content knowledge have been used to explain the lack of strategic behavior in certain groups of learners such as young children, LD, and EMR. Research shows that young children and unskilled learners demonstrate less metacognition and less use of effective strategies while performing tasks, and in interviews about task performance. Also, with regard to reading, unskilled learners set decoding goals instead of meaning goals (Paris, 1981). This may be both a cause and effect of their insufficient content knowledge. Because unskilled readers use much of the space available in working memory for "reading the words," there is little room left over to process the meaning of a passage. Hence, content knowledge is not being developed. Learners often make sense of new information by relating it to prior knowledge. It seems reasonable that a lack of content knowledge would limit the connections a learner could make between old and new knowledge.

The metacognitive and strategic weaknesses of unskilled readers have been observed in studies that compare their comprehension monitoring behaviors to those of skilled readers.

Garner (1980, 1981; Garner & Taylor, 1982) examined differences between good and poor readers in comprehension monitoring. She found that good readers noticed the disruptive effects of inconsistent text more than poor readers. Poor readers had difficulty identifying what they found difficult about a passage, and they needed considerably more prompting in order to identify where in the text the difficulties existed. It is interesting to note that few readers at any level of proficiency demonstrated spontaneous awareness of quite blatant meaning disruptions (Garner & Taylor, 1982). Even good readers required some prompting to identify the inconsistencies in text.

Two studies by Paris and Meyers (1981) examined the comprehension monitoring behavior of good and poor readers in grade four and its relationship to performance on free recall and comprehension questions. In the first study, students were presented with passages containing nonsense words and phrases. In the second study, students were presented with passages containing difficult vocabulary. The findings of these studies indicated that good readers monitored their comprehension with a higher degree of accuracy than poor readers and employed more effective strategies to cope with their difficulties in comprehension (i.e., consulting a dictionary, asking for help). Differences between good and poor readers' comprehension monitoring also was reflected in their performance on free recall and comprehension question exercises.

Wong and Wong (1986) examined differences between above average, average, and LD readers in their awareness of difficult

vocabulary and disorganized prose. They found that LD readers showed sensitivity to difficult vocabulary but not to disorganized prose. Only above average readers showed an awareness of disorganized prose by studying it longer. These findings might be interpreted in two ways. Either the LD and average students were unaware of the disorganized prose, or they were aware of the inconsiderate text but didn't employ a suitable strategy (i.e., more study time) to cope with it. Students may have been unaware of a strategy that would help them to cope with the text or they may not have perceived the utility of applying a strategy to facilitate their comprehension (Winne, & Marx, 1989). This study emphasizes the need for instruction about strategies to include conditional information about why strategies should be used. Conditional knowledge about strategies is a key ingredient for motivating students to use strategies (Paris, 1983, 1988b).

Motivation. The important role that motivation plays in strategic behavior has been attended to in recent research (Borkowski et al., 1985; Paris, 1988b; Winne & Marx, 1989; Wong 1986). Researchers and practitioners are realizing that having adequate amounts of metacognition, strategy knowledge, and content knowledge does not ensure that students will approach tasks strategically. Students must also believe that strategic behavior is worthwhile. Borkowski et. al.'s (1985) model of strategy knowledge emphasizes the important role motivation plays in the use of strategies. Paris, Lipson, and Wixson (1983) also include a motivational component in their description of the knowledge

required to behave strategically. According to Paris et al., learners need to know when and why a particular strategy should be used. They need to have "conditional knowledge" about the strategy so that they can weigh the costs and benefits of using it. Strategic behavior is expensive in terms of the time and energy students must devote to it. In order to feel motivated to apply a strategy while performing a task, students must perceive that strategy's utility, they must believe in their ability to use it effectively, and they must have the will to do so (Paris, Lipson, and Wixson, 1983; Winne, & Marx, 1989).

Self-efficacy and attributions. Palmer and Goetz (1988) emphasize that students need to feel competent to use a strategy. They suggest that learners look for a match between their abilities and the strategy demands. The degree to which these two factors match will affect students' judgements of the personal effectiveness of the strategy and their decision about whether to use it. Palmer and Goetz (1988) also point out that learners are motivated to understand the causes of events in their environment and these understandings or attributions influence action.

Attribution theory (Weiner, 1979, 1986) proposes that learners view environmental events as being either controllable or uncontrollable, stable or unstable. In order for students to behave strategically, they must attribute their learning or performance to things which they can control, like effort and strategy use. They must also view learning as an unstable factor that has the potential for increment (Dweck, 1986). Attributions that relate effort and

strategy use to increases in performance and learning will help students to feel a sense of control over their learning environment and encourage persistence in the face of task difficulty and failure (Clifford, 1984).

For skilled learners, feelings of self-efficacy and attributions toward effort and strategy use develop and are reinforced by successful task performance. For the most part, these learners are operating on tasks in a "flow state" (Csikszentmihalyi, 1975). For these learners, perceived and actual skill is evenly matched with the challenge the task provides. In situations where learners perceive the task, or the strategy required to operate on the task, as being unevenly matched with their ability, anxiety and frustration result. Arkin and Maruyama (1979) found that this was particularly true for students who believe that failure is due to factors which are outside of their control.

Theories of self-efficacy and attribution contribute to understandings of why unskilled and LD students have been labeled passive, unmotivated learners. These students have all experienced repeated academic failures (Licht & Kistner, 1986). More often than not, these students face challenges for which their perceived ability is out of line with the task requirements. This is especially true for students with reading disabilities because most, if not all, school subjects involve some reading. Repeated failure results, for these students, in a sense of helplessness and effort becomes a double edged sword (Covington & Omelich, 1985). For these students, effort has not led to success and is, therefore, perceived as a

reinforcement of low ability. This may explain why many unskilled and LD students seem unmotivated, don't employ strategies to solve problems, and don't persist in the face of failure. The cost of effort is not balanced by its benefits.

So far this chapter has shown how learner characteristics interact to influence strategic behavior. For unskilled and LD students, insufficient amounts or ineffective use of metacognition, strategy knowledge, and content knowledge results in academic failure. When failure is repeated often, learners come to feel incompetent and helpless in their learning environment. This leads to motivational problems. Effort and strategy use are not perceived as being useful or worthwhile and so these learners develop a passive, non-strategic attitude toward learning and task performance. In order for strategy instruction to enhance students learning and foster self-controlled, strategic behavior, it must address each of these learner characteristics and the ways in which they interact to produce good strategy users (Pressley et al., 1988).

Instructional Variables

Theories of effective instruction. Effective instruction, according to Rosenshine and Stevens (1986), has several characteristics. Teachers are very clear about their goals and objectives. They describe and demonstrate specific and concrete procedures for completing tasks, going over one step at a time and checking to make sure that students are understanding. Their lessons are well organized and they demonstrate sufficient

examples before asking students to perform. Students' performance is guided until they can perform a task with a high degree of accuracy. Feedback is corrective and continuous and students are provided enough practice, guided and independent, to achieve mastery of a particular skill or procedure.

Brophy and Good (1986) reviewed literature in order to identify characteristics of instruction that lead to student achievement. They advocate "active teaching". This involves providing students with information via clear, structured and elaborate explanations, and preparing students for seatwork by working through a sufficient number of examples. Seatwork is monitored, feedback is provided, and mastery is the achievement goal.

The type of instruction described by Rosenshine and Stevens (1986) and Brophy and Good (1986) has been referred to as direct instruction. This method of instruction has been advocated by many designers of strategy interventions and has been supported empirically by their research (Deshler et al., 1981; Garner, 1984, 1987; Pressley et al., 1988; Schumaker, Deshler, & Ellis, 1986; Wong, 1985). Pressley et al. (1988) examined several types of strategy instruction and concluded that direct instruction is one of the most complete methods and that it is the most practical because it can be used to teach individuals, small groups, or whole classes. One reason for the success of direct instruction, according to Pressley et al., is that direct explanations provide students with detailed and explicit information about how to carry out all the

components that make up a strategy as well as specific information about the strategy's utility. They emphasize the importance of utility knowledge for encouraging the continued use of a strategy after training. Pressley et al. also point to the inclusion of concrete examples, modeling, sufficient practice, and feedback about performance in direct instruction as reasons for its success.

Winnograd and Hare (1988) have focussed on the role of teacher explanation in direct instruction to explain its success. After reviewing studies which used direct instruction to successfully train reading comprehension strategies, they developed a list of five features that are characteristic of good teacher explanations. These include: a description of the critical or defining features of a strategy, an explanation for why the strategy should be learned, a demonstration of how to use the strategy, examples of when and where the strategy might be applied, and an explanation of how students might evaluate their use of the strategy. Such explanations are likely to influence strategic behavior because they facilitate the development of strategy awareness. Telling students what a strategy is and how it works provides them with specific strategy knowledge. An explanation for why strategies should be learned provides students with information about strategy utility and may enhance their motivation to use it. Information about where and when strategies might be used and how strategy use can be evaluated helps students to connect strategies with particular types of content and to regulate their use of both content and strategies.

Providing students with the kinds of knowledge and information they need to behave strategically is likely to encourage their behavior in that direction. For this reason, direct strategy instruction for students who do not initiate strategic behavior makes sense. According to Garner (1987), if a particular activity is considered an important component for successful performance, then teaching people who do not use that component to do so should improve their performance. She found this to be the case when she taught a text lookback strategy to students in the upper elementary grades (Garner, 1984). There were 12 students in the strategy training group and 12 students in the control group. The strategy training group benefitted from instruction which included what, why, how, when, and where information about text lookbacks.

There are numerous examples of strategy interventions which have included the kinds of explanation advocated by Winnograd and Hare (1988) and demonstrated by Garner (1984). Bauman (1984) taught 22 of 66 grade six students a strategy for finding main ideas. Direct explanation was used to teach students to locate explicit and implicit main ideas in paragraphs and short passages and to construct outlines of main ideas for brief passages. Hare and Borchardt (1984) and Wong et al. (1986) used direct explanation to teach high school students a summarization strategy. In Wong et al.'s study, the strategy was successfully taught to low-achieving and LD adolescents.

The method of direct instruction about a strategy has proven effective with students who need stringent and systematic

instructional procedures in order to acquire and apply learning strategies (Deshler et al., 1981). For this reason, researchers at Kansas University (Schumaker, et al., 1986) have developed a Strategies Intervention Model (SIM) which helps LD adolescents to become autonomous and successful in their learning. Schumaker et al.'s model has three components. The first component focuses on the strategic repertoire which students need to have in order to cope with curriculum. They are taught some specific strategies that will help them to cope with specific kinds of content and some general strategies that will help them to solve their own learning problems. Along with these task specific and general executive strategies, Schumaker et al. have developed strategies which promote the development of social-skills, motivation, and transfer of learning. The second component in the SIM is the instructional component. Schumaker et al. have developed a set of specific acquisition and generalization procedures which incorporate the principles of direct instruction. This second component also deals with group instruction for LD students and methods by which materials can be modified for use with these students. The third and final component of the SIM is the organizational component. This component was designed with teachers in mind. It provides guidelines for communication, management and evaluation. It also includes a teacher training and adoption subcomponent so that teachers will understand the particular needs of students and be able to use a direct approach in meeting these needs. Schumaker et al. are still testing their model; however, preliminary findings are validating its

effectiveness and emphasizing the interplay between its components as an explanation for the model's overall success.

Informed Strategies for Learning (ISL). In developing his package of ISL, Paris (1987) has attended to the principles of direct instruction and to the needs of learners. Paris (1988a) identifies several criteria for successful strategy instruction. Strategies should be functional and meaningful. By this Paris means that strategies must suit the task and the learner and they must be reasonable in terms of the time and effort required to employ them. Instruction should demonstrate what strategies can be used, how they can be applied, and when and why they are helpful. Students need to believe that strategies are useful and necessary or they will not be motivated to use them. Students must also feel that they are competent to use strategies to perform tasks and, according to Paris, this confidence can be instilled through instruction. Strategy instruction should be direct, informed, and explanatory, and the responsibility for generating, applying, and monitoring effective strategies must be transferred gradually from instructor to student. This premise is adopted from Vygotskian theory (1978) and its effectiveness was demonstrated by Palinscar and Brown (1984). Brown and Campione (1981) emphasize the need for students, particularly those with actual or perceived incompetence, to move from other regulation to self-regulation. This is achieved in direct instruction with the progression from teacher demonstration to guided practice and, when students are ready, independent practice. Finally, Paris points to the important role instructional materials

play in informing and motivating students. Materials must be lucid, considerate and enjoyable.

For each of the eighteen strategies in the ISL Kit (1987), Paris has created a metaphor. For example, the metaphor for the main idea strategy is "Tracking Down the Main Idea." Students are instructed to think of themselves as reading detectives, searching for clues to find the main idea. This theme is used in the discussion/explanation portion of the lesson and is illustrated on both demonstration and student materials. Paris (1988a) maintains that metaphors help to explain new phenomena. They provide a set of features in a common knowledge system that correspond to a set of features in an unfamiliar knowledge system. Students are stimulated to compare the two systems according to their similarities and dissimilarities. According to Paris, this interanimation gives rise to semantic tension that is resolved when the similarities of the two systems are apprehended. Paris proposes four functions for metaphors: to inform, to provoke, to entertain, and to communicate. "Metaphors provide expressions for actions, events and phenomena that are beyond the experience or difficult to describe (Paris, 1988a)."

Paris and Jacobs (1984) tested the ISL with 91 third graders and 92 fifth graders. This involved eight classrooms in four different schools. Direct, informed instruction was used to teach students reading comprehension strategies. Metaphors and discussion were used as a means of conveying strategies to students and promoting the development of conditional knowledge. Dependent measures included a metacognitive interview, the Gates MacGinitie

standardized measure of reading comprehension, a cloze exercise, and an error detection task. Research questions focussed on the relationship between reading awareness and reading achievement, whether the intervention enhanced either or both of the preceding, and whether there were individual differences on any of the measures. The results showed a moderate relationship between reading awareness and reading skills. Improvement in both awareness and skill resulted from training. Paris and Jacobs found that all students benefitted from instruction but that there were age and ability differences in the degree to which instruction benefitted students. Older students showed more reading comprehension awareness and performed better on reading comprehension tasks.

A larger study of the ISL was conducted by Paris and Oka (1986a). This study involved 800 grade three students, 800 grade five students and 46 teachers. Again students received direct, informed instruction about reading comprehension strategies and their uses. Strategies selected for instruction focussed on skills that are believed critical for comprehension such as constructing meaning, making inferences, integrating information, activating prior knowledge, and monitoring comprehension. Dependent measures included the Gates MacGinitie, a cloze exercise, and an error detection task as well as indices of reading awareness and self-perceptions of competence. The ISL were, again, successful at enhancing reading awareness and performance, although there were age and ability differences. All but one of the measures (social

self-perceptions) were related to one another and to reading achievement. The findings in this study emphasize the role that reading awareness plays in reading achievement and motivation. Students who had accurate perceptions of their reading ability were motivated to use the strategies and were successful. Students who over-estimated their ability were usually motivated to use the strategies but this did not necessarily enhance performance. Students who under-estimated their ability were not motivated to use the strategies and this was a detriment to performance. Students need well-developed metacognition so that they are aware of what they know and, in some cases, what they need to know. They also need to view strategies as the bridges between knowledge and performance so that they will be motivated to use strategies to developed knowledge structures and to demonstrate the knowledge they have.

In general terms, Paris' strategy instruction is effective because it facilitates the development and use of metacognition, strategy knowledge, and content knowledge, and because it encourages a belief by students that an effortful, strategic approach to learning tasks will lead to success. More specifically, it is possible that the effectiveness of these strategies lies in their ability to focus students' attention on important text elements or by helping students to create mental elaborations of text information (Reder, 1985). For example, one of the strategies in the ISL teaches students how to "track down the main ideas," focussing students' attention on the important elements in a passage. Students look for

clues about the characters, setting, actions, and outcomes, and then use this information to write a short summary of the passage. Summarizing text requires that students integrate and reconstruct information, making it more concise. Mayer (1988) suggests that strategies, like summarizing, which require the modification and manipulation of information will facilitate inferencing and transfer. Another ISL encourages students to look for picture and title clues before reading a passage in order to determine a reading purpose. Students who use this strategy will likely link information from the picture and the title to their existing knowledge structures and, in doing so, they will be elaborating on information in the text and in their existing knowledge structures (Reder, 1980). Reder (1985) points out that elaborations may facilitate recall because they result in an increased number of propositions related to one idea. The more links an idea has, the easier it should be to retrieve when it is needed.

Concept mapping. Another method that has been used successfully to enhance reading comprehension is concept mapping. Novak and Gowin (1984) describe concept maps as schematic devices for representing a set of concept meanings embedded in a framework of propositions. Concept maps consist of nodes that contain key words or phrases, and links in the form of lines or arrows that indicate relationships between the nodes (Sinatra, Stahl-Gemake, & Morgan, 1986). Concept mapping is a relatively structured, visual means of representing concepts and their interrelationships (Lehman, Carter, & Kahle, 1985).

Lehman et al. (1985) suggest that forming explicit relationships between concepts is necessary for students to learn meaningfully. Students need to relate ideas [in texts] to one another and to existing conceptual schemes. Concept mapping helps students to do this. These spatial representations of text help students to recognize superordinate and subordinate ideas and to understand the relationships between them. Concept mapping can help students to link new information with prior knowledge, resulting in the organization, integration, and elaboration of the information. Identifying the relationships between ideas helps students to understand that ideas do not exist in isolation. Rather, each idea is part of a network of interrelated ideas. Also, because humans have a capacity for recognizing patterns and images, these visual representations may facilitate recall and recognition of text structures (Flood & Lapp, 1988; Novak & Gowin, 1984; Sinatra, et al., 1986).

Concept mapping can be used as an advance organizer to stimulate relevant prior knowledge about the topic of the passage to be read. Students can add to their maps as they read, making the exercise integrative and incremental. Finally, concept mapping can be a post reading exercise that students perform to organize or synthesize information in the passage they have read (Johnson, Pittelman, & Heimlich, 1986; Sinatra et al., 1986).

Concept mapping can be taught in the context of direct instruction. Students can be told explicitly how to format their maps and what kinds of information to include on them. Students

can be told why mapping is useful and when and where the skill of mapping might be applied. Students can also be provided with a set of criteria for evaluating their maps. Teacher demonstrations, guided practice with feedback, and sufficient independent practice should lead to successful application of the mapping strategy by students and to feelings of competence and attributions relating effort and effective use of the mapping strategy to successful performance.

Stahl and Vancil (1986) used concept mapping to teach 45 grade six students vocabulary. They hypothesized that mapping would be an effective instructional tool because it would allow students to tie new information to already existing knowledge structures and it could involve a great deal of discussion which may force students to process information more actively. Students were randomly assigned to one of three groups: mapping and extensive discussion, mapping only, and discussion only. Group differences were measured in three ways. First, a multiple choice test, pairing 12 words with either synonyms or short definitions and three distractors was administered. This was followed by a sentence cloze test and a sentence anomaly test. Findings support the use of both discussion and mapping. Discussion seems to be critical in concept mapping and it seems to benefit both participants and non-participants. It may be that non-participants can benefit from information participants provide and since all students anticipate possible participation, they may attend more and process information more actively. Stahl and Vancil (1986) point out that

teachers can use discussion to check students understanding, clarify ambiguous points and otherwise tailor instruction to students needs.

In another study (Stice & Alvarez, 1987), 261 students in kindergarten through grade five were taught to make concept maps to represent text. Nine classrooms and teachers were involved. Participating teachers were instructed to follow steps from Novak and Gowin (1984) to generate concept maps with their students. Teachers reported increases in students' awareness of meaningful learning components after training. Students were able to see how new information could be linked to prior knowledge and they developed a better understanding of conceptual relationships. Mapping also helped students to recognize organizational patterns, to reconstruct information, and to note logical gaps in text. Teachers reported that students were motivated to use concept maps but that there were developmental differences in the maps produced. Students in kindergarten through grade three produced maps which were less complex and less elaborate than the maps produced by grade four and five students. Finally, teachers found that concept mapping provided an excellent opportunity for direct instruction.

Lehman, Carter, and Kahle (1985) taught 250 high school students, 97% black, to use either concept mapping or outlining to study information in biology texts. It was hypothesized that students using concept mapping as an aid for studying would score significantly higher on achievement test items designed to measure "meaningful" learning (application or higher order problems in

Bloom's taxonomy) than students using outlining. Also, because concept mapping requires the formation of explicit relationships, including relationships between concepts at different levels of hierarchical organization, students using concept mapping were expected to perform better than students using outlining on a test of conceptual relationships. Measures included a pretest, some unit tests, an immediate posttest, a delayed posttest, and a test of relationships. Analyses of variance failed to detect statistically reliable differences between concept mapping and outlining groups on any of the measures. However, when effect sizes are calculated on Lehman et al.'s data, some differences emerge between pretest and posttest for students in both treatment groups. Students in the concept mapping group increased their scores from pretest to posttest .57 standard deviation units while students in the outlining group increased their scores .48 standard deviation units. These findings indicate that, although concept mapping was not substantially better than outlining as a study aid, it did enhance students' understanding of text. Therefore, concept mapping is a viable tool for processing text.

Lehman et al. offer three possible explanations for the results of their study. First, both concept mapping and outlining involve structured, hierarchical representations of information. This similarity may have contributed to the difficulty in identifying achievement differences. Second, because concept mapping was new to students, more time and practice may have been needed for

significant learning gains to be realized. Finally, the test items used in this study were difficult and low in reliability.

Research suggests that both ISL and concept mapping can be used to enhance reading comprehension. It would be informative to research how each method of instruction affects learners' comprehension and beliefs about strategy use. For example, does concept mapping facilitate verbatim recall because it requires students to form networks of interrelated ideas? Research suggests that these networks allow students to add new information to their existing knowledge about a concept, increasing the number of idea units students have about a particular concept.and facilitating the retrieval of those ideas by means of spreading activation. Likewise, does the main idea strategy in the ISL facilitate performance on tasks that ask students to make inferences, and not on tasks requesting verbatim recall, because it asks students to focus on important text elements and modify the information in texts in order to summarize it. Also, does feedback about performance, and discussion about effort and strategy use, help students to link strategy use with successful performance on tasks and motivate them to use strategies. Answers to these and other similar questions have implications for planning instruction and advocating particular strategies to meet specific instructional objectives and learner needs.

Summary. A review of the literature describing the learner and instructional characteristics necessary for successful application of reading strategies has been presented. Prior research

indicates that direct explanations and discussion can be used to provide students with knowledge about what strategies exist and how to use them. Conditional knowledge can also be conveyed through explanation and discussion about why strategies are useful and when and where they can be employed. Movement from teacher demonstration to guided practice and then to independent practice helps students to develop feelings of competence and control over their strategy use. Moreover, increased self-efficacy and improved performance on tasks as a result of strategy employment promotes attributions toward effort and strategy use as well as a constructive orientation toward failure. All of these increase the likelihood of strategy use because they increase the likelihood that students will recognize situations in which to apply strategies and that they will perceive the application of strategies as useful. The belief that it is advantageous to behave in a particular way should motivate students to behave that way.

Research that has used direct strategy instruction to enhance reading comprehension has been examined in this chapter with particular interest paid to ISL and to concept mapping. It has been suggested that one of the reasons these strategies work is that they help students either to focus on important text elements or to make mental elaborations. It has also been suggested that it would be useful for researchers and practitioners to find ways of identifying what each of these strategies helps students to do (focus, elaborate) so that each of the strategies can be selected and taught for their appropriate function. This would ensure that strategy use will meet

the goals and objectives of the task. For example, a strategy which results in the integration and reconstruction of information will be useful for students if the instructional objective is to provide a brief summary of a text but not if verbatim recall is the goal.

All of the measures and procedures described in chapter three of this study were included in an attempt to provide students participating in this study with effective strategy instruction. However, only those measures and procedures which address the research questions outlined in chapter one will be analysed and discussed in chapter four.

Chapter 3

Methods

Subjects

Seventy-four grades four and five students from Coquitlam School District participated in this study. There were four schools and nine classrooms involved.

Subjects selected for this study were either learning disabled (LD) or average students. A discrepancy between performance and potential was used to identify students for the LD population. As it was not permissible for the experimenter to administer intelligence tests, discrepancy information was obtained from teachers and principals. In order to be selected for the LD group, students had to be reading 1 1/2 - 2 years below grade level and, more specifically, students reading difficulties had to involve reading comprehension. Students chosen for this group were receiving remedial reading instruction in a learning assistance centre or resource room in their schools. The amount of remediation received by individual students in the LD group ranged from three half-hour sessions per week to five complete mornings per week. Students were selected for the average group if they were performing at grade level in all subject areas.

A standardized measure of reading comprehension was administered by the experimenter prior to training to obtain grade equivalent (GE) scores for all students participating in the study.

These scores were based on students ages at the time of testing. The mean GE scores of students in grade four and five that were selected as the LD group were 2.8 and 3.0, respectively. These students ranged in age from 9 yrs., 6 mos. to 12 yrs., 5 mos. The mean age in this group was 10 yrs., 8 mos. Students in grades four and five that were selected as the average group had mean GE scores of 4.2 and 4.4, respectively. Their ages ranged from 9 yrs., 6 mos. to 12 yrs., 5 mos. The mean age in this group was 10 yrs., 8 mos.

Design

There were three phases in this experiment: pretest, training and posttest. (These phases are discussed in detail in the procedures section of this chapter.) This study was conducted between the months of April and June in 1988. LD and normally achieving students were grouped together for instruction but separated during data analyses for comparative purposes. This study was configured as a 2 (LD, normally achieving) X 2 (ISL, mapping) factorial design with repeated measures.

Treatments

Students within each achievement level were randomly assigned to one of two treatment conditions, referred to in this study as the Informed Strategies for Learning (ISL) group and the mapping group. The thirty-nine students assigned to the ISL group, received instruction about two reading and thinking strategies that are part of a larger package of reading comprehension strategies

designed by Paris (1987). The remaining 35 students, assigned to the mapping group, received instruction about two strategies for concept mapping.

The first ISL strategy taught students to set a reading goal, monitor their comprehension, and summarize the main points in a reading passage by carrying out both cognitive and behavioral tasks before, during and after reading. Before reading, students were directed to read the title, look at the picture and ask themselves, "What do I think the passage is going to be about?" While they were reading, students were directed to stop after each paragraph to check their understanding. They asked themselves questions about the content of the paragraph or they paraphrased the paragraph. After they had read the passage and judged that they had understood its meaning, the strategy directed them to summarize the main points by writing down what they believed to be the most important ideas to remember from the passage.

The second ISL strategy provided students with a means by which to identify the main ideas in a reading passage. The students were directed to act as reading detectives "tracking down the main ideas." They used six sources of information to search for clues about important ideas in a passage: picture, title, characters, setting, actions and outcomes. Once they had identified the important ideas in a given passage, they used these ideas to write a summary of the passage. This strategy also instructed students that there are different types of discourse structures and that there are different kinds of clues in different kinds of discourse.

For example, an explanation structure contains a problem and a solution; therefore, students can recognize an explanation passage by the presence of some problem and a solution to that problem.

The first mapping strategy taught students to use concept maps to develop a spatial representation of information in a passage. Students included information about the topic of the passage, important ideas from the passage, and their own ideas about the passage in their maps. These students were also encouraged to include linking ideas on their maps. Linking ideas were ideas within the passage that were related to each other, ideas stimulated by the picture or title that related to ideas in the passage, or students' own ideas that related to ideas in the passage.

The second mapping strategy taught students to identify different kinds of discourse structures and to construct maps that provide visual representations of these text structures (see Appendix 1). When reading a passage, students were encouraged to ask themselves, "What kind of passage is this? What kind of map should I construct to show its meaning?" If the passage was an explanation, students applied a map arrangement that represented the problem and solution of the passage.

Along with strategy training, students in the ISL and mapping groups were provided with a rationale for using the strategies. They were instructed that finding the meaning in a passage is not always an easy goal to reach. It requires effort on the part of the

reader and it is helpful for the reader to have a plan for "how" to find the meaning. Students were also instructed that strategy use helps to ensure that the energy they expend to complete a task will lead to successful completion of that task.

<u>Measures</u>

Five pretests were administered prior to training: a measure of attributions and self-efficacy, a recognition of discourse structures task, the Gates MacGinitie Test of Reading Comprehension, an interview, and an error detection task. Training measures included six measures of strategy use, two free recall exercises, two sets of comprehension questions, and two attribution measures. Posttests targeted the same categories of dependent variables as the pretests.

<u>Attribution and self-efficacy</u>. A four page questionnaire was used to measure students' attributional orientation and feelings of self-efficacy (see Appendix 2). Page one of the questionnaire asked students to do three things. First students were asked to rate themselves on a five point scale according to how well they believe they are doing in school compared to an average student in their classroom. Then, students were asked to rate the importance of six explanations for how they are doing in school, again on a five point scale. Five of the six explanations corresponded to categories of attributions proposed by Weiner (1986): task difficulty, effort, luck, ability, and emotions. The sixth explanation measured attributions about the use of strategies and

replaced Weiner's sixth category, attributing success to help from someone else (e.g., the teacher). The final question on page one was open ended. It asked students if there was anything else that they could think of to explain how they are doing in school.

Pages two, three and four of the questionnaire followed the same format as page one except the topic which students considered was changed. Page two measured students' perceptions of how well they are doing in reading; page three measured students' perceptions of how well they are doing at finding the meaning when they read; and page four measured students' perceptions of how well they read words.

All four pages of the questionnaire were scored the same way. For each of the items measuring self-efficacy, a value of 1 indicated that the students perceived themselves to be performing not as well as their peers in school, in reading, at finding the meaning, or at reading the words. A value of 2, 3, 4, or 5 indicated that students perceived themselves to be performing almost as well, the same, better, or much better than their peers, respectively.

Students' responses to the four sets of attribution items were scored similarly. A value of 1 indicated that students' perceived an attribution to be not very important for explaining how they are performing. A value of 2, 3, or 4 indicated that students perceived that attribution to be a bit important, important, or very important for explaining their performance in

school, respectively. A value of 5 indicated that the students were unsure about how that item affected their performance in school.

Finally, the open ended questions on this measure provided students with the opportunity to explain what they perceived to be other reasons for their performance in school. These responses were coded in terms of the six categories of attributions already mentioned, or to a new category, other.

Recognition of discourse structures. To measure students' ability to recognize different types of discourse structures, all students completed a three page booklet containing twelve short paragraphs (see Appendix 3). Under each paragraph, four types of discourse structures were listed: description, explanation, comparison and story. To complete this task, students read each paragraph, decided what "kind" of passage it was and circled the word that described what kind of passage it was . Each type of discourse structure was represented by three of the twelve paragraphs. Each of the twelve paragraphs on the recognition of discourse structures measure was considered to be one item. Students were scored either correct (1) or incorrect (0) on each item. The sum of correct scores for the twelve paragraphs represented a student's total score on the recognition of discourse structures measure. Reliability for this measure was calculated using the Guttman model (1945). This model provided a lower bounds estimate of internal consistency equal to .66.

<u>Gates MacGinitie Test of Reading Comprehension.</u> All students completed level D, form 1 of the Gates MacGinitie comprehension subtest in April prior to training. This measure was used to ensure that students participating in this experiment were appropriately classified into the LD group or the normally achieving group according to the specific criteria defined previously.

This test consists of a series of short, paragraph length stories followed by two, three or four multiple choice questions designed to assess children's understanding of each story. This test was selected for three reasons. It can be administered in groups, it is easy to score and it was used by Paris and Jacobs (1984) in their research.

There are 43 items on the Gates MacGinitie comprehension subtest. For each item, students were scored correct (1) or incorrect (0). According to the Kuder - Richardson Formula, the reliability of this test is .87 and .89 for students in grades four and five, respectfully. These values are taken from the Gates MacGinitie test manual.

<u>Performance interview.</u> Students were interviewed about their use, awareness and value of reading comprehension strategies (see Appendix 4). The interview was divided into two parts. In the first part, students were asked to recall a passage they had read previously. Then they were asked three questions about their reading behavior in relation to that passage. The first question asked students if they did anything before they started to read. If

the response was yes, they were asked to explain what they did. The second question asked students if they did anything while they were reading. If the response was yes, they were asked what they did and how they thought it helped them in their reading. The third question asked students if they did anything after they finished reading the passage, what they did, and how it helped them.

In the second part of the interview, the experimenter gave students a passage to refer to and asked six questions about it. The first question asked students if they were thinking about anything before they read the passage. Students were then prompted to consider the picture and title of the passage. The second question asked students if they thought it was a good idea to think about the picture and title before reading the passage. Students were then asked to read the passage and informed that they would be asked some questions about it when they were finished.

After students had read the passage, they were asked if they did anything while they were reading to prepare for the questions. If their response was yes, they were asked to describe what they had done. After this question, students were asked to recall as much of the passage as they could. This was followed by 10 comprehension questions about the passage. Once students had responded to all of the questions they were told the number of questions they had answered correctly. Students who had named things they had done to prepare for the questions were asked how they thought doing those things helped them to answer the questions. If students had reported doing nothing to get ready for the questions, they were

asked if they thought doing something would have helped them with the questions, and if so, how. The fifth question asked students if thinking about the title and picture had helped them to understand the passage. The last question on the interview asked students if they thought it was important to do things before, during, and after reading to help them understand or if just' reading the passage was sufficient. Students were asked to supply reasons for their responses.

Students responses to questions on the interview were coded in terms of three strategy variables: reported use, awareness, and value. Students received 1 point for each component of a strategy they reported using in response to questions 1-3 in part one of the interview and questions 1 and 3 in part two of the interview. Also, students received 1 point for each explanation they offered about how using the components of the strategy facilitated their performance on reading comprehension tasks in response to questions 2 and 3 in part one of the interview and questions 2, 4 and 5 in part two of the interview. Finally, students were given 1 point for indicating that they attached value to the components of the strategies in response to questions 2, 4, 5 and 6 in part 2 of the interview. It was possible for students in the ISL group to obtain 23 points for reported use. Students in the mapping group could obtain 26 points on this variable. It was possible for students in both the ISL and mapping groups to offer 26 different explanations for how strategy use facilitated their performance on comprehension tasks, and it was possible for students in both

groups to indicate that they value using the components of strategies four times during the interview.

Students' responses to questions on the interview were scored by the experimenter and an alternate rater. The generalizability coefficient computed between raters for reported strategy use on the performance interview was .98 for the ISL group and .89 for the mapping group. The generalizability between raters of strategy awareness and strategy value was .96 and .97, respectively. The variance between raters on each of these generalizability coefficients was 0.

The free recall and 10 comprehension questions on the Performance Interview were used as measures of reading comprehension. Students were given 1 point for each idea they recalled from the text during the free recall exercise. Students received a separate score for main ideas and details. There were a total of 8 main ideas and 21 details in the pretest passage. Also, students received 1 point for each idea in their recall that was either a plausible inference or a sensible elaboration. The generalizability coefficient between raters on the free recall exercise was .79 with 0 variance between raters.

A value of 1 was given for each correct idea provided by students in response to comprehension questions. Subscores were calculated to represent literal and inferential information provided by students in response to questions. On the pretest question set, students were asked to supply 8 literal ideas from the passage and

make 6 inferences. The internal consistency of this measure was .83 and the generalizability coefficient between raters on the inferential questions was .74 with 0 variance between raters.

Error detection. Like Paris' studies, this experiment used an error detection task to measure students' monitoring of reading comprehension. Students were interviewed about six passages. Two of the passages contained internal inconsistencies like those used by Garner (1980, 1981; Garner, & Taylor, 1982). The other paragraphs were constructed for this study and were believed, by the experimenter, to be more ecologically valid and to fit the kind of comprehension monitoring students might be expected to engage in after training. One passage contained difficult vocabulary, one gave incomplete instructions for performing a task, one was accompanied by an inappropriate picture, and another was accompanied by an inappropriate title.

After reading each passage, students were asked whether they thought the passage was a) easy to understand, it made sense, b) OK, a bit difficult, or c) hard to understand, it didn't make sense. If students chose b) or c), or if they felt the passage was easy to read but it didn't make sense, they were asked first to show what made the passage difficult and then to explain why this made the passage difficult or confusing for them (see Appendix 5). This interview format follows Garner's example (1980, 1981; Garner, & Taylor, 1982). As an extension to Garner's work, students who recognized the intended error were asked to suggest ways of fixing the passage so that it would be less confusing.

For each of the six passages, students were given a value of 0 if they found the passage a) easy to understand, it made sense, and 1 if they found the passage ai) easy to understand, but it didn't make sense, b) OK, a bit difficult, or c) hard to understand, it didn't make sense. For passages 1, 2, 4, 5 or 6, students were given a value of 1 if they identified the intended error in the passage or if they identified some other difficulty with the passage (i.e., difficult vocabulary). Values of 1 were given to students if they could explain why the error made the passage difficult to understand and if they could 'fix' the passage so that it made better sense. For passage 3, which contained difficult vocabulary and concepts, students were given a values of 1 if they recognized that the passage was too difficult for their reading ability, if they could explain why the passage was too difficult for them (i.e., the words were hard, it was hard to understand, the ideas\words were new to me) and if they could make suggestions about how to make the passage easier to understand (i.e., leave the difficult words out, replace difficult words with easier words, explain what the difficult words mean). Scores were summed across passages to create four dependent variables: recognition, demonstration, explanation, and correction. The maximum possible score was 6 for recognition and demonstration and 8 for explanation and correction. Generalizability between raters on the error detection task was .94 with 0 variance between raters.

Measures of strategy use for the ISL group. Measures of strategy use were administered on six different occasions during

the training phase of this experiment. The criteria for measuring students' knowledge and use of the two ISL strategies were as follows. Students were presented with a skeleton of the worksheet they had been using for training and practice (see Appendix 6) plus a reading passage to which they could apply the strategy. Students were expected to show their knowledge of the strategy by writing the steps of the strategy on the skeleton worksheet where they would usually be found on the training worksheet. Then students were expected to read the passage provided and to follow the steps in the strategy to fill in the worksheet. For example, to demonstrate knowledge of the first step of the reading purpose strategy, students were expected to write "I look at the picture and read the title" in the appropriate place on their skeleton worksheet, apply this step to the reading passage, and then write something on their worksheet to indicate that they had used this step. To demonstrate step one a student might write, "The title and picture make me think that the passage is going to be about a small dog in a railway station."

Measures of students' use of the second strategy also included a measure of students' recognition of discourse structures. The four types of discourse structures -- description, explanation, comparison, story -- were listed near the bottom of the test worksheet. Students were asked to circle the word that told what kind of passage they were reading.

For both ISL, students were given a 1 point for each of the steps in the strategy they wrote on their worksheet and 1 point for

each of the steps in the strategy they demonstrated the use of. Students, using the second strategy, were also given a 1 point if they recognized the discourse structure of the passage and 1 point if they wrote a summary of the main ideas in the passage. Students could obtain a total of 6 for their performance on the measure for the reading purpose strategy and a total of 14 for their performance on the measure for the main idea strategy. The generalizability between ratings was 1.00 for both the written and the performance components of the strategy measures.

Measures of strategy use for the mapping group. Students trained to use maps to represent the meaning of a passage also completed measures of strategy use on six different occasions. On the first three occasions students' use of a generic web-like map was measured (see Appendix 1 for map outlines). Students were given the map outline and expected to write the topic of the passage in the centre of their map and to surround it with important ideas from the passage plus their own ideas about the passage. Students were also encouraged to link ideas on their maps that were related to each other.

Students were given 1 point for each kind of idea included on their maps: the topic, important ideas, three kinds of linking ideas, and students' own ideas about the passage. Linking ideas were ideas from within the passage that related to one another, information from outside the text (i.e., picture and title) that related to the text, and students' prior knowledge or thoughts and feelings about an idea in the passage. It was possible for students

to obtain a score of 6 for this measure if an example of each kind of idea was included on their map.

On the last three occasions, students ability to use different kinds of maps to represent different kinds of discourse structures was measured. Added to the list of criteria for the first three measures was whether students used the appropriate kind of map. Students were presented with a blank piece of paper and a passage to read. They were asked to make a decision about what kind of passage they were reading and to draw the kind of map that shows its meaning. On these measures, students were given 1 point if they used the correct kind of map to represent the passage, making 7 the maximum score possible. The generalizability between ratings on these measures of strategy use was .93 with 0 variance between raters.

Comprehension measures. Two measures of reading comprehension were administered to all students during training. These measures included a free recall task and a set of literal and inferential comprehension questions. The comprehension questions used as training measures, as well as those used in the pretest and posttest interviews, were matched closely on the number and type of ideas required to answer them. The free recall exercises and comprehension question sets were all scored the same way (see pretest comprehension measures). The first passage to be used as a measure during training contained 5 main ideas and 21 details. The second passage contained 6 main ideas and 24 details. Comprehension questions about the second passage asked students

to supply 8 pieces of literal information and to make 7 inferences. Questions about the third passage asked students to supply 8 pieces of literal information and to make 5 inferences.

Attribution and self-efficacy measures. The same measure of attribution and self-efficacy that was used during pretesting was administered twice during training.

Posttests. Measures used as pretests were readministered after training. New passages and paragraphs were constructed for the recognition of discourse structures and error detection tasks as well as the performance interview. The passage used in the posttest interview contained 5 main ideas and 15 details. Questions about this passage asked students to supply 6 pieces of literal information and to make 7 inferences. Level D, form 2 of the Gates MacGinitie Comprehension Subtest was administered.

Transfer measure. A classroom probe was used to measure students' transfer of the strategies in an alternate setting and with a different instructor. Students were given a passage to read and a blank piece of white paper to be used for studying. When students had finished reading and studying the passage, they were given a set of literal and inferential comprehension questions. These questions were matched with the other comprehension questions used in this study on the type of ideas required to answer them and were scored the same way. Students were asked to supply 4 pieces of literal information from the passage and to make 7 inferences. A measure of free recall was not taken.

Participating teachers met before administering this measure. They were provided with a script and a set procedure for administering the transfer probe. This was to ensure consistency across classrooms.

Materials

Reading materials for testing and training were adapted from: Comprehension Plus, Books B and C (Flood & Lapp, 1983), Gathering Clouds and Drifting Snowflakes (Barnes & Burgdorf, 1978), the Boning Specific Skills Series, (Boning, 1976), the Reading and Thinking Strategies workbook (Paris, 1987), and students' social studies and science textbooks. Readability was determined for a sample (one from each lesson, two from pretest, and two from posttest) of the passages selected for use in this study. The Fog Index (Gilliland, 1972) indicated that the average reading level of these passages was grade 5.4. Passages ranged in reading level from grade 3.6 to grade 6.8. Both the ISL and mapping groups used the same reading passages during testing and training.

Two posters from the Reading and Thinking Strategies Kit were displayed for the ISL group. Each poster conveyed a metaphor for one of the two strategies being taught. On one of the posters was a detective looking through a magnifying glass at some footprints that led to an animal. Inside each of the footprints was written one of the clues (i.e., title) that students were to look for when reading to find the main ideas. The caption at the top of the poster read "Tracking Down Main Ideas."

Prompt cards were provided for students to refer to during strategy training (see Appendix 7a). These prompts listed the steps of the strategy. Worksheets from Paris' Reading and Thinking Strategies workbook (1987), which also listed the steps of the strategy, were used during training and adapted for measuring strategy use (see to Appendix 6).

Prompts for the students in the mapping group were displayed on 22 X 28 inch railway board at the front of the classroom (see Appendix 7b). These prompts listed some questions for students to ask themselves while they constructed their maps. The maps used to show different types of discourse structures (see to Appendix 1) were modified from maps used by Sinatra et al. (1986).

Teaching Scripts

ISL group. Scripts for the students in the ISL group were developed from lesson plans in the Reading and Thinking Strategies Kit (Paris, 1987). They were piloted on six grade four and five students, three of whom met the criteria for the LD population in this study. The scripts presented in Appendix 8a are the versions used in the study.

A generic three-phase lesson plan was developed and applied to both ISL strategies. In the first phase, the experimenter engaged students in a discussion that included dialogue about the strategy's metaphor and the purpose for reading. There was also discussion about the effort required to meet the reading goal and how it is useful to have a plan for meeting that goal. Then the

experimenter outlined a strategy that students could use to find meaning.

Phase two of the lesson combined modeling and guided practice. During this phase, the experimenter performed the strategy but encouraged students' input and guidance. After practicing the strategy as a group, students were provided with worksheets and passages so that they could perform the strategy with input and guidance from the experimenter and their classmates.

Phase three of the lesson was a review. During this phase, the steps of the strategy were reviewed. Also, the strategy's rationale as well as the costs and benefits of using it were discussed.

The experimenter initiated discussion about the reading purpose strategy by asking students what they thought about when they heard the word "treasure." The experimenter used this discussion to introduce the idea that "reading is like a treasure hunt. because when we are reading we are trying to find something valuable. We are trying to find the meaning." The experimenter guided discussion about what meaning is, the effort required to find the meaning, and how having a plan to find meaning can facilitate the search. Finally, the experimenter introduced students to the three-step plan for finding meaning: 1) look at the picture and read the title before reading the passage, 2) stop and check for understanding by paraphrasing or self-questioning while

reading the passage, and 3) summarize the main ideas after reading the passage.

In the second phase of the lesson, the experimenter provided each of the students with a reading passage and suggested that the plan be tested to see if it works. Then the experimenter demonstrated each of the steps in the strategy, encouraging students to participate at each step. In order to indicate to students how important it is to follow each of the steps in the strategy, the experimenter initiated a discussion about what happens when one of the steps in a chocolate chip cookie recipe is left out by the cook. A parallel was drawn between recipes and strategies. "If you leave out one of the steps, the strategy will not work. It won't help you to find the meaning." Once the experimenter had modeled the steps in the strategy, students were given another passage and the strategy was practiced once more. This time students were encouraged to perform each of the steps in the strategy with minimal guidance from the experimenter. Guidance was faded during training and practice until students were performing the strategy independently.

After modeling and guided practice there was a review of the lesson. This involved a discussion about what "reading treasure" is and what had been learned that might be helpful for finding meaning. The review also included discussion about whether it was worthwhile to have a plan for finding meaning.

Mapping group. Scripts for the students in the mapping group followed the same three-phase format as the scripts for the ISL group (see Appendix 8b). These students also discussed purposes for reading and they set the same reading goal as the ISL group -- to find meaning. Effort required to find meaning and the value of having a plan for finding meaning were also discussed by this group.

The experimenter suggested to this group that maps might be used to find the meaning of a passage. A discussion about maps and their uses helped students to see that the maps they would use to show meaning would be different (less complex) than the maps they may be used to seeing in social studies or in their parents' car. Discussion in this first phase of the lesson ended with dialogue about what kinds of information could be included on the maps and a suggestion by the experimenter that the mapping plan should be tested to see if it works.

In the modeling and guided practice phase of the lesson, students were provided with a passage to read and encouraged to participate as the experimenter completed a map of the passage's meaning on the blackboard. Then students were provided with a passage and their own map to do. The experimenter reminded students about the kinds of ideas they could include on their maps and the group discussed specific examples of each kind of idea from the passage they were mapping. As with the ISL group, guidance was faded and independent practice encouraged as

students became more confident and more competent in using the mapping plan.

The lesson for students in the mapping group also ended with a review. Discussion included the reasons for reading and the plan that had been used to meet the reading goal. Students in this group also discussed the value of using maps to show what a passage means or to help them understand it better.

Procedures

There were three phases in this experiment: pretesting, training and posttesting. For both pretesting and training phases, one experimenter was present, the author. A second experimenter, a female graduate student, helped to interview 35 of the 74 students during the posttest phase.

Pretest Procedures

Group testing. Three of the five pretest measures were administered to groups of seven to ten students. Two sessions, approximately 30 min each, were used for group testing.

During the first session, the measure of attribution and self-efficacy and the recognition of discourse structures task were administered. Each of these tasks took approximately 10 min to complete.

The measure of attributions and self-efficacy was administered first. Each subject received a four page booklet. The

first and second pages were completed as a group. Students were instructed to look at item one which asked them to rate how they are doing in school compared to the average student in their class. There were five choices ranging from "not well" to "much better." Students were asked to circle their choice after being informed that there are no right or wrong answers to these questions and that they should circle the choices that tell what they think. Students were encouraged to make one choice for each of the items and asked not to make more that one choice because the experimenter would not know which one they meant.

Next, students' attention was directed to the second part of the questionnaire which asked them to rate the importance of six explanations for how they are doing in school. The experimenter went through each of the items, clarifying for students what was meant by each one. Students were asked to rate the importance of each item on a five point scale that went from 'not very important' to 'very important' and included 'I don't know'. Again students were asked to circle their choice.

Lastly, students were asked to respond to an open ended question, "Is there anything else you can think of that explains how you are doing in school?" Students were encouraged that they may be aware of something that explains how they are doing in school that the experimenter had not thought of and so they should write it down so that the experimenter could know about it too. After page one and page two were completed as a group, students were

asked to follow the same procedure to complete pages three and four.

After students had completed the measure of attributions and self-efficacy, the recognition of discourse task was administered. Students were given a three page booklet containing twelve paragraphs and a cardboard mask so that they could cover all but the paragraph they were working on. Students' attention was directed at the paragraphs and it was emphasized that below each paragraph there were four choices. Students were instructed to read each paragraph and then to circle the word below the paragraph that tells what kind of passage it is. "If you think the paragraph is describing something, circle description. If you think the paragraph is explaining something, circle explanation. If you think the paragraph is comparing things, circle comparison. If you think the paragraph is telling a story, circle story." Students were asked to circle only one of the words below each paragraph, the one they thought best told what kind of passage the paragraph was. Students were also encouraged to ask for help from the experimenter by raising their hands if they had difficulty reading or understanding words in any of the paragraphs.

During the second group session, the Gates MacGinitie Reading Comprehension Subtest was administered. Students had 30 min to work on this measure.

Each student was given a Gates MacGinitie test booklet containing reading passages and comprehension questions, and a

separate answer sheet. Students were instructed to look at the back cover of their booklets and at the box on the left lower half of their answer sheet for the practice questions. These items were completed as a group and then students were instructed to turn to page six in their test booklets and to complete the 43 test items independently. Students were told to work until they were finished or until the experimenter asked them to stop, and they were also encouraged to ask the experimenter for help by raising their hands if they had difficulty reading the words.

Individual testing. Each subject was interviewed by the experimenter once prior to training. During this 30 to 35 min session, students completed the performance interview and the error detection task. The session was divided so that approximately 20 min were used for the performance interview and about 20 min were used for the error detection task. Students and experimenter met in an empty classroom and sat across from one-another at a small table.

Before beginning the interview the experimenter briefed students about the nature of the task to be completed. They were told that they would be asked some questions about things they do or things they think about when they read. It was emphasized that there were no wrong answers to the questions and that whatever answer they gave would help the experimenter to understand the things they do and think when they read. The experimenter followed the performance interview script (see Appendix 4). A copy of the questionnaire was made for each subject and students'

answers to each of the questions were recorded on the questionnaire by the experimenter.

After the performance interview, the error detection task was administered. Students were told that the experimenter wanted to use the passages they were about to read with other kids their age. They were asked to help the experimenter by reading each passage and then rating it a) easy to understand, it made sense; b) OK, a bit difficult; or c) hard to understand, it didn't make sense. These choices were printed on a card and placed in front of each subject. Passages were presented one at a time and students were encouraged to take their time reading and thinking about each one. If, after reading a passage, a subject decided that it was easy to understand, the experimenter asked whether there was anything difficult or confusing about it. If the subject's response was "no", the experimenter directed the subject's attention to the next passage. If the subject decided that the passage was either a bit difficult or hard to understand, the experimenter asked the subject to identify what made the passage difficult and to explain why 'that' made the passage difficult or confusing. If the subject identified the intended error in the passage, the experimenter asked the subject to fix the passage so that it would be easier to understand. The same procedure was repeated for each of the six passages.

After the error detection task students were thanked for their participation and directed back to their classroom.

Training Procedures

Students were divided into small groups for training, each one having five to seven members. There were three groups in each of the four participating schools. Across schools, six groups were trained to use the ISL and six groups were trained to map texts. Training involved students in 10 lessons, each lasting 40 min, distributed over 10 school days.

ISL group. Five lessons were allocated to each of the two strategies. Lessons one and two were devoted to training and practice and followed the three phases described in the teaching scripts section of this chapter. Lessons three through five devoted less time to discussion and more time to practice, encouraging students to become more independent in their strategy use. Measures of strategy use, reading comprehension, and attributions and self-efficacy were also administered during lessons three four, and five.

Each subject was given a prompt card, listing the steps in the strategy, to use during discussion and practice. Worksheets from the Reading and Thinking Strategies workbook also guided students through the steps of the strategies. These worksheets were supplied to students along with the passages to read. The worksheet for the "Reading Treasure" strategy instructed students to write down 1) their reading goal, and 2) what they thought the story would be about after they had looked at the title and the picture (if available) but before they started to read the passage.

The worksheet also instructed students to stop periodically as they were reading and to write what they had read so far in their own words. The final portion of the worksheet instructed students to write a summary of the main ideas in the passage.

The worksheet for the "Tracking Down the Main Idea" strategy had six footprints on it, each one representing one of the clues to be used in finding the important information in a passage. Before reading, students looked at the picture and the title and recorded information found there in the appropriate footprint. As students read a passage, they continued to record information from the passage in the footprints labeled characters, settings, actions and outcomes. Students used the information they had collected in the footprints to write the main ideas in the passage. Completion of the strategy worksheets was guided at first.

During the training of the second ISL strategy, students were also instructed about different types of discourse structures. This training began in lesson two. Distinctions between stories and descriptions were discussed and students practiced identifying passages as being either stories or descriptions. In lesson three, students were introduced to two more types of discourse structures -- explanations and comparisons -- and they practiced identifying passages as being one of the four types of discourse structures. Students were encouraged to think about the kind of passage they were reading as they gathered clues about the passage because different types of passages contain different types of clues. After finding as many clues as possible, students could

decide what kind of passage they had been reading and circle one of four choices listed at the bottom of their strategy worksheet.

The measure of strategy use was administered at the end of lessons three, four and five. Measures of reading comprehension followed the strategy measure in lesson four. Students were presented with a passage to read and study and were informed that they would be asked some questions about it. Students had as much time as they needed to prepare for the questions. When students indicated that they were ready for the questions, they were given a blank piece of lined paper and asked to write down everything they could remember about the passage. Once students had completed the free recall task, they were assigned a set of comprehension questions which required them to remember literal information from the text and to draw inferences about the information in the passage.

The measure of attribution and self-efficacy administered during training was the same as the pretest measure. Students were told that the same questionnaire was being used because the experimenter wanted to see if students had changed their minds about any of their ratings since the last time they had completed the questionnaire. This measure was administered at the end of lesson five. The procedures for administration were the same as those used during pretesting except that students were able to fill out the questionnaire independently.

Feedback to students during all phases of the experiment was informative and performance based. Each subject's performance on the strategy measures was recorded on a chart (see Appendix 9a) showing whether the subject had met the criteria of first saying each step in the strategy and then performing each step. The experimenter conferenced with each subject after each measure to ensure students' correct interpretation of their chart and to discuss with students what they might do if they were dissatisfied with their performance. Performance on comprehension questions was reported in terms of the number of ideas students remembered about a passage. A graph, showing the number of ideas remembered about each test passage, from pretest through training, was drawn for each subject. The experimenter conferenced with students about their graphs, asking students if they could think of possible reasons for upward or downward trends. Students were also encouraged to share possible explanations for increased or decreased performance during group discussions. Feedback from the experimenter to individual students was confidential. File folders were used to store all of the work done by students during training, including measures, charts and graphs.

Mapping group. Like the ISL group, the students in the mapping group were exposed to two sets of five lessons. Their first two lessons were also devoted to training and practice and followed the three phase teaching script. Less discussion and a movement toward independent practice occurred in lessons three through five. During these lessons the measures of strategy use,

reading comprehension, and attributions and self-efficacy were administered. The comprehension measures and the attribution and self-efficacy measures as well as the procedures used to administer them paralleled those used with the ISL group. To measure students use of the first strategy in lessons three through five, the experimenter provided students with a passage to read and a map like the one used during training (web-like). Students were expected to write the topic of the passage in the centre of the page and to surround it with important ideas from the passage, their own ideas about the passage and linking ideas from or about the passage.

The second mapping strategy exposed students to different types of discourse structures, beginning on lesson one. The distinctions between descriptions and stories were discussed on lessons one and two and students were shown that each type of discourse could be mapped differently. In lesson three, two more types of discourse were introduced (explanation and comparison) and a map for each type was shown (see Appendix 1 for map structures). In lessons three through five students practiced recognizing different types of discourse, selecting maps which represent these various types of discourse, and completing the map with information from the text.

The procedure for providing feedback to students in the mapping group matched the procedure used with students in the ISL group. (See Appendix 9b for the mapping group's chart.)

Posttest Procedures

Group testing. The Gates MacGinitie Reading Comprehension Subtest, the recognition of discourse structures task and the measure of attributions and self-efficacy were administered in the same session during the posttest phase. Groups of between 15 and 20 students were formed and each group met for approximately 50 min to complete the tasks. The increase in group size and the decrease in number of sessions used at posttest to administer these measures reflects the limited number of school days available to the experimenter to complete this study before the school year ended in June.

The Gates MacGinitie Comprehension Subtest was administered first. The procedures for administration were the same as the procedures for pretesting and students had 30 min to work on the test.

The recognition of discourse structures task was administered next, followed by the measure of attributions and self-efficacy. Students were allowed as much time as they needed to complete each of these measures (10 min per measure was the average amount of time used by students). The procedures for administering these measures matched those used for pretesting except that the attribution and self-efficacy measure was completed by students independently since they had completed the same questionnaire three times before.

Individual testing. An experimenter met with individual students in an empty classroom or library for one 30 to 40 min session to administer the performance interview and the error detection task. Twenty to 25 min were used for the performance interview and 10 to 15 min were used for the error detection task. Students sat across from the experimenter at a small table.

Students were reminded of the pretest interview and told that they would be asked the same questions so that the experimenter could see if they had changed their minds about anything or if they do anything differently when they read now. The interview was conducted according to the pretest script. The passage and the comprehension questions used were different but they matched the other comprehension measures on the number of questions asked and the number of ideas required from students to answer them. Students were offered a blank piece of paper during the posttest interview at the point when the experimenter asked students to read the passage and informed them that they would be asked questions about it when they had finished reading. The experimenter explained that they could use the paper to get ready for the questions.

The administration procedures and the questions for the error detection task matched those used for pretesting. The passages were different but they matched the pretest passages in number, type and order of presentation.

As mentioned earlier in the procedures section of this chapter, a second experimenter helped to interview 35 of the 74 students at posttest. The reason for the second experimenter was the amount of time left in the school year to complete this study. Both experimenters used the same administration procedures and scripts for the performance interview and the error detection task. Experimenter bias was also controlled by having the experimenters matched on the number of students interviewed as well as the age, sex, ability and treatment group of the students they interviewed.

Transfer measure. The transfer measure was administered after training by the nine teachers whose students had participated in this study. In order to avoid inappropriate prompting to students who had received strategy training, the entire classes completed this transfer measure.

The experimenter supplied each teacher with reading passages, question sets, and sheets of blank paper for the entire class, plus a teaching script to follow when administering the measure (see Appendix 10). First teachers gave students a passage to read and a blank piece of paper. Then teachers informed students that the passage was for them to read and study and that they would be asked questions about it when they judged they had studied the passage enough. Students were told that the blank piece of paper was for them to use for studying. When students indicated, by raising their hands, that they felt ready for the questions, teachers collected their reading passages and study sheets and gave them a set of ten comprehension questions.

Students were instructed to answer as many of the questions as they could and to write their answers on their question sheets. Teachers collected completed question sets and gave them, along with the passages and study sheets, to the experimenter for scoring.

These procedures were not followed by all participating teachers. One teacher forgot to administer the measure and two teachers administered the measure only to those students in their classes that were participating in the study. Unfortunately, there was not enough time left in the school year to administer another transfer measure. Consequently, transfer data is insufficient to permit worthwhile analyses and will be excluded from the results section of this study.

Chapter 4

Results and Discussion

Data analyses in this study involved seven of the measures described in chapter three: strategy use, the performance interview, the Gates MacGinitie Test of Reading Comprehension, free recall, comprehension questions, error detection, and recognition of discourse structures. The results of these analyses are presented and discussed in this chapter according to the four sets of research questions in Chapter 1.

Did Students Learn to Use the Strategies?

Two dependent variables were used to examine this question: measures of strategy use collected during training, and reported strategy use on the performance interview.

Measures of strategy use. Measures of strategy use collected during the last training session for each strategy, lessons 5 and 10, were used in the data analyses. Scores on strategy measures were converted to percent in order to facilitate discussion about the degree to which the different strategies were used by students.

Students, trained to use the Informed Strategies for Learning (ISL), were asked to trace their knowledge of either the reading purpose or the main idea strategy by 1) writing the steps of the strategy and 2) demonstrating their performance of each step by writing information from a reading passage that related to each of

the steps in the strategy. Figure 1 shows that the proportion of strategy steps evidenced in students' written and performance traces was consistently high.

Figure 1. Mean proportion of strategy steps written and performed by students in the ISL group during training. Error bars indicate the standard error of the mean.

Figure 1   Mean proportion of strategy steps written and performed by students in teh ISL group during training.

These results provide strong evidence that LD and average students receiving ISL instruction learned to use the two strategies they were taught. LD and average students wrote almost the same proportion of the steps in both the reading purpose and the main idea strategies. For both the reading purpose strategy and the main idea strategy, percentage of steps performed was higher for average students. A discrepancy exists for LD students between steps of the

main idea strategy written and steps performed. It is evident from their 99% score on the written component of this measure that LD students knew what the steps of the strategy were. Their lower score on the performance component of the strategy measure likely suggests that they needed more time to proceduralize and apply all of their knowledge about the strategy. The opposite relationship between steps written and steps performed exists for average students. They applied the steps of both strategies more than they wrote the steps. However, their knowledge of the steps can be inferred through their demonstrated use of them.

The mean percentage of strategy steps performed by students receiving mapping instruction is shown in Figure 2. These data indicate that both LD and average students were using the strategies and that LD students' use of the mapping strategy was comparable to that of the average students.

The strategy measures for the mapping group only provide information about performance of the steps. Students receiving mapping instruction were not asked to write down the steps of the strategy. As demonstrated by the LD students who received ISL instruction, it is possible that mapping students' knowledge of the steps in the strategies exceeds their demonstrated use of them.

Any comparison between the ISL and mapping groups' use of the strategies must be qualified because the steps which comprise the strategies and the criteria for measuring the use of those steps were not the same. The data in Figures 1 and 2 do suggest, however,
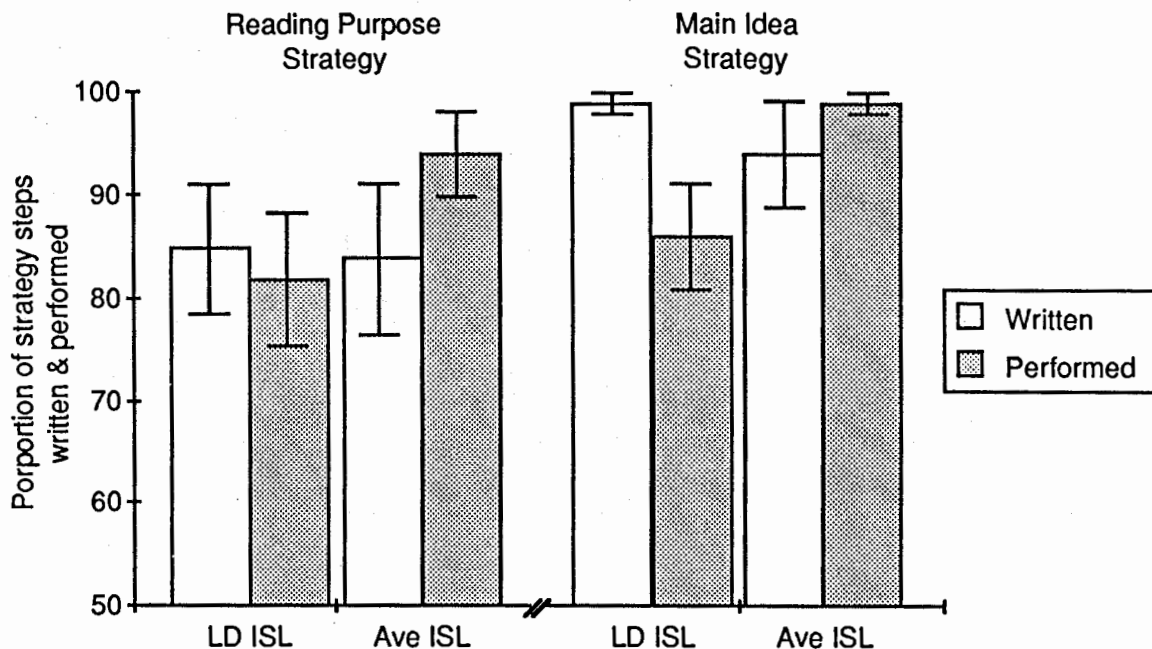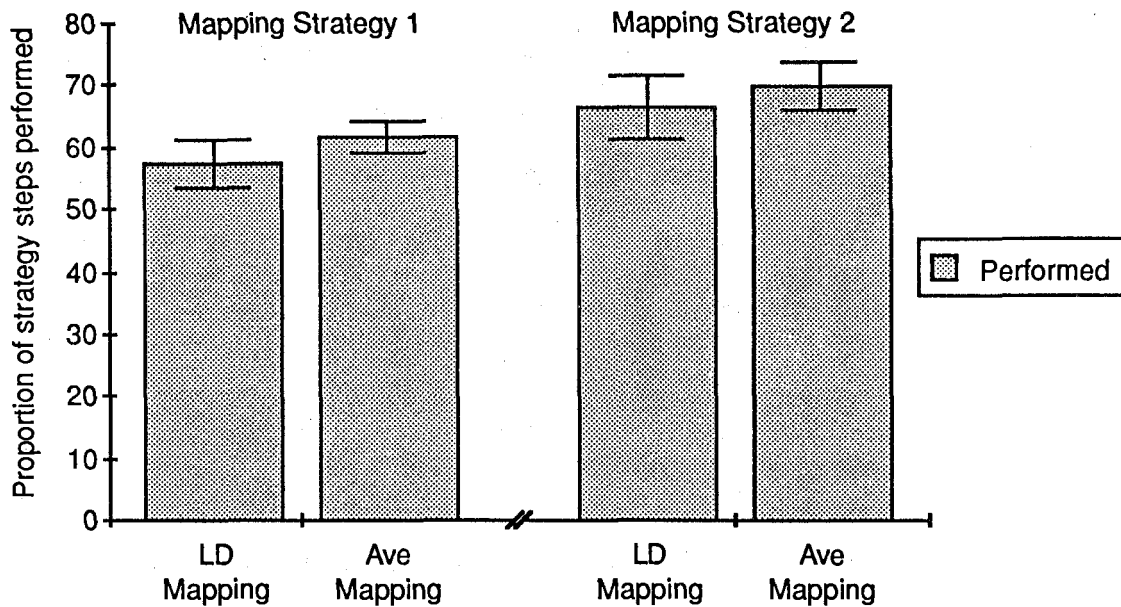
Figure 2. Mean proportion of strategy steps written and performed by students in the mapping group during training. Error bars indicate the standard error of the mean.

that students in the ISL group were using the two ISL more than students in the mapping group were using the two mapping strategies. Explanations for why this is the case may be contained in the strategy measures or in the strategies themselves. During lesson 5, students in both groups received a worksheet on which to demonstrate their use of the first strategy. It is possible that the ISL worksheet provided students with cues about the steps in the reading purpose strategy because it used the strategy metaphor as its title and was divided into three sections with the headings, "Before I read, While I read, and After I read." In contrast, the mapping strategy worksheet provided students with an outline of a web-like map which contained no verbal information. Also, it is possible that writing the steps of the strategy prior to demonstrating use of them helped students in the ISL group, or that steps of the reading purpose strategy were triggered by

characteristics of the reading passage. For example students in the ISL group may have been reminded to look at the picture and read the title by the presence of these features of the passage.

These latter two explanations become more convincing when the results of the last strategy measure are considered. This measure, collected during lesson 10, asked students in both the ISL and the mapping groups to perform the strategy they had been taught on a blank piece of paper. This meant that neither group had access to verbal information about the strategy. As with the first strategy, students in the ISL group wrote the steps of the strategy before demonstrating their use of them, creating a concrete, visual prompt which they could reference when applying each step in the strategy to the text. This lessened the amount of information their working memories needed to keep active during strategy performance. Also, it is possible that characteristics of the passage such as pictures, title, characters, and setting acted as triggers for the steps in the strategy because students could map information about each of these characteristics onto a step in the main idea strategy. In contrast, the steps of the mapping strategy were not as explicitly represented in the passage as the ISL steps, and students in the mapping group did not write the steps of their strategy on their blank page before applying them to the passage.

Performance interview. Responses to questions on the performance interview were separated into three subscales: reported strategy use, strategy awareness, and strategy value. Preliminary inspection of the reported strategy use data indicated a

very low rate of responding (low means), heterogeneous variances, and irregular distributions. Thus adding the scores for students' use of the individual steps in the strategies to create an overall reported use scale would not have been appropriate. Therefore, frequencies were computed for each step in the reported strategy use scale and the proportion of students within a group reporting the use of a particular step was observed.

Reported strategy use by students in the ISL group is shown in Table 1. At pretest, students in the LD group reported using picture cues and thinking about the topic in answer to the interview questions that focussed students' attention on a particular passage and asked them what they do before reading. Average students reported thinking about the topic of a passage in answer these questions. All other steps in the reading purpose and main idea strategies were reported by 5% or less of LD and average students in the ISL group in answer to the questions about a previously read passage and to the questions about the passage presented to students in the interview.

During the posttest interview both LD and average students in the ISL groups reported using picture and title clues, thinking about the topic of the passage, stopping while reading to check understanding and to self-question, paraphrasing the passage, and summarizing the passage's main ideas in answer to questions about previously read passages and to questions about the passage presented to them in the interview. Three of these steps are contained in both the reading purpose strategy and the main idea

Table 1. Proportion of students in the ISL group reporting the use of strategy steps.

Previously read passages	LD Pretest	LD Posttest	Average Pretest	Average Posttest
Before I read I ...				
read the title	0	35	5	63
look at the picture	0	30	5	57
think about the topic	0	15	5	47
While I read I ...				
stop and check my understanding	0	30	0	26
ask myself questions	0	25	0	16
say it in my own words	0	10	0	30
predict what will happen next	0	0	0	0
think about the:				
characters	5	0	0	5
setting	5	0	0	5
actions	0	0	0	0
outcomes	0	0	0	0
After I read I ...				
summarize the main ideas	5	25	5	37
Passage presented during interview				
Before I read I ...				
read the title	0	25	5	47
look at the picture	20	50	5	57
think about the topic	35	25	30	42
While I read I ...				
stop and check my understanding	0	25	0	37
ask myself questions	0	15	0	21
say it in my own words	0	5	0	30
predict what will happen next	0	0	0	0
think about the:				
characters	0	0	0	0
setting	0	0	0	0
actions	0	0	0	0
outcomes	0	0	0	0

strategy (looking at the title, the picture, and summarizing the main idea). The other steps which students reported using most were contained only in the reading purpose strategy. Generally, there was an increase in the reported use of these steps from pretest to posttest for both LD and average students and, for the most part, average students' percentage of reported strategy use was higher than that of LD students.

LD and average students in the mapping group reported strategy use is shown in Table 2. At pretest, LD students in this group reported thinking about their own ideas about the passage , and about the main ideas in the passage in answer to questions about previously read passages. These students also reported thinking about the title and topic of the passage in answer to questions about the passage presented to them during the pretest interview. Average students in the mapping group reported thinking about the topic and about the main ideas in a passage in answer to questions about previously read passages. They reported using picture and title cues, and thinking about the topic when questions were asked about the passage presented in the interview. The other steps in the mapping strategies were reported by less than 7% of LD and average students in the mapping group during the pretest.

At posttest, both LD and average students in the mapping groups indicated that a map could be used to facilitate their reading comprehension in answer to questions about a previously read passage. Some of the average students in the mapping group

Table 2. <u>Proportion of students in the mapping group reporting the use of strategy steps.</u>

	LD		Average	
Previously read passages	Pretest	Posttest	Pretest	Posttest
Before I read I ...				
read the title	0	0	0	14
look at the picture	0	7	0	14
think about the topic	0	7	5	5
think about making a map	0	14	0	5
While I read I think about...				
making a map	0	7	0	10
what type of map to make	0	0	0	10
the topic of the passage	0	0	0	0
the main ideas in the passage	0	7	5	0
my ideas about the passage	7	0	0	0
linking ideas	0	0	0	0
After I read I think about ...				
making a map	0	21	0	14
what type of map to make	0	0	0	14
the topic of the passage	0	0	0	0
the main ideas in the passage	14	0	14	5
my ideas about the passage	0	0	0	0
linking ideas	0	0	0	0
Passage presented during interview				
Before I read I ...				
read the title	0	7	10	14
look at the picture	7	57	10	62
think about the topic	29	14	43	29
think about making a map	0	0	0	0
While I read I think about...				
making a map	0	0	0	14
what type of map to make	0	0	0	5
the topic of the passage	0	7	0	0
the main ideas in the passage	0	7	0	14
my ideas about the passage	0	0	0	0
linking ideas	0	0	0	0

reported thinking about what kind of map they could use to show meaning. Students in this group reported thinking about main ideas in the passage in answer to questions about a previously read passage and in answer to questions about the passage presented to them during the interview. Students' responses to questions about the passage presented in the posttest interview suggest that picture cues were just as salient for students in the mapping group as they were for students in the ISL group.

At posttest, students' responses to general and specific questions on the interview correlated .64 (p<.001) in the ISL group and .65 (p<.01) in the mapping group. Reported strategy use was reliably correlated with awareness for the ISL group (r=.49, p=.001) but not the mapping group (r=0, p=.491). Reported strategy use and value were not reliably correlated for either the ISL group or the mapping group (r=.19, p=.131; r=.23, p=.093, respectively). Awareness was reliably correlated with value for the mapping group (r=.47, p=.002) but not the ISL group (r=.07, p=.332).

No reliable relationship existed between reported strategy use on the posttest interview and demonstrated use during training for students in either the ISL or the mapping group. The reported use of strategies for both ISL and mapping groups was much less than their actual use of strategies on paper and pencil tasks during training. This may reflect the fact that questions on the interview did not explicitly request students to list all the steps in the strategies they had been taught, nor did the questions require students to demonstrate their use of these steps on paper. Students may not

have felt it necessary to provide as detailed an account of their strategy knowledge in the interview. Alternatively, the interview questions may not have prompted a detailed account of the steps in the strategies. Reported strategy use for students in the mapping group was less than that of students in the ISL group. It is possible that the structure of the interview was more sensitive to ISL reported strategy use because it asked students to report things they do before, during and after they read. This caveat must also be considered when the results of the awareness and value subscales are interpreted.

Did Students Increase Their Strategy Awareness and Strategy Value Through Training?

Data from the awareness and value subscales of the performance interview were entered into a MANOVA. Reliable differences were detected between LD and average students (exact $F=11.14$; $df=2,69$; $p<.001$), treatment groups (exact $F=2.98$; $df=2,69$; $p=.057$), and pretest and posttest (exact $F=6.10$; $df=2,69$; $p=.004$). None of the interaction effects were statistically reliable ($p>.1$). These results were followed up by univariate ANOVAs on the awareness and value data.

Awareness. ANOVA for repeated measures on the awareness data indicated reliable differences between LD and average students ($F=22.20$; $df=1,70$; $p=.001$; $MS_W=3.84$), treatments ($F=5.95$; $df=1,70$; $p=.017$; $MS_W=3.84$), and pretest and posttest ($F=12.31$; $df=1,70$; $p=.001$; $MS_W=2.42$). The results of this analysis also indicated an

interaction between students' ability and treatments (F=3.31; df=1,70; p=.073; MS_W=3.84).

An examination of the group means indicates that average students demonstrated more awareness than LD students about how using the steps in the strategies facilitates their reading comprehension (see Table 3). This was true at pretest and posttest. Students in the ISL group performed better on the awareness measure than students in the mapping group at posttest. At pretest, LD students in the ISL group demonstrated more awareness about the facilitative effects of using the strategy steps to find meaning in a passage than LD students in the mapping group. However, average students in the ISL group obtained marginally lower scores on this measure than average students in the mapping group (.06 of a standard deviation). Students in all groups increased their scores on the awareness measure from pretest to posttest.

Table 3. <u>Means, Standard Deviations, and Effect Sizes for the Awareness Subtest</u>

Treatment	Pretest		Posttest		Effect Size
	M	SD	M	SD	
LD ISL	4.25	1.86	5.60	2.11	0.87
Average ISL	5.26	1.82	6.47	1.58	0.78
LD Mapping	3.29	1.94	3.79	1.25	0.32
Average Mapping	5.38	1.60	5.95	1.77	0.37

The ability by treatment interaction reflects differences between the two average ability groups. Average students in the ISL

group increased their score on the awareness measure from pretest to posttest more than their average counterparts in the mapping group. Figure 3 plots the means for the awareness data and graphs the interaction effect.
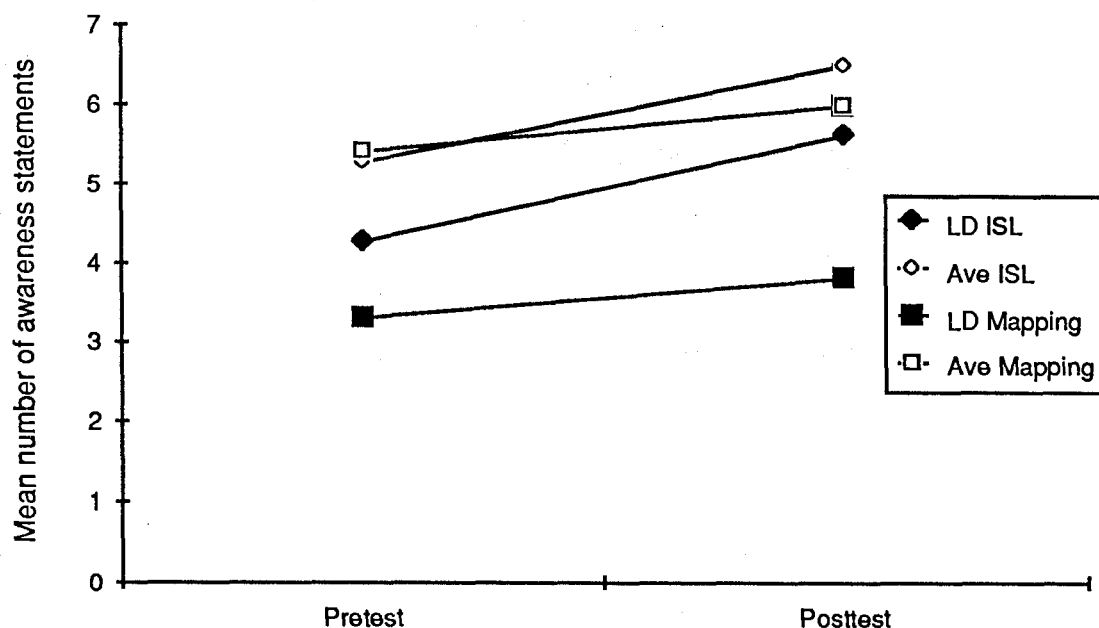

Figure 3. Plotted means and interaction effects for the awareness subtest.

In order to describe further the differences between ability and treatment groups, experimental effect sizes were computed, using the $\sqrt{MS_W}$ from the awareness ANOVA as the denominator (see Table 4). At pretest, LD students in the ISL group obtained scores that were about half a standard deviation lower than average students in the ISL group on the awareness measure. LD students in the mapping group obtained scores that were 1.07 standard deviation units lower than their average counterparts on this measure. At posttest, differences between LD and average students in the ISL group had decreased from .52 to .44 standard deviation units;

however, this decrease was not considered educationally significant. Differences between LD and average students in the mapping group increased from 1.07 to 1.10 standard deviation units from pretest to posttest.

Table 4. <u>Between Group Effect Sizes for the Awarenes Subtests</u>

	LD ISL	Average ISL	LD Mapping	Average Mapping
LD ISL		-0.52	0.49	-0.58
Average ISL	0.44		1.00	-0.06
LD Mapping	-0.92	-1.37		-1.07
Average Mapping	0.18	-0.27	1.10	

Pretest effect sizes are shown in the upper triangle, posttest effect sizes in the lower triangle. Effect size = row mean - column mean ÷ $\sqrt{MS_w}$

Differences between LD students in the ISL and mapping groups increased .43 standard deviation units from pretest to posttest. This increase in the awareness gap between LD students in the ISL and mapping groups reflects the degree to which each group increased their awareness score from pretest to posttest (see Table 3 for within group effect sizes). LD students in the ISL group increased their score on the awareness measure .87 standard deviation units while LD students in the mapping group increased their score .32 standard deviation units. The difference between average students' scores on the awareness subscale of the performance interview corresponds to .06 standard deviation units at pretest and .27 standard deviation units at posttest. Again, the

from pretest to posttest on the awareness measure experienced by students in the two treatment groups. Average students in the ISL group increased their scores .78 standard deviation units from pretest to posttest while average students in the mapping group increased their score .37 standard deviation units. LD students in the ISL group increased their score on the awareness measure more than any other group.

In summary, it can be said that all students who participated in the study increased their strategy awareness from pretest to posttest. Differences between LD and average students' awareness of strategies persisted after training; however, LD students in the ISL group increased their score on the awareness subtest more than average students receiving the same instruction and LD students in the mapping group increased their strategy awareness over training to almost the same extent as their average counterparts. Differences between treatment groups indicate that students in the ISL increased their awareness of strategies more than students in the mapping group.

Value. ANOVA for repeated measures indicated reliable differences between LD and average students in terms of how much they valued the steps of the strategies that they had reported using in the posttest interview ($F=3.75$; $df=1,70$; $p=.057$; $MS_w=0.96$). None of the other main effects or interaction effects were statistically reliable ($p>.1$) for this data. The means and standard deviations for the value data are shown in Table 5. An examination of the pretest and posttest means indicates that average students valued the steps

in the strategies they reported using in the interview more than LD students valued the steps that they had reported using. Although reliable differences within groups were not detected after training, the means for three of the four groups did increase on the value measure between pretest and posttest. The size of this increase was the same for the three groups and corresponds to an effect size of .29 standard deviation units (see Table 5).

Table 5. Means, Standard Deviations, and Effect Sizes for the Value Subtest

Treatment	Pretest		Posttest		Effect Size
	M	SD	M	SD	
LD ISL	3.05	0.99	3.35	0.88	0.29
Average ISL	3.32	0.67	3.58	0.69	0.29
LD Mapping	3.00	1.04	3.00	0.78	0.00
Average Mapping	3.43	0.68	3.52	0.68	0.29

Did Strategy Training Affect Students' Performance on Reading Comprehension Tasks?

Five measures of reading comprehension were analysed in order to examine the efficacy of strategy training for enhancing reading comprehension performance. Included in these measures were the Gates MacGinitie Test of Reading Comprehension, the pretest and posttest comprehension questions, the pretest and posttest free recall exercises, the error detection task, and the recognition of discourse task.

Gates MacGinitie. Means and standard deviations for performance on the Gates MacGinitie Comprehension Test are shown in Table 6. Repeated Measures ANOVA revealed reliable differences between LD and average students (F=23.384; df=1,53; p=.001; MS_W=58.02). None of the other main effects or interaction effects were statistically reliable (p>.1). Means were examined in order to determine the direction of the difference between categories of students. As might be expected, average students performed better on this standardized measure of reading comprehension than LD students. Mean scores were 22.4 and 15.6, respectively.

Table 6. Means and Standard Deviations for the Gates MacGinitie Test of Reading Comprehension

Treatment	Pretest		Posttest	
	M	SD	M	SD
LD ISL	15.50	5.13	14.47	5.38
Average ISL	22.16	5.52	21.32	7.92
LD Mapping	13.00	2.62	17.50	6.05
Average Mapping	22.28	8.71	23.57	7.49

If it is true that standardized tests of reading comprehension measure general aptitudes and abilities in reading and are not sensitive to specific cognitive skills (Paris, Cross, & Lipson, 1984), it is not surprising that the Gates MacGinitie did not detect differences in performance between treatment groups or between pretest and posttest. Paris et. al. (1984) also found non-reliable differences in comprehension performance from pretest to posttest using the Gates MacGinitie. They suggested that such tests may be

ill-suited to the task of measuring the specific skills taught by the ISL (i.e., paraphrasing or discerning different discourse structures). They also suggested that students may not employ these strategies during timed, standardized (often multiple-choice) tests because they take up too much time or seem inappropriate. It seems, therefore, that more useful information about the effect of strategy training would be obtained through the administration of criterion measures that have as their target the specific skills acquired during strategy training.

Comprehension questions and free recall exercises. Data from the comprehension questions and free recall exercises were entered as dependent variables in a MANOVA. The results of the MANOVA reveal a reliable differences between LD and average students (exact F=13.56; df=2, 69; p<.001) and for pretest and posttest (exact F=18.99; df=2, 69; p<.001), but not for treatment groups (p>.1). Also, these results indicate reliable interaction effects for categories of students by treatments (exact F=2.62; df=2, 69; p=.080), categories of students by tests (exact F=3.62; df=2, 69; p=.032), and categories of students by treatments by tests (exact F=5.60; df=2, 69; p=.006). Total scores on the comprehension question sets and free recall exercises were used in the analyses because the literal and inferential subscales for these data proved to be unreliable, and the variances were heterogeneous. The results of the MANOVA were followed up with univariate ANOVAs.

Free recall. ANOVA for repeated measures was applied to the free recall data. Reliable differences were detected between LD and

average students (F=10.33; df=1,70; p=.002; MS$_W$=133.48) and between pretest and posttest (F=34.25; df=1,70; p=.001; MS$_W$=84.85), but not between treatments (p>.1). Reliable interaction effects on the free recall exercises include a two-way interaction between students' ability and tests (F=3.43; df=1,70; p=.068; MS$_W$=84.85), and a three-way interaction between students' ability, treatments, and tests (F=3.98; df=1,70; p=.050; MS$_W$=84.85). None of the other interaction effects were reliable (p>.1).

Scores on the free recall exercises were converted to percent to equalize the pretest and posttest scales. Means and standard deviations for these exercises are shown in Table 7. Average students recalled more information from both the pretest and the posttest passage. All groups increased their scores on the free recall measure from pretest to posttest. The largest gains were experienced by average students in the mapping group.

Table 7. <u>Means, Standard Deviations and Effect Sizes for the Free Recall Exercises</u>

| Treatment | Pretest | | Posttest | | Effect Size |
	M	SD	M	SD	
LD ISL	7.93	5.93	17.50	15.26	1.09
Average ISL	10.35	6.08	19.47	9.56	0.98
LD Mapping	8.37	5.01	11.07	13.61	0.33
Average Mapping	12.64	9.53	27.14	12.90	1.52

Figure 4 plots the means for the free recall data and graphs the interaction effects. The figure shows that LD students in both

treatment groups remembered less than average students in either the ISL or the mapping group at pretest. LD students in the ISL group remembered less that LD students in the mapping group and, likewise, average students in the ISL group remembered less than average students in the mapping group. At posttest, scores on the free recall exercise increased for all groups; however, increases for LD students in the mapping group were slight. LD students in the ISL group surpassed LD students in the mapping group at posttest. The average students in the mapping group maintained the highest level of performance on the free recall exercises throughout training.
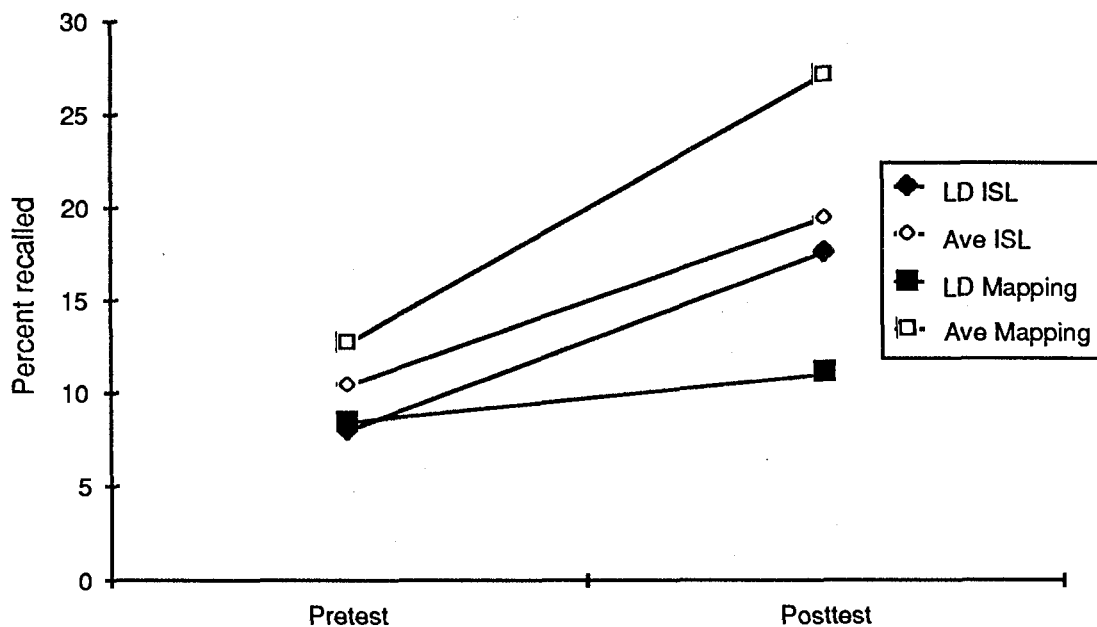

Figure 4. Plotted means and interaction effects for the free recall exercises.

In order to get more descriptive information about the differences within and between groups on the free recall exercises, effect sizes were computed. Effect sizes for pretest to posttest performance within groups on the free recall exercises are shown in

Table 7. On this measure of comprehension, LD students in the ISL group increased their score .76 standard deviation units more than LD students in the mapping group from pretest to posttest. Substantial increases in performance from pretest to posttest on the free recall exercises were obtained by average students in both the ISL group and the mapping groups.

Table 8 shows the between group effect sizes for the free recall exercises. The differences in performance on the free recall exercises between LD and average students in the ISL group were small at both pretest and posttest. At pretest, there was no difference between the two LD groups; however, at posttest LD students in the ISL group obtained scores on the measure of free recall that were .61 standard deviation units higher than LD students in the mapping group. Differences between average groups increased .43 from pretest to posttest. This difference reflects the degree to which each of these groups increased their scores from pretest to posttest. The largest effect size between groups on the free recall exercise describes the difference between LD and average students in the mapping group after training. Average students in the mapping group increased their free recall score more than any other group while LD students receiving the same instruction increased their score the least.

Comprehension Questions. ANOVAs for repeated measures were applied to the data for the comprehension questions and revealed reliable differences between LD and average students (F=27.52; df=1,70; p=.001; MS_W=363.34) and between pretest and

Table 8. <u>Between Group Effect Sizes for the Free Recall Exercises</u>

	LD ISL	Average ISL	LD Mapping	Average Mapping
LD ISL		-0.17	0.00	-0.43
Average ISL	0.09		0.17	-0.26
LD Mapping	-0.61	-0.69		-0.43
Average Mapping	0.78	0.69	1.39	

Pretest effect sizes are shown in the upper triangle, posttest effect sizes in the lower triangle. Effect size = row mean - column mean ÷ $\sqrt{MS_W}$

posttest (F=5.22; df=1,70; p=.025; MS_W=167.99), but not between treatments (p>.1). The ANOVA results also indicated a two-way interaction between students' ability and treatments (F=4.24; df=2,69; p=.043; MS_W=363.34) and a three-way interaction between categories of students, treatments, and tests (F=6.96; df=2,69; p=.010; MS_W=167.99).

Scores on the comprehension question sets were converted to percent in order to equalize pretest and posttest scales. Means and standard deviations for performance on these exercises are shown in Table 9. The reliable main effect for ability reflects average students' superior performance on the comprehension questions at pretest and posttest. All groups except the average mapping group increased their scores on the comprehension questions from pretest to posttest. Average students in the mapping group decreased their scores.

Table 9. <u>Means, Standard Deviations and Effect Sizes for the</u>
<u>Comprehension Questions</u>

Treatment	Pretest		Posttest		Effect Size
	M	SD	M	SD	
LD ISL	40.71	18.55	45.00	15.64	0.31
Average ISL	49.25	17.80	56.68	10.00	0.62
LD Mapping	29.59	23.08	43.41	16.42	1.00
Average Mapping	62.59	16.27	56.78	11.79	-0.46

Figure 5 plots the means for the comprehension questions and graphs the interaction effects. At pretest, there were no interactions. LD students in both the ISL and the mapping groups were not performing as well as average students in either of the treatment groups. LD students in the mapping group obtained lower scores than LD students in the ISL group. In contrast, average students in the ISL group obtained lower scores than average students in the mapping group on the pretest questions. At posttest, all groups except the average mapping group increased their scores on the comprehension questions. LD students in the mapping instruction group increased their scores to the level of LD students in the ISL group. This interaction occurs because LD students in the mapping group experienced larger increases than LD students in the ISL group on the comprehension questions from pretest to posttest. Average students in both treatment groups were also performing at the same level on the comprehension questions at posttest. This interaction is the result of increased performance by average ISL students and decreased performance by mapping students.
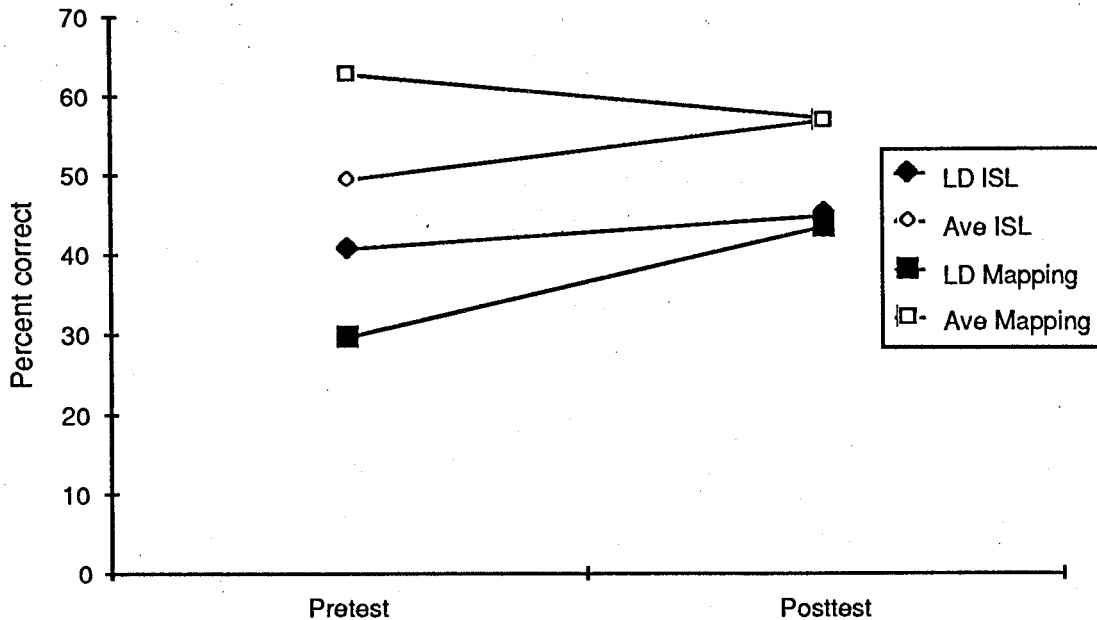
Figure 5. Plotted means and interaction effects for comprehension questions.

Table 9 shows the effect sizes within groups from pretest to posttest for comprehension question data. Three out of the four treatment groups increased their score on comprehension questions after training. The exception to this was the average mapping group who decreased their score .46 standard deviation units. This decrease is in sharp contrast to their performance on the free recall exercises. The greatest increase in performance on the comprehension question sets was obtained by the LD mapping group. This result is also in contrast to the findings for the free recall exercises.

The effect sizes that describe the between group differences in performance on the comprehension question sets are shown in Table 10. At pretest, LD students in the ISL group obtained scores that were .42 standard deviation units lower than the scores of average students in the ISL group. This gap in performance

increased .21 standard deviation units from pretest to posttest. At pretest, LD students in the mapping group obtained scores that were 1.68 standard deviation units lower than average students in the mapping group. These differences decreased 1.00 standard deviation units over training, partly because of the lower scores obtained by the average students at posttest, but also because of the substantial increase in performance from pretest to posttest experienced by students in the LD mapping group. Scores for LD students in the ISL group were .58 standard deviation units higher than scores for LD students in the mapping group at pretest. At posttest these groups differed by only .10 standard deviation units. Again, this decrease in group differences reflects a larger increase in performance experienced by LD students in the mapping than by LD students in the ISL group. The difference between average students in the ISL and mapping groups was also decreased over training. At pretest, average students in the mapping group obtained scores that were .68 standard deviation units higher than the scores of average students in the ISL group. At posttest, this difference was only .27 standard deviation units. This decrease is the result of increased performance by average students in the ISL group and decreased performance by average students in the mapping group

In summary, all groups increased their performance on comprehension questions and free recall exercises from pretest to posttest with the exception of average students in the mapping group who decreased their scores on the comprehension questions. LD students in the ISL group showed a greater increase on the free

Table 10. Between Group Effect Sizes for the Comprehension Questions

	LD ISL	Average ISL	LD Mapping	Average Mapping
LD ISL		-0.42	0.58	-1.10
Average ISL	0.63		1.00	-0.68
LD Mapping	-0.10	-0.73		-1.68
Average Mapping	0.58	0.27	1.10	

Pretest effect sizes are shown in the upper triangle, posttest effect sizes in the lower triangle. Effect size = row mean - column mean ÷ $\sqrt{MS_w}$

recall exercises than LD students in the mapping group. In contrast, greater performance gains were obtained for LD students in the mapping group on the comprehension question sets, although scores on the comprehension questions were higher for LD students in the ISL group at both pretest and posttest. Although average mapping students decreased their scores on the comprehension questions from pretest to posttest, their free recall score increased 1.52 standard deviations from pretest to posttest. This increase is larger than the increases obtained by the other groups. Average students in the ISL group increased their performance on both comprehension questions and free recall exercises from pretest to posttest. Their performance gain was most noticeable on the free recall exercise.

Performance on the free recall exercise and the comprehension questions correlated .62 (p<.001) at posttest, compared to pretest when the correlation between these tasks was .36 (p=.002). Of

interest was whether there was a reliable correlation between performance on these comprehension exercises at posttest and strategy use during training. For the ISL group saying the steps of the reading purpose strategy was not reliably correlated with performance on comprehension questions and free recall exercises (r=.11, p=.474; r=.03, p=.866; respectively) but doing the steps was (r=.32, p=.045; r=.32, p=.046; respectively). Doing the steps of the main idea strategy was reliably correlated with performance on the comprehension questions but not the free recall exercise (r=.44, p=.005; r=.17, p=.288; respectively). Performance on the comprehension questions and free recall exercises was not reliably correlated with saying the steps of the main idea strategy (r=-.08; p=.644; r=.20; p=.230, respectively).

Correlations between strategy use during training and performance on comprehension questions and free recall exercises at posttest were not reliable for the mapping group. Correlations between strategy use during training and performance on the comprehension questions at posttest were .11 (p=.513) and -.07 (p=.681) for the first and second mapping strategies, respectively. Use of mapping strategies one and two during training correlated .06 (p=.704) and .23 (p=.190), respectively, with performance on the free recall exercise at posttest.

Error detection. Repeated Measures ANOVA on the error detection data yielded no reliable main or interaction effects (p>.1). Table 11 shows the means and standard deviations for the error detection data. These means reference students' total scores on the

error detection exercises instead of their scores on the four subscales (recognition, demonstration, explanation, and correction). Of interest in this study was whether students monitored their comprehension more after training as measured by this error detection task. None of the means on the subscales changed from pretest to posttest and were, therefore, collapsed to form a composite score.

Table 11. <u>Means and Standard Deviations for the Error Detection Task</u>

	Pretest		Posttest	
Treatment	M	SD	M	SD
LD ISL	8.70	4.51	7.50	4.06
Average ISL	8.95	4.73	8.26	4.72
LD Mapping	7.71	4.30	7.21	3.36
Average Mapping	7.81	3.86	7.43	3.97

These findings are consistent with past studies which have used error detection as a measure of comprehension monitoring (Garner & Reis, 1981; Garner & Taylor, 1982; Wong & Wong, 1986). Generally, these studies have shown that only above average readers recognize inconsistencies in text and disorganized prose, and that they do so only when prompted. Wong and Wong (1986) showed that average and LD students did recognize difficult vocabulary in reading passages. This is also consistent with the findings of this study. At posttest, 80% of LD students and 86% of average students in the study identified difficult vocabulary on the error detection task.

Recognition of discourse structures. A repeated measures ANOVA indicated reliable differences between LD and average students (F=26.27; df=1/68; p=.001; MS_W=5.69). None of the other main or interaction effects were statistically reliable (p>.1). Means and standard deviations for the recognition of discourse structure are shown in Table 12. Average students recognized more discourse structures than LD students at pretest and posttest.

Table 12. Means and Standard Deviations for the Recognition of Discourse Structures Task

| | Pretest | | Posttest | |
Treatment	M	SD	M	SD
LD ISL	4.20	2.19	4.35	1.87
Average ISL	7.21	2.15	6.37	2.06
LD Mapping	5.21	2.01	5.00	2.63
Average Mapping	6.76	2.41	6.37	1.83

Recognizing different types of discourse structures is not an easy task. Many passages are not clearly one or another type of discourse structure (i.e., a story may contain a problem and a solution and, therefore, be confused with an explanation). It was hypothesized that mapping students might outperform the ISL students on this task because they had been taught to represent text structure spatially. This hypothesis was not born out by the data. During training, students in the ISL group were able to recognize discourse structures more often than students in the mapping group. Mean scores in percentage were 45% for LD students and 82% for average students in the ISL group, 29% for LD students and 27% for

average students in the mapping group. The fact that treatment differences were not maintained at posttest may indicate that students did not take time during the test to think about the kind of passage they were reading or that more time and practice was needed to consolidate the skill of discourse recognition. Since recognition of discourse structure was not a primary goal of this intervention, it did not receive as much emphasis during training as the other skills.

Chapter 5

Conclusions

In this study 74 grade 4 and 5 students learned to use either two Informed Strategies for Learning (ISL) or concept mapping to find meaning in text. These strategies were taught to both learning disabled (LD) and average ability readers. Of interest was whether strategy training would facilitate performance on reading comprehension tasks such as free recall exercises, comprehension questions, recognition of discourse structures, and standardized measures of reading comprehension. Of particular interest was whether the two types of strategies would exert differentially facilitative effects on these tasks. Increased comprehension monitoring, strategy awareness, and strategy value and were also goals of the two types of strategies taught in this study.

Strategy Use

Actual strategy use. Measures of strategy use collected during training indicate that students in both ISL and mapping groups were using the strategies they had been taught. LD and average students in the ISL group demonstrated attainment of similar levels of declarative knowledge about the steps in their strategies. However, average students demonstrated a higher degree of proceduralization. This result reinforces the notion that LD students need more time and practice with strategies than average students in order to proceduralize them.

In the mapping group, LD and average students used their strategies to the same degree. Because these students did not write the steps of their strategies on their measure, it is not possible to compare their declarative and procedural knowledge about the mapping strategies. It is possible, as demonstrated by LD students in the ISL group, that these students knew a greater proportion of the steps in the mapping strategies than they were using.

Students in the ISL group were using the ISL to a greater degree than students in the mapping group were using the mapping strategies. It is possible that writing the steps of the ISL provided students with the opportunity to rehearse the steps in the strategy and create for themselves a visual prompt of the steps to perform. Also, the actual steps in the ISL may have been prompted by characteristics of reading passages such as titles, pictures, characters, and setting. It is pertinent to note that these characteristics were constantly present in both training and testing materials. In contrast, the mapping strategy steps were not linked as explicitly to characteristics of reading passages. Therefore, students in the mapping group were required to recall, without prompting, the steps of the mapping strategies.

Reported strategy use. Students' reported use of the strategies on the posttest interview was much less than their actual use of the strategies on the training measures. This finding may reflect the age and ability of the students participating in this study. Research has shown that younger and less able students do not provide as much data in interviews as older and more able

students (Garner, 1987). This finding may also reflect students' perceptions of the interview task. They may have judged the interview questions to be asking for an overview, rather than a detailed account, of the acts they perform when they read. An attempt was made in designing the interview to create first a general and then a specific context for students to answer questions. First, students were asked questions about their reading behaviors in relation to passages they had read in the past. Then, students were presented with a passage and asked questions about their reading behaviors as they went through the task of reading that passage and answering questions about it. It was hypothesized that students' reported use of strategies would be more detailed when questions focussed on the presented passage and the act of reading that passage. However, questions directed at the presented passage did not prompt a more detailed account of strategy use. Perhaps the questions, not just the task, needed to be more specific. These findings emphasize the need for researchers to compliment reports of strategy use with traces or observations of actual strategy use in order to get a clear picture of what students know about the strategies they have been taught.

The steps of strategies that students did report using may reflect those aspects of the strategy that students perceived to be most useful in performing reading comprehension tasks. Students in the ISL group reported looking at the title and pictures, thinking about the topic, monitoring comprehension, paraphrasing, and summarizing. Students in the mapping group reported thinking about

making a map and thinking about the form their map would take. Reported use of strategies for students in the mapping group was less than for students in the ISL group. This result echoes the findings for the measures of strategy use collected during training.

Reading Comprehension

Free recall and comprehension questions. All groups of students improved their performance on criterion measures of comprehension after training. The inferential statistics applied to these data found no reliable differences between training groups. However, when effect sizes were calculated, some interesting differences between groups emerged. LD students in the ISL group increased their score on the free recall exercise from pretest to posttest more than LD students in the mapping group. On the comprehension questions, the opposite was true. LD students in the mapping group increased their score from pretest to posttest more than students in the ISL group. Average students in both ISL and mapping groups experienced greater performance gains on the free recall exercises than on the comprehension question sets. Average students in the mapping group actually decreased their score from pretest to posttest on the comprehension questions. This is an interesting result in light of the fact that they experienced greater gains on the free recall exercises than any other group in the study. It is also interesting to note the inverse relationship between LD and average students in the mapping group's performance gains on the comprehension questions.

It was hypothesized that the ISL would promote integration and reconstruction of information because they involve paraphrasing and summarizing (Mayer, 1988). Such manipulation of text should enhance students' performance on comprehension questions that involve inferencing or recall of particular portions of the text more than on free recall exercises that ask for a verbatim representation of the text. However, the results of this study indicate that the ISL do enhance verbatim recall. This finding might be accounted for by the first step in the reading purpose and main idea strategies. Reder (1980) suggests that presenting students with a descriptive title or picture and having them think about the topic of a passage before reading enhances their ability to remember the passage by activating a schema or conceptual framework that helps to make the referents in the passage clear. According to Reder, this schema provides students with a prior structure on which to map the incoming material.

It was also hypothesized that the mapping strategies, because they encourage linking and elaborating ideas in text, would facilitate performance on verbatim recall tasks more than on tasks requiring inferencing. Both LD and average mapping groups did increase their performance on the free recall exercises from pretest to posttest; however, the size of the increase was quite a bit less for the LD students. It seems reasonable that the facilitative effects of the mapping strategy on free recall would be related to the amount of information from the text and the number of elaborations about this information that students included on their

maps. Average students in the mapping group produced much more detailed maps than the LD students in this group and experienced more substantial performance gains on the free recall exercises.

Recognition of discourse structures. The measures of students' ability to recognize different discourse structures detected reliable differences between LD and average students but not between treatments or tests. Average students were better able to recognize discourse structures than LD students at pretest and posttest. It was hypothesized that students in the mapping groups would be better able to recognize discourse structures than students in the ISL group after training as a result of drawing the different text structures during training. Posttest data as well as data collected during training suggests that this is not the case. Students in the ISL groups who were only given definitions and examples of discourse structures recognized a larger proportion of discourse structures during training than students in the mapping group. Instead of promoting the development of a schema for discourse structures that would facilitate recognition in future, arranging information in the text spatially to represent discourse structures may have created a cognitive overload for students in the mapping group. It seems that definitions and examples of discourse structure were sufficient to create such schemas and that more information impaired, rather than enhanced, performance. These differences in performance between ISL and mapping groups disappeared at posttest. It is likely that, because the task of recognizing discourse structure is both difficult and specific,

students needed more intensive training and more practice to consolidate this skill.

The Gates MacGinitie Test of Reading Comprehension. The Gates MacGinitie proved useful in this study for identifying categories of students, LD and average, but not for measuring differences in students' reading comprehension as a result of strategy training. These findings support the claim made by Paris, Cross, & Lipson (1984) that standardized tests of reading comprehension may be inappropriate measures of a strategy's efficacy. Researchers and practitioners should focus their attention away from such measures of general comprehension and emphasize measures that target the specific skills that are expected to be developed by the use of a given strategy. This focus will also enable researchers to find answers to more specific questions about the ways in which comprehension is enhanced through the use of strategies.

Error Detection. Findings in this study about students' performance on the error detection task also replicated prior research (Garner & Reis, 1981; Garner & Taylor, 1982; Wong & Wong, 1986). LD and average readers did not recognize inconsistencies in reading passages but they did recognize difficult vocabulary.

It has been suggested that error detection tasks are laden with methodological flaws and that researchers should begin thinking of new ways to measure comprehension monitoring (Garner, 1987). It is not clear that students are not monitoring their comprehension just

because they do not report finding errors in the text. It has been shown that even good readers do not report finding errors unless prompted to do so (Garner & Reis, 1981; Garner & Taylor, 1982). Garner (1987) maintains that students may apply fix-up strategies to errors and, in doing so, alleviate their effect on overall comprehension. Students who view themselves as less competent readers may be reluctant to report a problem they are having with the text in case it is their problem or because they feel unqualified to editorialize. Also, the kinds of errors that exist in error detection tasks are often not the kind of errors found in an unaltered text (i.e., anomalous words or phrases, semantic contradictions).

In future, researchers need to design instruments that are more sensitive to acts of comprehension monitoring. As an alternative to the error detection tasks used in past research, Garner (1987) suggests the use of on-line-assessment of silent reading processing. Students are shown text, usually sentence by sentence, and the computer monitors how long they spend with each sentence or how often they return to particular portions of the text. This new methodology holds promise; however, it is still the case that computers are largely unavailable to graduate students and classroom teachers for research and assessment. For this reason, it would be useful for researchers to design paper and pencil tasks which ask students to produce a trace (Marx, Winne, & Walsh, 1985) of their cognitive processing. These measures, like on-line-assessment, would catch students in the act of monitoring their comprehension and alleviate some of the methodological problems

associated with error detection tasks. In addition, traces would provide researchers and teachers with a physical representation of students' cognitive processing during comprehension monitoring. Paris and Meyers (1981) obtained traces of students' comprehension monitoring by having students underline difficult vocabulary and phrases in text. In a follow-up experiment, students' comprehension monitoring (i.e., using the dictionary, asking for help) was observed and recorded. Students were then asked to report any strategies they used when they encountered difficulties in comprehending. Traces and observations can be obtained without aid of sophisticated equipment, rarely available to whole classes of students, and in regular classroom settings. They seem, therefore, to be the most practical and ecologically valid of the alternatives for measuring error detection.

<u>Awareness of Strategies</u>.

All groups participating in the study increased their awareness of how strategies help them to perform reading comprehension tasks. Differences between LD and average students on the awareness measure persisted after training. It should be noted, however, that LD students in the ISL group experienced greater performance gains than their average counterparts and that LD students in the mapping group achieved gains comparable to the average students receiving the same treatment. Results on the awareness subtest of the performance interview indicate that students in the ISL group experienced more substantial gains in strategy awareness than students in the mapping group.

Value for Strategies.

Data from the value subtest of the performance interview indicates that average students valued using the steps of the strategies more than LD students. The pretest means indicate that all students regarded the steps in the strategies as worthwhile before training. Students' value for these steps did not reliably increase from pretest to posttest, although calculated effect sizes reveal a slight increase in value after training. It may be that the value scale on the performance interview was too short (4 items) to detect substantial increases in value for the ISL and mapping strategies after training. Also, it may be that strategy value is slower to develop than strategy awareness and strategy use. Students may require that a strategy prove its efficacy before they place too much value on it. They may require more time to work with a strategy and to observe changes in their performance as a result of its use. It would, therefore, be informative for researchers to track the development of strategy value over an extended period of time.

Practical Implications and Directions for Future Research

Several implications for teaching and directions for future research can be derived from this study. First, the fact that students' performance on free recall and comprehension question exercises improved after they were trained to use either ISL or mapping strategies to process text suggests the efficacy of those strategies. The findings in this study also indicate that students'

awareness and use of strategies are facilitated when the steps in those strategies are explicitly linked to the characteristics of reading passages. It seems plausible that the presence of certain features in a reading passage such as titles and pictures provide retrieval cues for the steps in strategies. When the steps in strategies are not so explicitly linked to the characteristics in text, students must 1) recognize a context in which to apply a particular strategy, 2) search their memory for the steps in the strategy, and 3) keep those steps active in working memory while processing the text. Furthermore, if processing the steps in a strategy absorbs a large proportion students' working memory, there may not be enough space left over to process text. Therefore, when selecting strategies to enhance students' performance on any task, it seems important to consider what they must do cognitively in order to retrieve and apply a strategy.

This study indicates that students require more emphasis, more time, and more practice with specific comprehension skills, such as recognizing discourse structures, than was provided in this study to master and maintain them. Studies of longer duration that focus on specific skills are needed to explore the ways in which the use of strategies facilitates the development of these skills. Students in this study learned to use two strategies. Longer studies in which students learn to use several strategies are needed to obtain insights about how students can be taught to select, from a repertoire of strategies, the one that is best suited to a particular task. The development of awareness and value of strategies also

needs to be examined over a longer period of time and in relation to more than one or two strategies. Finally, longer studies are needed to explore the ways in which students modify and apply the strategies they are taught.

References

Arkin, R. M., & Maruyama, G. M. (1979). Attribution, affect, and college exam performance. Journal of Educational Psychology, 71, 85-93.

Baker, L., & Brown, A. L. (1984). Metacognitive skills of reading. In D. Pearson, R. Barr, M. Kamil, & P. Mosenthal (Eds.), Handbook of reading research. New York, NY: Longman.

Baumann, J. F. (1984). The effectiveness of a direct instruction paradigm for teaching main idea comprehension. Reading Research Quarterly, 20, 93-115.

Borkowski, J. G., Johnston, M. B., & Reid, M. K. (1985). Metacognition, motivation and the transfer of control processes. In S. J. Ceci (Ed.), Handbook of cognition, social, and neuropsychological aspects of learning disabilities. Hillsdale, NJ: Lawrence Erlbaum.

Brophy, J. E., & Good, T. L. (1986). Teacher behavior and student achievement. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd ed.). New York, NY: MacMillan.

Brown, A. L., & Campione, J. C. (1981). Inducing flexible thinking: The problem of access. In M. Friedman, J. P. Das, & N. O'Connor (Eds.), Intelligence and learning. New York, NY: Plenum Press.

Brown, A. L., & Palincsar, A. S. (1982). Inducing strategy learning from texts by means of informed, self-control training. Topics in Learning Disabilities, 2(1), 1-17.

Chi, M. T. H. (1985). Interactive roles of knowledge and strategies in the development of organized sorting and recall. In S. Chipman, J. Segal, and R. Glaser (Eds.), Thinking and learning skills: Research and open questions, Vol. 2. Hillsdale, NJ: Lawrence Erlbaum Assoc.

Clifford, M. M. (1984). Thoughts on a theory of constructuve failure. Educational Psychologist, 19,(2), 108-120.

Covington, M. V., & Omelich, C. L. (1985). Ability and effort valuation among failure-avoiding and failure-accepting students. Journal of Educational Psychology, 77, 446-459.

Csikszentmihalyi, M. (1975). Beyond boredom and anxiety. San Francisco: Jossey-Bass.

Deshler, D. D., Alley, G. R., Warner, M. M., & Schumaker, J. B. (1981). Instructional practices for promoting skill aquisition and generalization in severely learning disabled adolescents. Learning Disability Quarterly, 4, 415-421.

Doyle, W. (1983). Academic Work. Review of Educational Research, 53, 159-199.

Flavell, J. H. (1978). Metacognition and cognitive monitoring: A new area of cognitive development inquiry. American Psychologist, 34, 906-911.

Flood, J. & Lapp, D. (1988). Conceptual mapping strategies for understanding information texts. Reading Teacher, 41(8), 780-783.

Garner, R. (1980). Monitoring of understanding: An investigation of good and poor readers' awareness of induced miscomprehension of text. Journal of Reading Behavior, 12, 55-63.

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

Garner, R. (1987). Metacognition and reading comprehension. Norwood, NJ: Ablex.

Garner, R., & Reis, R. (1981). Monitoring and resolving comprehension obstacles: An investigation of spontaneous text lookbacks among uppergrade good and poor comprehenders. Reading Research Quarterly, 16, 569-582.

Garner, R., & Taylor, N. (1982). Monitoring of understanding: An investigation of attentional assistance needs at different grade and reading proficiency levels. Reading Psychology, 3, 1-6.

Garner, R., Macready, G. B., & Wagoner, S. (1984). Readers' acquisition of the components of the text-lookback strategy. Journal of Educational Psychology, 76, 300-309.

Gilliland, J. (1972). Readability. London: University of London Press.

Goetz, E. T. (1984). The role of spacial strategies in processing and remembering text: A cognitive-information-processing analysis. In C. D. Holley, & D. F. Dansereau (Eds.), Spatial learning strategies: Techniques, applications, and related issues. New York, NY: Academic Press.

Guttman, L. (1945). A basis for analysing test-retest reliability. Psychometrika, 10(4), 225-282.

Hare, V. C., & Borchardt, K. M. (1984). Direct instruction of summarization skills. Reading Research Quarterly, 20, 62-78.

Jacobs, J. E., & Paris, S. G. (1987). Children's metacognition about reading: Issues in definition, measurement, and Instruction. Educational Psychologist, 22 (3 &4), 255-278.

Johnson, D. D., Pittelman, S. D., & Heimlich, J. E. (1986). Semantic mapping. The Reading Teacher, 39(8), 778-783.

Lehman, J. D., Carter, C., & Kahle, J. B. (1985). Concept mapping, vee mapping, and achievement: Results of a field study with black highschool students. Journal of Research in Science Teaching, 22(7), 663-673.

Licht, B. G., & Kistner, J. A. (1986). Motivational problems of learning disabled children: Individual differences and their implications for treatment. In B. Y. L. Wong, & J. K. Torgesen (Eds.), Psychological and educational perspectives on learning disabilities. Orlando, FL: Academic Press, Inc.

Marx, R. W., Winne, P. H., & Walsh, J. (1985). Studying students cognition during classroom learning. In M. G. Pressley, & C. J. Brainerd (Eds.), Cognitive processes and memory development. New York, NY: Springer-Verlag.

Mayer, R. E. (1988). Learning strategies: An overview. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), <u>Learning and study strategies: Issues in assessment, instruction and evaluation</u>. San Diego, CA: Academic Press Inc.

Novak, J. D., & Gowin, B. D. (1984). <u>Learning how to learn</u>. New York, NY: Cambridge University Press.

Palmer, D. J., & Goetz, E. T. (1988). Selection and use of study strategies: The role of the studier's beliefs about self and strategies. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), <u>Learning and study strategies: Issues in assessment, instruction and evaluation</u>. San Diego, CA: Academic Press Inc.

Paris, S. G. (1987). <u>Reading and thinking strategies</u>. Lexington Massachusetts: Collamore Education Pub.

Paris, S. G. (1988a). Models and metaphors of learning strategies. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), <u>Learning and study strategies: Issues in assessment, instruction and evaluation</u>. San Diego, CA: Academic Press Inc.

Paris, S. G. (1988b). Fusing skill and will in children's learning and schooling. Paper presented at the American Educational Research Association in New Orleans, LA, April, 1988.

Paris, S. G., & Jacobs, J. E. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. <u>Child Development, 55</u>, 2083-2093.

Paris, S. G., & Meyers, M. (1981). Comprehension monitoring, memory and study strategies of good and poor readers. <u>Journal of Reading Behavior, 13</u>(1), 5-22.

Paris, S. G., & Oka, E. R. (1986a). Children's reading strategies, metacognition and motivation. <u>Developmental Review, 6</u>, 25-56.

Paris, S. G., & Oka, E. R. (1986b). Self-regulated learning among exceptional children. <u>Exceptional Children, 53</u>(2), 103-108.

Paris, S. G., Cross, D. R., & Lipson, M. Y. (1984). Informed strategies for learning: A program to improve children's reading awareness

and comprehension. Journal of Educational Psychology, 76(6), 1239-1252.

Paris, S. G., Lipson, M. Y., & Wixson, K. K. (1983). Becoming a strategic reader. Contemporary Educational Psychology, 8, 293-316.

Pressley, M., Snyder, B. L., & Cariglia-Bull, T. (1987). How can good strategy use be taught to children? Evaluation of six alternative approaches. In S.T. Cormier, & J. D. Hagman (Eds.), Transfer of learning: Contemporary research and applications. San Diego, Calif.: Academic press Inc.

Reder, L. M. (1980). The role of elaboration in the comprehension and retention of prose: A critical review. Review of Educational Research, 50 (1), 5-53.

Reder, L. M. (1985). Techniques available to author, teacher, and reader to improve retention of main ideas of a chapter. In S. Chipman, J. W. Segal, & R. Glaser (Eds.), Thinking and learning skills: Research and open questions, Vol 2. Hillsdale NJ: Erlbaum.

Rosenshine, B., & Stevens, R. (1986). Teaching functions. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd ed.). New York, NY: MacMillan.

Schumaker, J. B. , Deshler, D. D. , & Ellis, E. S. (1986). Intervention issues related to the education of LD adolescents. In B. Y. L. Wong, & J. K. Torgesen (Eds.), Psychological and educational perspectives on learning disabilities. Orlando, FL: Academic Press, Inc.

Schunk, D. H. (1986). Verbalization and children's self-regulated learning. Contemporary Educational Psychology, 11, 347-369.

Sinatra, R., Stahl-Gemake, J., & Morgan, N. W. (1986). Using semantic mapping after reading to organize and write original discourse. Journal of Reading, 30 (1), 4-13.

Stahl, S. A., & Vancil, S. J. (1986). Discussion is what makes semantic maps work in vocabulary instruction. Reading Teacher, 40 (1), 62-67.

Sternberg, R. J. (1985). Beyond IQ: A triarchic theory of human intelligence. Cambridge, England: Cambridge University Press.

Stice, C. F., & Alvarez, M. C. (1987). Hierarchical concept mapping in the early grades. Childhood Education, 64 (2), 86-96.

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Cambridge, MA: Harvard University Press.

Weiner, B. (1979). A theory of motivation of some classroom experiences. Journal of Educational Psychology, 71, 3-25.

Weiner, B. (1986). An attributional theory of motivation and emotion. New York, NY: Springer-Verlag.

Winne, P. H. (1985). Steps toward promoting cognitive achievements. The Elementary School Journal, 85 (5), 673-693.

Winne, P. H., & Marx, R. W. (1989). Motivation and classroom tasks. In R. Ames and C. Ames (Eds.), Research on motivation in education (Vol. 3). Orlando, FL: Academic Press.

Winograd, P., & Hare, V. C. (1988). Direct instruction of reading comprehension strategies: The nature of teacher explanation. In C. E. Weinstein, E. T. Goetz, & P. A. Alexander (Eds.), Learning and study strategies: Issues in assessment, instruction and evaluation. San Diego, CA: Academic Press Inc.

Wong, B. Y. L. (1985). Metacognition and learning disabilities. In T. G. Waller, D. Forrest, E. E. MacKinnon (Eds.), Metacognition, Cognition, & Human Performance, Vol.2. Orlando, Florida: Academic Press, Inc.

Wong, B. Y. L. (1987). How do the results of metacognition research impact on the learning disabled individual? Learning Disabilities Quarterly, 10, 189-195.

Wong, B. Y. L., & Wong, R. (1986). Study behavior as a function of metacognitive knowledge about critical task variables: An investigation of above average, average and learning disabled readers. Learning Disabilities Research, 1(12), 101-111.

Wong, B. Y. L., & Wong, R. (1987). Cognitive interventions. In K. Kavale (Ed.), Learning disabilities: State of the art and practice. San Diego CA: College Hill Press.
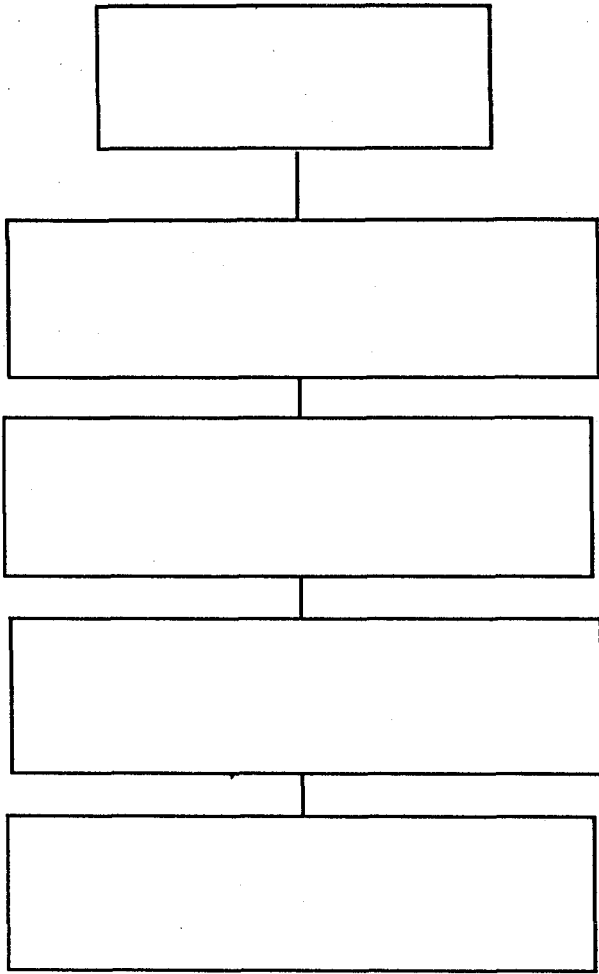
Wong, B. Y. L., Wong, R., Perry, N., & Sawatsky, D. (1986). The efficacy of a self-questioning summarization strategy for use by underachievers and learning disabled adolescents in socials studies. Learning Disabilities Focus, 2, 20-35.
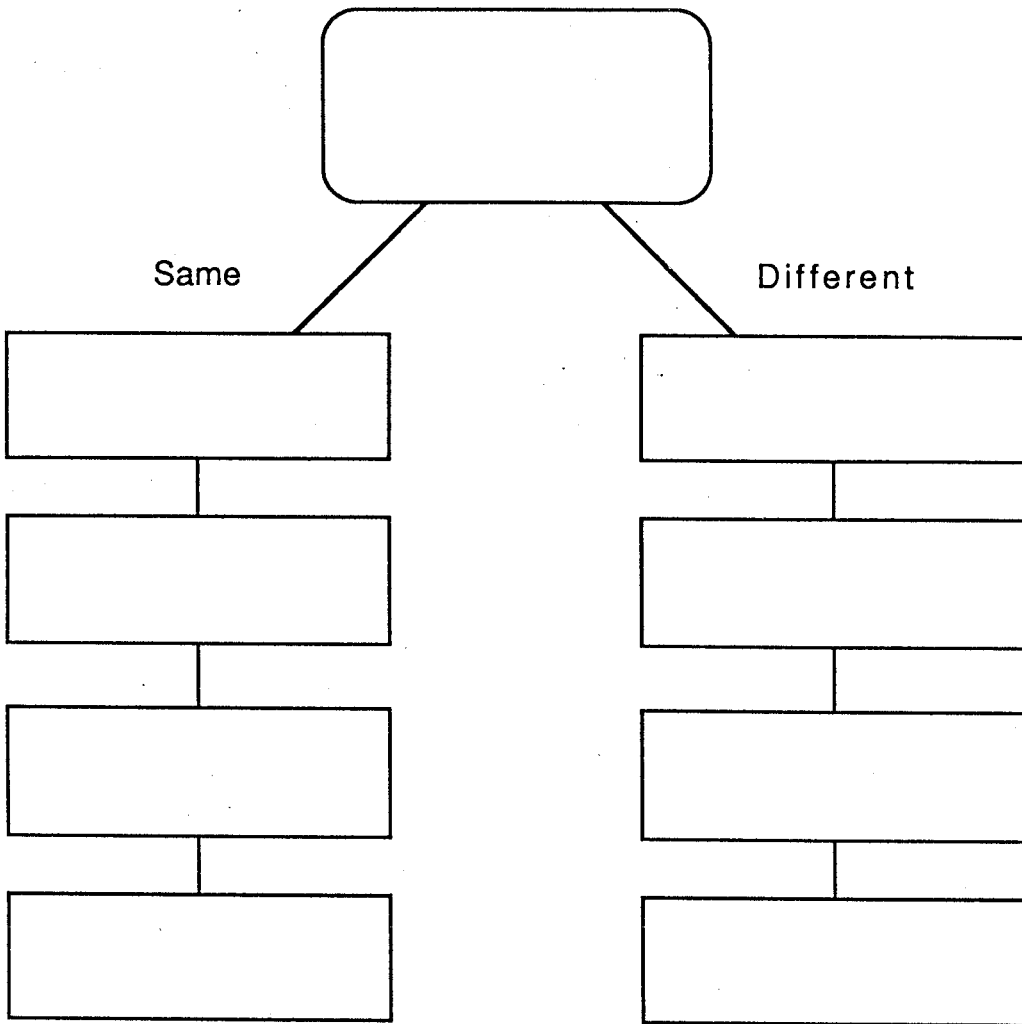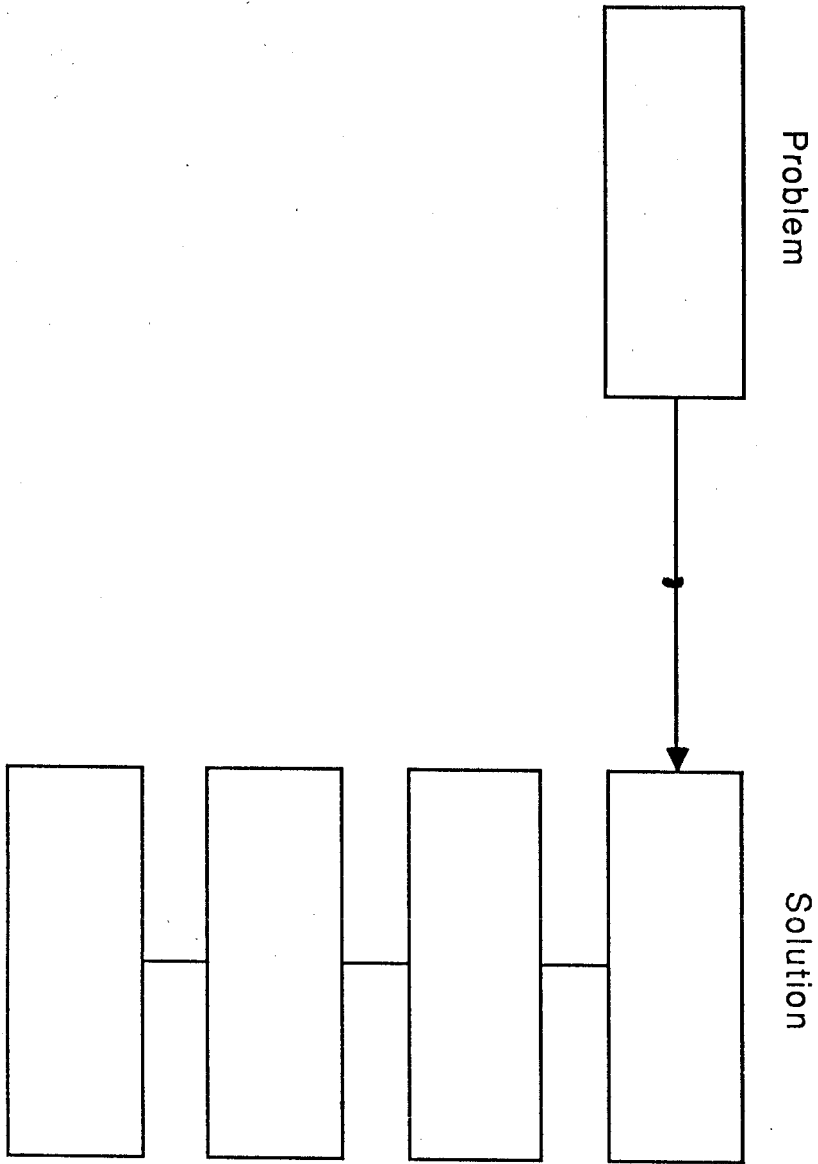
Appendix 1

Maps

Same

Different

Problem

Solution
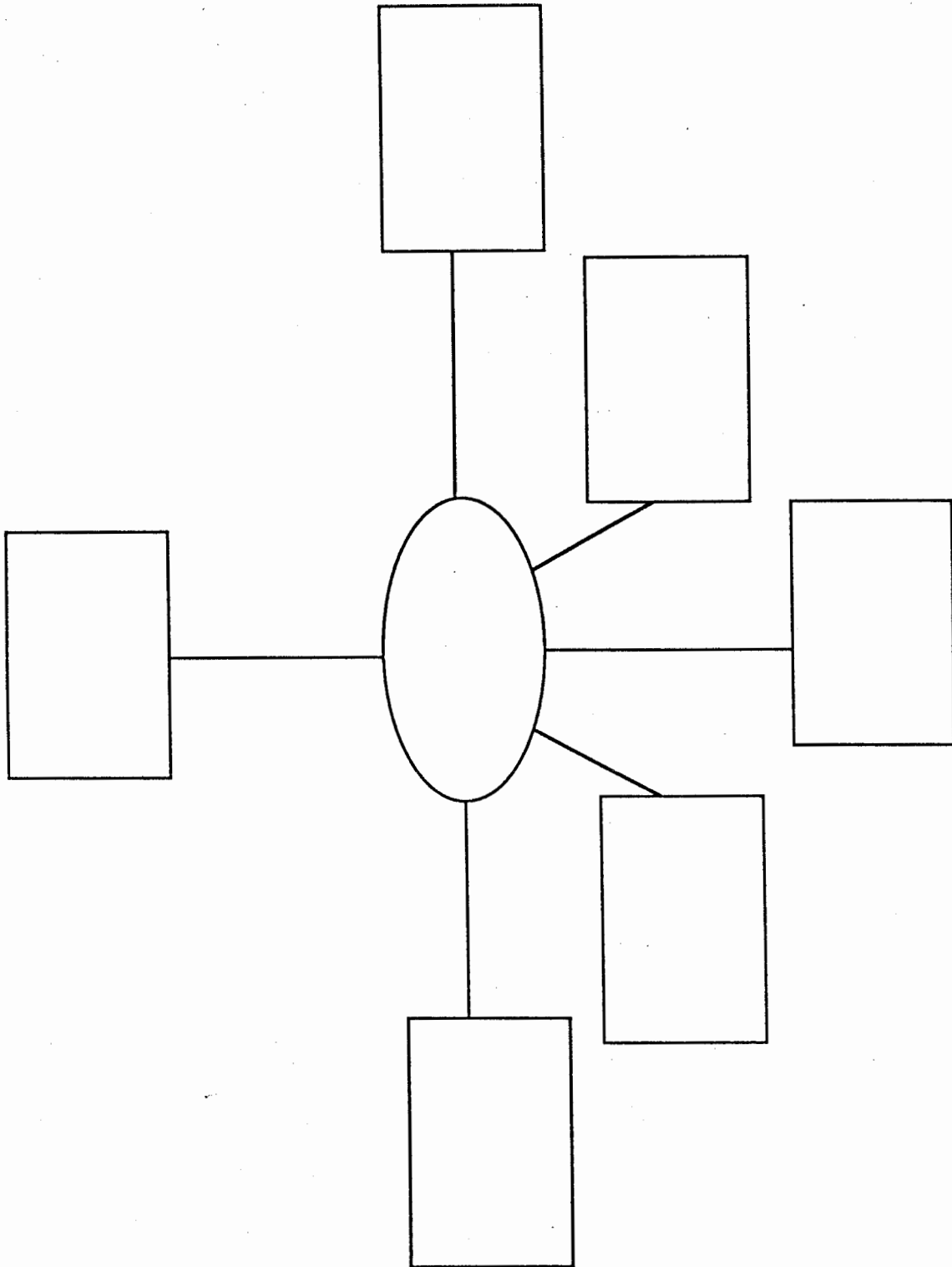
Appendix 2

Measure of Attributions and Self-Efficacy

Think of an average student in your class. How well are you doing in school compared to that student?

Not well	Almost as well	The same	Better	Much better

How important is each of these for explaining how you are doing in school?

a) how hard the work is

Not very important	A bit	Important	Very important	I don't know

b) whether I try

Not very important	A bit	Important	Very important	I don't know

c) whether I am lucky

Not very important	A bit	Important	Very important	I don't know

d) how smart I am

Not very important	A bit	Important	Very important	I don't know

e) the plan I use

Not very important	A bit	Important	Very important	I don't know

f) whether I feel like being in school

Not very important	A bit	Important	Very important	I don't know

Is there anything else that explains how you are doing in school?

Think of an average reader in your class. How well are you doing in reading compared to this reader?

Not   Almost   The   Better   Much
well   as well   same   better

How important is each of these for explaining how you are doing in reading?

a) how hard the reading is

Not very   A bit   Important   Very   I don't
important   important   know

b) whether I pay attention to what I'm reading

Not very   A bit   Important   Very   I don't
important   important   know

c) whether I'm lucky when I read

Not very   A bit   Important   Very   I don't
important   important   know

d) how good a reader I am

Not very   A bit   Important   Very   I don't
important   important   know

e) the plan I use for reading

Not very   A bit   Important   Very   I don't
important   important   know

f) whether I feel like reading

Not very   A bit   Important   Very   I don't
important   important   know

Is there anything else that explains how you are doing in reading?

How good are you at finding the meaning when you read compared to the average reader?

Not as good	Almost as good	The same	Better	Much better

How important is each of these for explaining how good you are at finding the meaning when you read?

a) how hard the passage is to understand

Not very important	A bit	Important	Very important	I don't know

b) how much I think about what the passage means

Not very important	A bit	Important	Very important	I don't know

c) how well I can guess at the meaning

Not very important	A bit	Important	Very important	I don't know

d) the plan I use to find the meaning

Not very important	A bit	Important	Very important	I don't know

e) how good I am at understanding what I read

Not very important	A bit	Important	Very important	I don't know

f) whether I feel like finding the meaning

Not very important	A bit	Important	Very important	I don't know

Is there anything else that explains how good you are at finding the meaning?

How good are you at reading words compared to the average reader?

Not as good	Almost as good	The same	Better	Much better

How important is each of these things for explaining how good you are at reading words?

a) how hard the words are to say

Not very important	A bit	Important	Very important	I don't know

b) whether I can remember the word from before

Not very important	A bit	Important	Very important	I don't know

c) whether I can guess what the words say

Not very important	A bit	Important	Very important	I don't know

d) how hard I try to figure out the words

Not very important	A bit	Important	Very important	I don't know

e) whether I have a plan for figuring out what the words say

Not very important	A bit	Important	Very important	I don't know

f) whether I feel like reading the words

Not very important	A bit	Important	Very important	I don't know

Is there anything else that explains how good you are at reading words?

Appendix 3

Recognition of Discourse Structures Measure

1.   One day a hungry fox watched as some children hid their picnic lunch in the hole of a tree. "Mmmmm, I wonder what the children are having for lunch," thought the fox. "It sure smells good!"

description   explanation   comparison   story

2.   The pelican's beak is a very useful tool. It can hammer and break food. It is a good spear for catching fish and it also helps the pelican to oil its feathers.

description   explanation   comparison   story

3.   Three hundred years ago houses weren't heated so people wore their hats inside. The hats kept peoples heads warm and helped cut down on the number of colds. People even wore hats at the table during meals.

description   explanation   comparison   story

4.   Bill and Carmen are different in some ways and alike in others. Bill and Carmen belong to the same afterschool club. Bill likes to do crafts but he doesn't like to play games. Carmen likes to play games but she doesn't like doing crafts.

description   explanation   comparison   story

5.   Polar bears grow very big as they get old. When they are born, they weigh only one pound. When they are grown up, polar bears weigh about a thousand pounds.

description   explanation   comparison   story

6.   Zoo doctors had a problem. Tubby, the elephant had sore feet.
Its feet had to be protected until they got well.   The doctors called a
cobler and he made special shoes for Tubby.

    description   explanation   comparison   story

7.   Going to school in Holland is very different from going to
school in Canada. There, the school day ends at 4:00 but they get
two hours for lunch. They go to school Saturday morning but they
have Wednesday afternoon off.

    description   explanation   comparison   story

8.   "It's Saturday, but who cares?" Timmy mumbled while trying
to look at himself through the steam on the bathroom mirror. "It
might as well be Monday because I have no one to play with."

    description   explanation   comparison   story

9.   The backswimmer is a waterbug that swims on its back when
it is under water. The backswimmer has a thick back that is shaped
like the bottom of a boat. It moves along by using its long, oarlike
legs.

    description   explanation   comparison   story

10.   There are some subjects that I like to study in school and some
subjects that I don't like to study. I like to study English, math and
science. I don't like to study French and social studies.

    description   explanation   comparison   story

11.   The eagerly awaited day had finally arrived. Dave got out of
bed shakily but ready to meet the challenge. Today he would be
playing in a big basketball tournament.

    description   explanation   comparison   story

12.   Water on the leaves of plants acts as a lens and makes the heat from the sun even hotter. Too much heat burns the leaves. To solve this problem, water your plants at the beginning or the end of the day.

description   explanation   comparison   story

Appendix 4

Performance   Interview

Think about a story you have read. Tell me as much as you can about the story. (For further prompting ask, "What is the story called? What\Who is the story about?")

Do you remember reading _____ ? Did you think about anything special before reading _____ ? What did you think about?

While you were reading _____ did you think about anything to help you to understand what you were reading? Can you tell me what you thought about?

Make a list of the student's responses. Refer to #1 and ask, "Why did you think about #1? How did it help you to understand what you were reading?

When you finished reading the story, did you think about anything to help you to understand what the story was about? What did you think about?

Make a list of the students responses. Refer to #1 and ask, "Why did you think about #1? How did it help you to remember the story?"

Put the passage entitled "Plant Friends" in front of the student and say, "In a minute I am going to ask you to read this passage about plants. The passage is called "Plant Friends".

Is there anything you are thinking about now before you read the passage? Can you tell me what you are thinking?

Look at the picture of the flowers and plants. What does the picture make you think of?

Read the title. What does the title make you think of?

Do you think it is a good idea to think about the picture and the title before you read "Plant Friends"? Why do you think so?

I would like you to read "Plant Friends" now. When you are finished reading, I am going to ask you some questions about the passage to see if you've understood what you've read.

Did you think about anything special while you were reading to get ready for the questions? Can you tell me what you thought about?

Make a list of student's responses."Plant Friends"

Tell me everything you can remember about "Plant Friends"

1. What two things can be used to keep insects and worms away from plants? (insecticides and plant poison) How are these alike and different? (both protect plants but insecticides also harm birds, animals and people, plant poison doesn't)

2. What do insects and worms do to plants? (eat them)

3. The passage says, "Insecticides can get into vegetables." Why do you think this would be harmful? (poison, if you eat them, you might get sick)

4. Which is the best solution for keeping plants healthy? Why?

5. What insect destroys the roots of roses? (roundworms)

6. What plant will protect roses from roundworms? (marigolds)

7. What plant keeps beetles away from roses? (garlic plants)

8. If you want to have healthy rosebushes, what should you do?
(plant marigolds or garlic plants close to them)

9. What keeps carrot flies away from carrots? (onion plants)

10 How do asparagus plants help tomatoes? (keep worms away)

Provide student with feedback about his\her performance on the comprehension questions.

You said you thought about _____ to help you understand the story and to answer the questions. Did _____ really help you to answer question #__? Why\How do you think _____ helped\did not help you?

(Alternately) You said you didn't do anything while you were reading to help you to understand what you read. Do you think you would have understood better if you had done something to help you understand? Why do you think so?

Did thinking about the picture and the title help you to understand the story? Why do you think so? Can you tell me how it helped?

Do you think it's important to do things before, during and after reading to help you understand what you've read or can you understand what the passage means if you just read it? Why do you think so?

Appendix 5

Error Detection

I have some passages that I'm thinking of using with children your age. Iwant you to read and study each passage. Then Iwant you to tell me if you think children your age will find the passages easy to understand, OK (a bit difficult), or hard to understand.

Refer to "The Road Runner". Instruct the student to read it over. Tell the student to take as much time as s\he needs.

Did you think "The Road Runner" was   a) easy to understand
                                     b) OK, a bit difficult
                                     c) hard to understand

Provide the student with a prompt so s\he can see the choices. If student chooses b) or c) ask the following questions.

Can you show me what made the passage difficult?

Can you tell me why this made "The Road Runner" hard to understand?

Can you fix the passage so that it is easier to understand?

Follow the "Road Runner" script for the following passages.

Did you think "Best Friends" was a) easy to understand
                                 b) OK, a bit difficult
                                 c) hard to understand

Can you show me what made "Best Friends" difficult?

Can you tell me why this made the passage hard to understand?

Can you fix the passage so that it is easier to understand?

Did you think "Weapons of Long Ago" was   a) easy to understand
                           b) OK, a bit difficult
                           c) hard to understand

Can you show me what made "Weapons of Long Ago" difficult?

Can you tell me why this made the passage hard to understand?

Can you fix the passage so that it is easier to understand?

Did you think "A Handy Trick" was a) easy to understand
                           b) OK, a bit difficult
                           c) hard to understand

Can you show me what made "A Handy Trick" difficult?

Can you tell me why this made the passage hard to understand?

Can you fix the passage so that it is easier to understand?

Did you think "A Most Unusual Animal" was   a) easy to understand
                                          b) OK, a bit difficult
                                          c) hard to understand

Can you show me what made the passage difficult?

Can you tell me why this made "An Unusual Animal" difficult to understand?

Can you fix the passage so that it is easier to understand?

Did you think "Lisa and Robert Go To The Zoo" was
        a) easy to understand
        b) OK, a bit difficult
        c) hard to understant

Can you show me what made the passage difficult?

Can you tell me why this made "Lisa and Robert Go To The Zoo" difficult?

Can you fix the passage so that it is easier to understand?

Appendix 6

Worksheets and Measures of Strategy Use for the ISL Group

Searching for a Reading Treasure

Before I read:

What is my goal?

_____

_____

Read the title and look at the picture. What is the story going to be about?

_____

_____

While I read:

Stop after each paragraph and say it in my own words. Does everything make sense? What happens next?

_____

_____

_____

_____

_____

When I finish reading:

Summarize the main points.

_____

_____

_____

Searching for a Reading Treasure

Before I read:

_____

_____

_____

_____

While I read:

_____

_____

_____

_____

_____

When I finish reading:

_____

_____

_____

Name _____

Title: _____

Picture
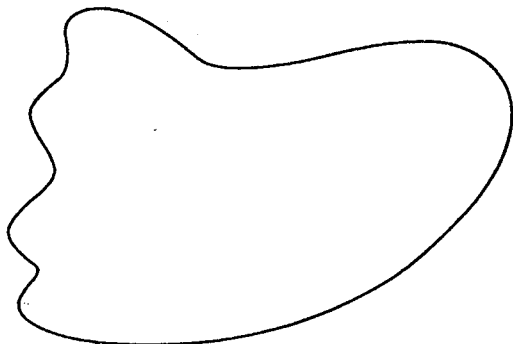
Title
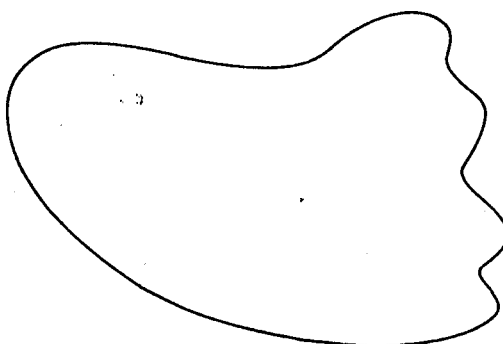
Setting
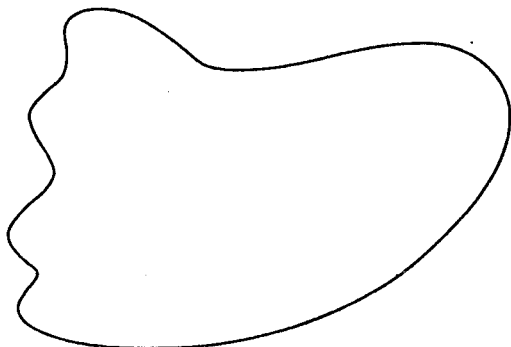
Characters
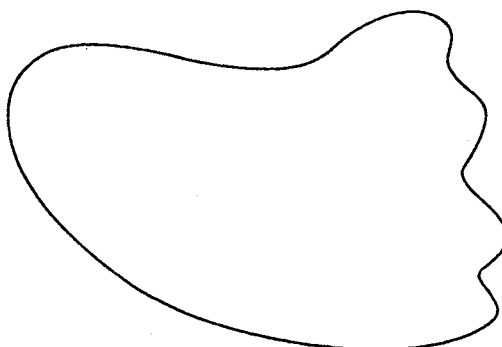
Actions
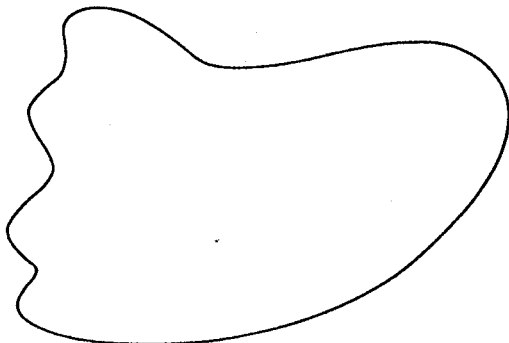
Outcomes
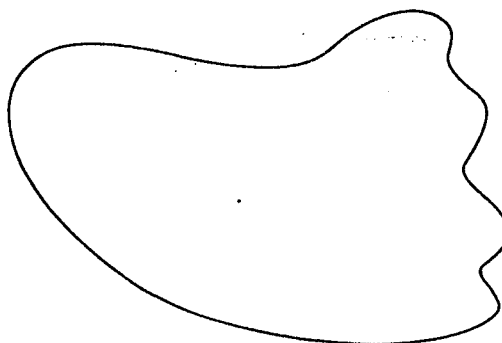
This passage is a:
Description   Story   Explanation   Comparison

The main idea is _____

_____

Name _____

Title: _____

This passage is a:

    Description   Story   Explanation   Comparison

The main idea is _____

_____
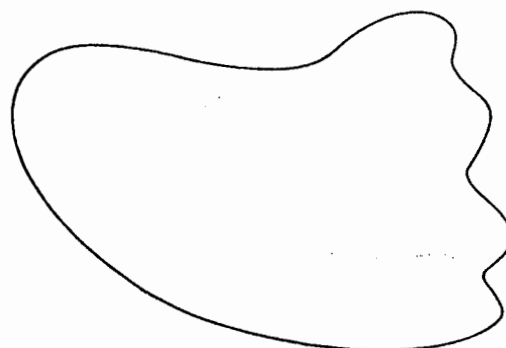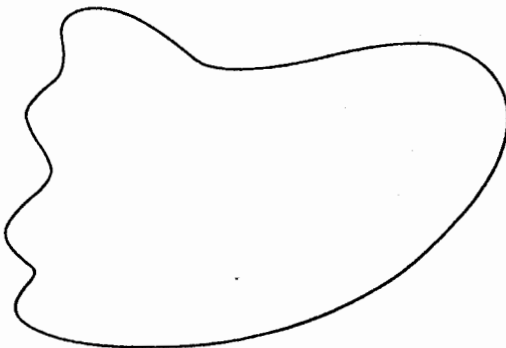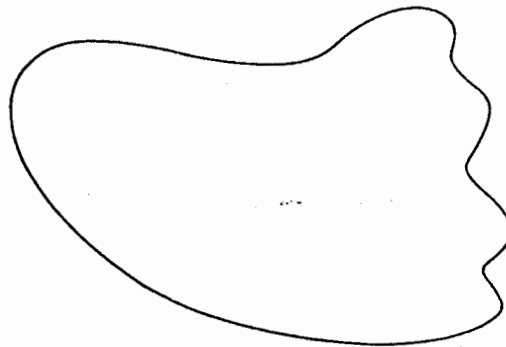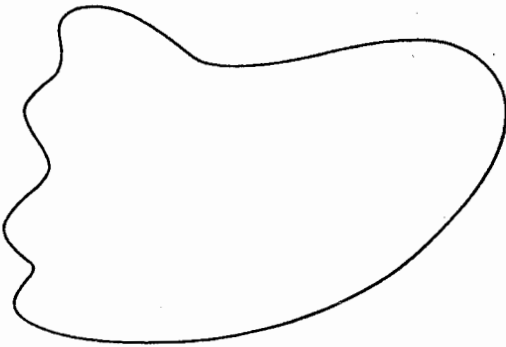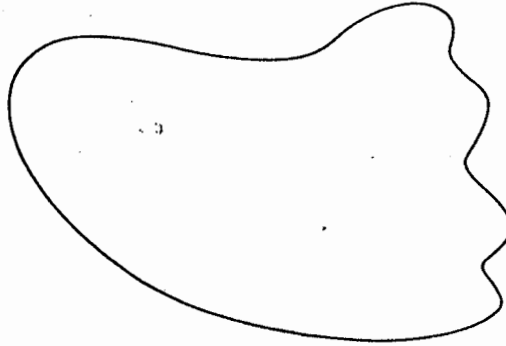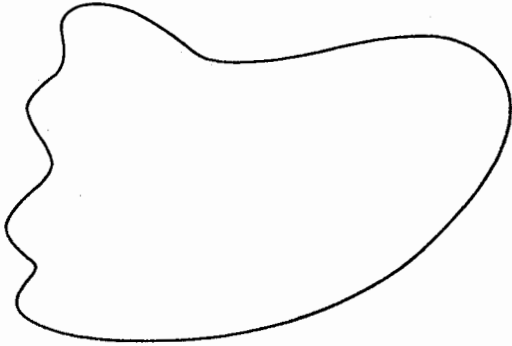
Appendix 7

Prompts

Searching For A Reading Treasure

Before reading:

Read the title and look at the picture.

During reading:

Stop and check your understanding.

After reading:

Summarize the main points.

Tracking Down The Main Ideas

1. What clues does the **title** give?

2. What clues does the **picture** give?

3. Who are the main **characters**?

4. What is the **setting** in the passage?

5. What **action** takes place?

6. What is the **outcome**?

Mapping Meaning

1. What was the passage about?

2. What did the passage tell me about _____?

3. What did the passage make me think about?

Mapping Different Kinds of Meaning

1. What kind of passage is this?

2. What kind of map can I use to show its meaning?

3. What kinds of ideas can I include on my map?

Appendix 8

Teaching Scripts

8a: Teaching Script for the ISL Group
8b: Teaching Script for the Mapping Group

Reading Treasure Script

Discussion:

Direct students attention to the poster metaphor.

What is a treasure? (sometimes money or gold but not always)

Reading can be like a treasure hunt because when we read we are looking for something valuable. What is the treasure we are looking for when we read? (meaning)

What is meaning? (making sense of info., prior knowledge, shating info., author's message, ideas from the passage, understanding the passage)

Is it always easy to get the meaning when you read? (sometimes you really have to try hard)

Do you always get the meaning the first time you read something? (sometimes it seems like I have to read a passage over and over and I still don't understand it, socials or science)

When you want to find the meaning you really have to pay attention to what you're reading. You really have to think about what you're doing. This is why it's important to have a plan that will help you find meaning when you read. Do you understand what I mean when I talk about a plan? (the way I am going to get something done, when I bake cookies, I follow the recipe - What will happen if I don't follow my recipe? my cookies won't be very good)

I am going to show you a plan for finding reading treasure -- I call it a strategy. If you use the strategy, it will help you to find meaning when you read.

The strategy I am going to show you has three steps. *Refer to the prompt.*

The first step is to think about the title and the picture. Can anyone explain why it might help to think about the title before you read the story? (tells the topic, includes names or places, gives info. about the kind of reading selection) What about the picture? Why do you

think it might help to look at the picture before you read the story? (look at characters, get an idea about what kind of action takes place, ideas about where the story takes place) Why is it helpful to know what a story is about before you start reading? (think about what you already know about the topic, guess what happens in the story, read the story to see if you're right, concentrate on the main points when the topic is known)

The second step says to stop and check your understanding while you read. Why do you think this might help you to find the reading treasure? (check your own understanding, so you know where the hard parts are, you can say the meaning in a way that makes sense to you, you can guess what happens next)

The last step is to think about what you've read when you've finished and to write down the most important parts, write down the meaning. Why is this a good thing to do? (just put down the important parts, not so much to remember, say it in your own words, don't just close the book and forget what you've read)

Let's review the three steps in the strategy. First, read the title and look at the picture before you read the passage for clues about what the passage might be about. Second, stop while you are reading to make sure you understand the meaning. Third, think about the meaning (the important things to remember) in the passage when you finish reading.

I will show you how to use the strategy and then we can practice using the strategy together.

Modelling:

Before I begin I think to myself, "What is my goal?" (I want to understand the meaning of this passage)

The first thing I want to do is to read the title. (...hm...it makes me think of...) I also want to look at the picture(s). (it looks like...) Do the picture and the title go together? Do they give me any clues for when I'm reading about what the passage might be about?

OK, now that I've read the title and looked at the picture I am ready to read the story. Hmmmm, maybe I'll just read the passage over. It's easier than stopping every once in a while to think about what

I've read and it takes less time. *Pretend to read silently.* OK, I've read the passage. Now, Step #3. What is the meaning? *Have a memory block. Stumble over the ideas in the passage.* Hmmmm, this isn't working very well. I can't write the meaning because I don't understand some important information. I can't remember the main points. I better go back and use step #2. I guess its important to use all the steps in the strategy in order to find the meaning. *Demonstrate step #2.*

I've read the passage. I thought about the title and the picture before I read and I stopped while I was reading to make sure I understood the meaning. I think step # 2 is a good idea. I think it helped me to understand the passage better. It's a gook idea to stop while reading to put the meaning into my own words or to ask myself questions to check my understanding. Now I'm ready to try step #3 in the strategy. Let's see...I should think about the meaning in the passage. What are the most important things to remember? I think it's a good idea to write the meaning down so I don't forget it and so I can look at it when I want to (the teacher might ask me a question about this passage on a test). I'll write it down in my own words so I can understand it better.

Do you understand how to use the strategy? Would you like me to show you again or would you like to work on a passage together this time?

Guided Practice:

Each student gets a copy of the passage to be practiced.

What is our reading goal? (to find meaning)

How can we reach our goal? (use the strategy)

What's the first step in the strategy? (read the title, look at the picture) Let's try it. *Spend time on each, link the two.*

Ok, now that we've thought about the title and the picture let's read the passage. Is there anything you want to do while you read? What is the second step in the strategy. (stop and check understanding) How can we be sure we are understanding what the passage means? (paraphrasing, questioning) *Stop periodically during the reading to*

*ask students questions about the passage or to ask students to
paraphrase portions of the passage.*

We have read the passage. We have followed the first two steps of
the strategy. Do you think you understand the meaning of the
passage? What is the meaning? What are the important points to
remember? *Make a list of student responses.* What can we do so
that we don't forget the meaning of this passage? (write the
meaning down) How can we put these ideas together to write a
sentence that tells what the meaning of the passage is? *Have
students write the meaning down on their Reading Treasure form.*

Was it easy to find the treasure in this passage? Did the passage
state it's meaning directly or did you have to search for it? What
did we use to help us? (a plan) Do you think finding the meaning
would have been more difficult if we didn't use a plan? Did the
strategy help? Did the strategy make it easier to find the meaning?

Did it help to look at the picture? the title? Did the title help more
or were the title and picture equally helpful? Did the passage match
the title and the picture? Was it helpful to stop while reding to
check understanding?

Review:

In what way is reading treasure hunting too? (we're looking for
something valuable -- meaning)

What did you learn today about finding meaning in reading? (it's the
goal of reading, it is sometimes difficult, requires effort, we need
to use strategies to help us)

Is it worth a little extra time and effort to use the strategy? Why
do you think so?

Semantic Mapping Script

Here is a passage called _____.   I'd like you to read the passage now.

Disscussion:

Why do we read?   (to find out about things, to learn, enjoyment, to find out what the author wants to say)

If we want to learn about something when we read or even if we want to enjoy a story, we need to understand what the passage means.   How can we be sure we've understood what we've read? (When I understand the words, when I know what it's talking about, when it makes sense, when it makes me think of something I already know about)   What are some things we can do to make sure we've understood the meaning of the passage?   (answer questions, tell it to someone else, draw a picture)

What is a map?   (tells you where to go, gives you directions, shows where different countries are and how far they are from each other)   We can draw a map to show that we've understood what we've read.   This kind of map shows the important ideas in the passage and how these ideas relate to each other.   Drawing a map can help us to understand and remember the ideas in the passage.   The maps we will draw will not be as difficult as the maps you study in social studies.

Look at the map on the board.   Let's see if we can use this map to show how the ideas in the passage we have just read relate to each other.   *Point to the map on the board.*

What was the passage about?

What did the passage tell us about _____ ?

Fill in the map with ideas generated by the students.

Does the map show what the passage is about?

Have we included all the important ideas?

We can add some of our own ideas about the topic to the map. Has anyone got an idea they would like to add? Does the passage remind you of anything? *If you run out of boxes, show students that more boxes can be added to the map if they are needed.*

Does the map show that we've understood the passage?

Do you think this map will help you understand and remember the passage?

Display all questions on a large prompt beside the map so that students know what questions to ask themselves while completing maps.

Guided Practice:

Here is a passage called _____. I'd like you to read the passage now.

Give each child their own map.

What was the passage about? Write what the passage was about in the circle in the centre of your map.

What did the passage tell you about _____? *Have students fill in boxes around the circle with group generated ideas at first and then have students fill in boxes and add boxes with their own ideas from the passage or about the passage.*

As students work, discuss , with individuals , their ideas and how they relate to the topic.

Review:

Why do we read? (to understand, to find meaning)

What did we learn to day that can help us to understand and remember what we've read? (to draw a map)

What can we put on the map to show that we've understood what we've read and to help us remember the passage? (the topic, important ideas, important details, our own ideas)

Do you think it's a good idea to draw a map to help you to understand and remember what you read?

Did you find anything about drawing the maps difficult?

Was it worth the extra time and effort to draw the map to help you to understand the passage better?

Appendix 9

Feedback Charts and Graph

9a: Feedback to the ISL Group
9b: Feedback to the Mapping Group

Searching For Reading Treasure

		Said it	Did it	Said it	Did it	Said it	Did it	Said it	Did it	Said it	Did it	Said it	Did it
Read the title and look at the picture.	Yes												
	No												
Stop while reading to check understanding.	Yes												
	No												
Summarize the main points.	Yes												
	No												

Tracking Down the Main Ideas

		Said it	Did it	Said it	Did it	Said it	Did it	Said it	Did it	Said it	Did it	
Picture	Yes											
	No											
Title	Yes											
	No											
Setting	Yes											
	No											
Characters	Yes											
	No											
Actions	Yes											
	No											
Outcomes	Yes											
	No											
identified what kind of passage	Yes											
	No											
Summarized the main points.	Yes											
	No											

Mapping the Meaning

Name. _____

Used the correct map		topic		important ideas		Own ideas		Bonus: linked related ideas	
Yes	No	Yes	No	Yes	No	Yes	No	Yes	No

Name

170

Number of ideas remembered

18
17
16
15
14
13
12
11
10
9
8
7
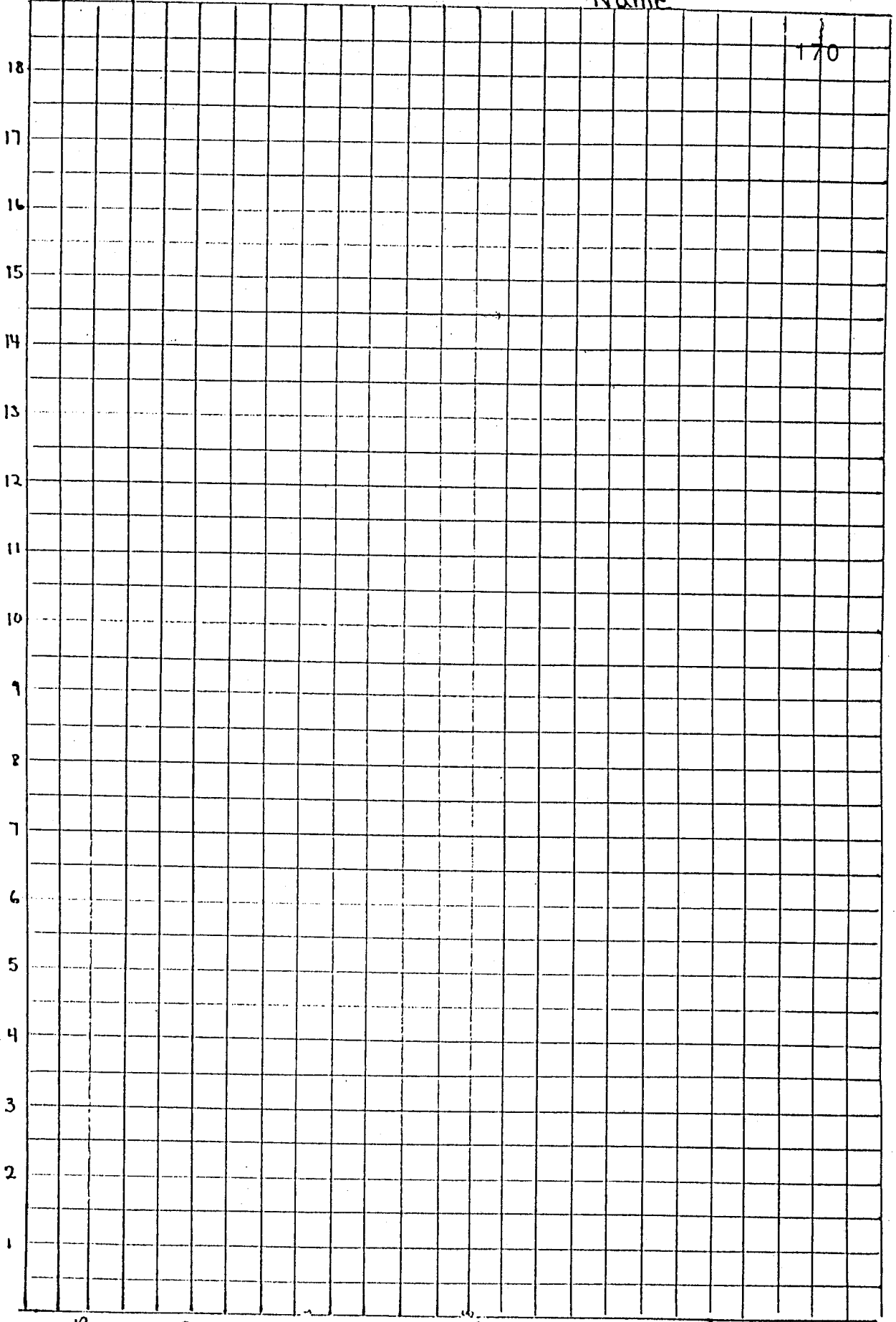6
5
4
3
2
1

Plant
Friends

Komodo
Dragon

Appendix 10

Transfer Script

Instructions from teacher:

Here is a passage I would like you to read and study. After you have read and studied the passage I am going to ask you some questions about it. Here is a blank piece of paper that you can use for studying. If you have any trouble reading the words, please raise you hand so I can help you.