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Effects of a cognitive-behavioral program designed to increase the reading comprehension skills of learning-disabled students

Jane Pindar Reilly

College of William & Mary - School of Education

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Reilly, Jane Pindar, Ed.D.

The College of William and Mary, 1991

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**EFFECTS OF A COGNITIVE-BEHAVIORAL PROGRAM DESIGNED
TO INCREASE THE READING COMPREHENSION SKILLS OF
LEARNING DISABLED STUDENTS**

**A Dissertation
Presented to
The Faculty of the School of Education
The College of William and Mary in Virginia**

**In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education**


**by
Jane Pindar Reilly
May 1991**

EFFECTS OF A COGNITIVE-BEHAVIORAL PROGRAM DESIGNED TO
INCREASE THE READING COMPREHENSION SKILLS OF LEARNING
DISABLED STUDENTS

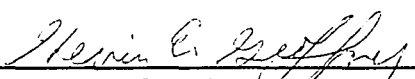
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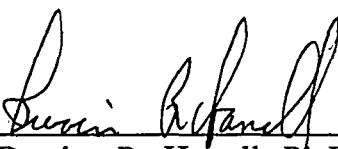
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To my husband
Richard
and my children
Tracey and Elizabeth
for their
encouragement, love, and support

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EFFECTS OF A COGNITIVE-BEHAVIORAL PROGRAM
DESIGNED TO INCREASE THE READING COMPREHENSION
SKILLS OF LEARNING DISABLED STUDENTS

ABSTRACT

The purpose of this study was to evaluate the effectiveness of a cognitive-behavioral approach to reading comprehension instruction. An important component of the intervention was a training course for teachers designed to communicate a conceptual framework for understanding the comprehension deficits of learning disabled (LD) children.

The sample included 39 elementary and middle school students who were identified as learning disabled. Intact classes were assigned to the treatment or control group. The nonequivalent control-group design was used, and data was examined using analysis of covariance. Dependent variables were reading comprehension as measured by the Gates-MacGinitie Reading Tests and locus of control as assessed by the Nowicki-Strickland Locus of Control Scale. Two null hypotheses were tested to determine whether differences between the treatment and control groups were significant at the .05 level of confidence.

The data analysis found that students in the cognitive-behavioral treatment showed significant improvement in reading comprehension when compared to control group students who

were exposed to their normal routine of reading instruction. The treatment did not affect the locus of control variable.

Recommendations include replication of the study in diverse school systems in order to assess generalizability and delayed posttesting to determine the maintenance of treatment effects. Efforts to increase locus of control may need to be implemented in multiple settings with frequent demonstrations of the role of effort in determining outcomes.

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**EFFECTS OF A COGNITIVE-BEHAVIORAL PROGRAM DESIGNED
TO INCREASE THE READING COMPREHENSION SKILLS OF
LEARNING DISABLED STUDENTS**

Chapter 1 Introduction

Justification for the Study

Once hailed as a panacea for meeting the needs of disabled children, special education recently has come under sharp criticism. For example, Madden and Slavin (1983) reviewed the literature and found that mildly handicapped students showed greater achievement gains when they remained in regular classes. The lack of progress observed in students in special education classes frequently has been attributed to the negative effect of labeling children as handicapped (Educational Delivery Task Force, 1987). Very few studies have addressed instructional practices as a variable in the achievement of special education students. There is a need to determine whether programs designed to match instruction with the needs of handicapped children lead to improved academic performance.

The majority of students placed in special education have reading problems (Spadafore, 1987). The current study evaluated the effectiveness of teaching learning disabled (LD) children specific strategies to improve reading comprehension. An important component of the intervention was a training course for teachers that was designed to communicate a conceptual

framework for understanding the comprehension deficits of LD students.

The literature on the characteristics of LD children suggests that they tend to have an external locus of control, attributing both success and failure to factors in their environment rather than to their own effort (Lewis & Lawrence-Patterson, 1989; Martin & Henderson, 1989). In order for reading instruction to be successful, underachieving students need to develop a more internal orientation. It is important that instructional programs provide experiences that demonstrate the relationship of effort to achievement (Borkowski, Carr, Rellinger, & Pressley, 1990). Cognitive-behavioral techniques facilitate active involvement in the learning process and, therefore, are appropriate methods for increasing internal locus of control.

Studies of LD students indicate that they display metacognitive deficits which interfere with their ability to acquire comprehension skills. They lack an awareness of cognitive strategies, and they do not monitor their cognitive activity as well as their non-learning disabled (NLD) peers (Slife, Weiss, & Bell, 1985). Cognitive-behavioral techniques that teach children to use self-statements as cues for using strategies to improve comprehension are appropriate interventions for children with reading problems (Meichenbaum, 1983).

Previous research suggests that there are adaptations to the reading curriculum that effectively increase comprehension skills.

The quality of the design of the majority of the studies, however, is questionable (Lysynchuk, Pressley, d'Ailly, Smith, & Cake, 1989). Studies evaluating comprehension instruction with LD students frequently have been implemented at the secondary level. Further research is needed to investigate the effectiveness of training elementary and middle school LD teachers in the use of strategy instruction.

Statement of the Problem

The purpose of the current study was to evaluate the effectiveness of a cognitive-behavioral program designed to increase reading comprehension and internal locus of control in elementary and middle school children identified as learning disabled. The central questions this study sought to answer were: (1) Will a cognitive-behavioral program increase reading comprehension skills in elementary and middle school children identified as learning disabled? and (2) Will the intervention increase the internal locus of control of these children?

Theoretical Rationale

Cognitive-behavioral interventions are based on the assumption that internal speech is an important variable in the determination of behavior. Research has demonstrated that behavior changes occur when children learn to modify their self-statements (Fish & Mendola, 1986; Montague & Bos, 1986; Short & Ryan, 1984; Zeidner, Klingman, & Papko, 1988).

Cognitive-behavioral techniques with children frequently use Meichenbaum and Goodman's (1971) model for self-instructional training (SIT). The literature on self-instructional training suggests that SIT is an effective technique for modifying a wide range of behaviors, including those that involve cognitive and affective responses. The goals of self-instructional training include teaching children to identify the problem, focus attention on specific problem-solving strategies, deal with frustration, and engage in self-reinforcing statements.

Cognitive-developmental psychology provides a theoretical foundation for self-instructional training. Based on the language development theories of Russian psychologists Luria (1961) and Vygotsky (1962), self-instructional training uses the techniques of cognitive modeling and cognitive behavior rehearsal. Using the SIT paradigm, an attempt is made to teach children to become aware of their thought processes as they solve problems. Children also are taught to monitor and reinforce their performance. First a model verbalizes as s/he performs a task. The child then performs the task with the model providing guidance. Next, the child guides his/her actions by talking aloud. After the next step of whispering instructions, the child uses covert self-instructions while performing the task.

Definition of Terms

Learning Disabled (LD) Students:

Based on criteria established by the federal government according to Public Law 94-142, students who are eligible to receive LD services demonstrate a significant discrepancy between ability and achievement that cannot be explained by physical handicaps, mental retardation, or environmental disadvantage.

Locus of Control:

The attribution of control over events; individuals having an internal locus of control attribute the source of control to their own behavior; those with an external locus of control see fate, luck, or the actions of others as determinants of events.

Metacognition:

The awareness and knowledge of cognitive strategies, and the monitoring and regulation of cognitive activity.

Research Hypotheses

1. Students receiving the cognitive-behavioral treatment will show significant improvement in reading comprehension when compared to control group students who will be exposed to their normal routine of reading instruction.
2. Students receiving the cognitive-behavioral treatment will show a significant decrease in external locus of control when compared to the control group.

Sample and Data Gathering Procedures

The sample for this study included 39 elementary and middle school students (i.e., grades 3 through 8) receiving LD services in a predominantly white, middle class school system in southeast Virginia. Intact classes were assigned to the treatment or control group.

Pre- and posttests assessed reading comprehension and locus of control. The comprehension subtest of the Gates-MacGinitie Reading Tests was used as a measure of reading comprehension. Locus of control was assessed using the Nowicki-Strickland Locus of Control Scale (N-SLCS).

Pretests were administered during a 2-week period prior to the teacher training component of the study. Posttesting was completed during a 2-week period following the 5-week intervention.

Limitations

The nonequivalent control-group design was used in this study because the treatment was administered to intact classes, making random assignment of subjects to experimental and control conditions impossible. To diminish threats to internal validity, analysis of covariance (ANCOVA) was used to reduce the effect of any initial differences between groups.

In an effort to control the external validity threat of reactive arrangements, treatment procedures incorporated regular textbooks and materials easily available to classroom teachers. In

addition, the treatment was administered during established instructional periods. Observations were conducted in each classroom in order to insure that the intervention was being implemented according to the design package.

The generalizability of the current study may be limited due to the demographics of the accessible population. The sample was drawn from a predominantly white, middle class school system and may not reflect the characteristics of LD students from a more heterogeneous school district.

Chapter 2

Review of the Literature

Historical and Theoretical Overview

Cognitive behaviorism has roots in the scientific technology of behavior therapy and in the clinical perspective of the rational therapies (Gilliland, James, & Bowman, 1989). Behavioral programs for children traditionally focused on the clinical application of operant learning principles and explained all action with a stimulus-response model. Studies in the 1950s concentrated on demonstrating that behavior could be predicted, controlled, and modified through the manipulation of external variables. As research into the efficacy of these strategies increased, it became apparent that behavior changes often did not generalize beyond the settings in which they were implemented.

In the early 1960s, psychologists became interested in cognitive theory. Homme (1965) introduced the term coverants, which he defined as operants of the mind. He said that covert events (i.e., thoughts) respond to the laws of operant conditioning. Homme (1965) designed a treatment program for the modification of thought patterns and recommended that these covert events be investigated in order to determine their influence on behavior.

Bandura's (1969) explanation of modeling provided theoretical interest in the role of cognitive factors on the modification of

behavior. As this interest increased, the issue of internal versus external factors and their impact on behavior developed.

Traditional therapies based on the theories of Freud and Rogers have an internal orientation. In contrast, radical behaviorists like Watson and Skinner stressed external causality (Rimm & Masters, 1979). As psychologists began to study cognitive phenomena, both the internal and external perspectives seemed to provide an incomplete explanation of human behavior. In an effort to resolve this issue, Bandura (1978) formulated the concept of reciprocal determinism which emphasizes that the individual (including one's cognitions) and the environment mutually and reciprocally influence each other. Reciprocal determinism is an important component of Bandura's Social Learning Theory (1977) and also influenced the development of cognitive behaviorism. Mahoney (1977) has suggested that cognitive-behavioral approaches reflect an effort to integrate internalism and externalism.

With the developing awareness that each individual perceives his/her environment in a unique way, psychologists became interested in cognitions and how the thinking process influences behavior and emotions. The attempt to combine the concerns of the cognitive theories with the technology of behavior therapy was the beginning of a paradigm shift in behavioral psychology. Cognitive behaviorism is an example of this shift. Fundamental to cognitive-behavioral theories is the notion that responses are mediated by beliefs, thoughts, and attitudes.

Ellis (1962) is one of the most popular writers in the cognitive-behavioral movement. In his rational-emotive therapy (RET), Ellis (1962) suggests that human problems are not the result of external events. It is the irrational way that people evaluate their experiences that causes psychological distress. The focus of RET is to dispute irrational thoughts and to provide conditions that enable the client to think more logically.

Like Ellis, Beck (1976) emphasizes that thoughts and emotions are integrally related. In contrast, Beck does not focus on the irrationality of maladaptive thinking. Instead, he sees dysfunctional thoughts as being too general, too dichotomous, too arbitrary, or too extreme. Beck instructs clients in the use of techniques such as reality checking and hypothesis testing in order to identify which of these maladaptive assumptions are causing emotional distress.

Meichenbaum (1977, 1985) emphasizes the effect of self-statements on thoughts, feelings, and behavior. The perspective that Meichenbaum brings to cognitive behaviorism evolved from his doctoral dissertation (cited in Rimm & Masters, 1979) which involved using operant conditioning to teach schizophrenic patients "healthy talk." During generalization tests, Meichenbaum noticed that patients engaged in overt self-statements similar to the directions that had been verbalized by the experimenter (e.g., "be coherent," "be relevant"). This observation led Meichenbaum to design a treatment to teach individuals positive self-statements to

be used to guide and regulate their behavior. He called this strategy self-instructional training.

Cognitive-developmental psychology provides a theoretical basis for self-instructional training. Specifically, Meichenbaum's approach reflects the views on language development of Russian psychologists Luria (1961) and Vygotsky (1962) who suggested that the internalization of verbal commands follows a developmental sequence. Luria (1961) proposed three stages which lead to the acquisition of internalized control of behavior in children. In the first stage, the child's behavior is directed and controlled by the verbal behavior of others (e.g., parents). During the second stage, the child begins to regulate his/her own behavior through the use of overt self-statements. In the third and final stage, the child uses covert speech to control much of his/her behavior.

Using Luria's model, Meichenbaum and Goodman (1971) developed a self-instructional training program to teach impulsive children to use self-statements to control their behavior. Children were taught to be more reflective through the use of cognitive modeling (a model verbalizes as s/he performs a task) and cognitive behavior rehearsal. The model provides the child with important cues designed to decrease impulsivity, including identification of the problem, focusing attention on skills required to complete the task, self-evaluation, self-reinforcement, and strategies for correcting errors. In the rehearsal phase, the child

first performs the task with the model providing guidance, next the child guides his/her actions by talking aloud, the child then whispers instructions, and, finally, s/he uses covert self-instruction to perform the task.

Cognitive-Behavioral Interventions

Cognitive-behavioral techniques are based on the assumption that self-talk is an important variable in the determination of emotional and behavioral responses. Previous research has demonstrated that children can learn to identify the role that internal speech plays in their responses, and that by changing the kinds of things they say to themselves, they can modify their behavior. Through modeling and rehearsal, cognitive-behavioral procedures encourage active participation in the learning process. These strategies have been effective in the remediation of a wide range of problems, including those that are related to deficits in cognitive and affective skills.

Cognitive-behavioral techniques with children frequently use Meichenbaum and Goodman's (1971) model for self-instructional training. Fifteen children between ages of 7 and 9 participated in Meichenbaum and Goodman's first experiment in 1971. These children were placed in a special class because of serious behavior problems. Five children were trained to use self-instructional training, five were placed in an attention control group, and five were in an assessment control group. The goal of the self-instructional training was to teach children to decrease impulsivity

through self-talk. Four 30-minute sessions were conducted over a 2-week period. The tasks used for the self-instructional training ranged from copying simple line patterns to following complex, sequential directions. Following treatment, children in the self-instructional training group showed performance superior to the control groups on sensorimotor and cognitive tasks requiring self-control. Classroom observations and teacher ratings, however, showed no significant differences between the experimental and control groups, indicating that the improvement in test performance did not generalize to the classroom.

Using Meichenbaum and Goodman's (1971) model, Fish and Mendola (1986) designed an intervention strategy to increase the homework completion rate of children in an elementary school class for the emotionally disturbed. Subjects were the 3 children who completed the least amount of homework during a 3-week monitoring period. Children were trained individually in 8 half-hour sessions which took place over a 2-week period. Through the use of self-instructional training, the experimenter taught children self-statements designed to help them remember to do their homework. The authors used a multiple baseline design to evaluate the training. Treatment means for the 3 subjects rose from below 50% to 75%. An interesting aspect of this study was that follow-up data was available for 2 of the 3 subjects after the 13-week summer break. This data indicated that the increase in homework completion was maintained in the fall. The

generalizability of these findings is, of course, limited by the small number of subjects in the study. In addition, it is difficult to evaluate the role of individual attention as a factor in the increased homework completion since the investigators did not include an attention control group.

In an effort to decrease test anxiety, Zeidner et al. (1988) designed a primary prevention program that was based on Meichenbaum's (1977) cognitive modification model. Subjects were 497 Israeli children who were in 24 fifth- and sixth-grade classes. Intact classes were assigned randomly to either the experimental or the control group. The training program consisted of five 1-hour sessions and was implemented by classroom teachers. Pre- and posttests assessed test anxiety, visual-motor speed, and achievement in reading and mathematics. The sessions focused on an educational presentation on the concept of test anxiety, training in rational thinking, relaxation training, visual imagery, focusing attention, time management, and behavioral rehearsal of coping skills. Controlling for pretest scores, the investigators analyzed dependent measures by means of analysis of covariance (ANCOVA). When compared to the control group, students receiving cognitive-behavioral training made significant gains in reading and mathematics achievement and in increasing visual-motor speed. Because only minimal differences in test anxiety scores were detected, the authors concluded that improvement in cognitive test scores was not due to anxiety

reduction. Rather, they suggested that the training improved students' test-taking skills.

The results of the Zeidner et al. (1988) study are important because they suggest that teachers can implement cognitive-behavioral programs in the classroom setting, and that these techniques can be used to teach children effective strategies to improve test performance. An interesting finding of this study is that self-reports of test anxiety did not decrease significantly as a result of the training. Perhaps a next step in research using cognitive-behavioral strategies to reduce test anxiety should include teaching children that they can do well on tests despite feelings of anxiety.

Interventions using cognitive-behavioral procedures to improve academic skills have focused on training children to use metacognitive skills in order to solve problems. Palincsar and Brown (1987) define metacognition as "awareness and regulation of cognitive activity" (p. 66). Short and Ryan (1984) designed an intervention program to teach poor readers to increase their comprehension skills. They developed story grammar training which they describe as a form of self-instructional training that teaches children cognitive strategies to guide their understanding of what they read.

Subjects were 56 fourth-grade boys who were designated as skilled and less skilled readers. The 14 skilled readers scored above the 92nd percentile on a reading comprehension test and

were used to contrast performance. The less skilled readers scored at or below the 50th percentile in reading comprehension.

Less skilled readers were assigned randomly to one of three groups: one group received both story grammar training and attribution training, another group received only story grammar training, and the third group received only the attribution training. The treatment consisted of seven sessions. The skilled readers were only involved in Sessions 1, 6, and 7 which consisted of pre- and posttesting.

The total training and the story grammar training groups were instructed in the use of active strategies to increase comprehension. Specifically, they were taught five questions referred to as the "wh" questions to ask as they read passages. These questions relate to the main character, the story location, action, and conclusion. The questions were presented through the use of a game called "Clue" with a storyteller who provided clues for making predictions about the story and a detective who asked questions and searched for clues. The procedure was modeled for the students and then practiced by the group. Students were prompted to verbalize the questions, to make notes in the margins, and to underline answers to the questions as they read. They were also given feedback regarding their performance.

The total training and attribution training groups were taught to engage in positive self-statements before they began to read. These statements included the concepts of the importance of

enjoyment, persistence, and self-reinforcement in reading comprehension.

Training maintenance was evaluated through free and probed recall. Generalization was assessed by performance on an error detection and correction task. Analyses of the data indicated that story grammar training led to significant gains in reading comprehension. The posttest scores of the less skilled readers who received story grammar training were commensurate with the scores of the skilled readers. The addition of attribution training to story grammar training did not differentially increase performance.

The results of Short and Ryan's (1984) study suggest that self-instructional training can be an effective technique for increasing reading comprehension skills. Generalization, however, is questionable because the definition of less skilled readers (i.e., at or below the 50th percentile) used in their research was rather broad.

Montague and Bos (1986) investigated the effect of training learning disabled students in the use of cognitive-behavioral strategies to solve verbal math problems. Subjects were 6 high school students who were eligible to receive LD services on a resource basis. Training took place during three 50-minute class periods and was administered by the LD teacher. The experimental conditions consisted of a multiple baseline design across individuals. Subjects were assigned randomly to positions in the design.

Treatment consisted of teaching students a strategy designed to enhance their ability to read, understand, solve, and check verbal math problems. The strategy consisted of eight steps, including reading the problem aloud, paraphrasing the problem aloud, visualizing the problem through the use of graphic displays, stating the problem, hypothesizing methods of solving the problem, and estimating, calculating, and checking the solution. During the first session, the teacher and student discussed baseline scores, current methods of problem solving, and the goal of improving verbal math problem solving skills. The teacher read the strategy to the student, modeled the strategy, and gave feedback to the student as s/he rehearsed the strategy. Sessions two and three consisted of strategy review, problem solving with the student verbalizing steps as the teacher monitored and gave feedback. The final step consisted of testing the student in the verbalization of steps from memory.

Strategy application practice was begun after students had reached the criterion of 100% memorization of the problem solving steps. A chart listing the steps was available during practice, and the teacher provided feedback. After the student obtained scores of 70% or better on two tests, practice sessions were discontinued. Testing on the dependent measure of ten two-step verbal math problems demonstrated improved performance for 5 of the 6 subjects. Although the results of this study suggest that LD students can learn to use cognitive-behavioral strategies to

improve their performance in the solution of verbal math problems, the small sample size and lack of an attention control group are serious methodological weaknesses which make generalization questionable.

Previous research clearly suggests that cognitive-behavioral interventions can be effective strategies for changing children's behavior. There are, however, several areas that warrant further investigation in order to assess generalization and maintenance. For example, studies with children identified as having serious learning or behavior problems typically have utilized very small samples and, often, have not used a control group for comparison. In order to increase the power of statistical analysis, future studies should include adequate samples and control groups.

To enhance the effectiveness of cognitive-behavioral interventions, direct instruction for generalizing strategies beyond treatment should be included as part of the program. None of the studies reviewed addressed this issue.

Finally, since one of the goals of cognitive-behavioral interventions is to teach children to be independent, it would be appropriate to include a self-monitoring component in the treatment. The studies reviewed did not teach children ways of monitoring their progress.

Reading Comprehension

Research investigating various aspects of reading dates back to the beginning of experimental psychology in the late 19th century.

In a comprehensive review, Lipson and Wixson (1986) trace the evolution of reading research from early studies that investigated neurological dysfunction to current trends that view reading as an interactive process. From an interactionist perspective, reading involves both the text to be read and the person who is reading (Hall, 1989).

Moving away from a search for pathology, the focus of recent research involves an attempt to identify optimal conditions for learning to read. These investigators suggest that children can be taught to improve their comprehension skills through direct instruction. The earlier assumption that understanding occurs naturally once decoding skills have been learned no longer is acceptable (Spadafore, 1987).

For example, Paris, Cross, and Lipson (1984) demonstrated that elementary school children can learn to use reading strategies through direct instruction in their regular classroom. They developed a treatment package called Informed Strategies for Learning (ISL) which consists of classroom lessons, bulletin boards, and recommendations to teachers. Subjects were 87 third graders and 83 fifth graders from eight intact classes. Two classes from each grade received training over a 4-month period. The four remaining classes were the control group. To prevent sharing of strategies learned in training, separate schools were chosen for experimental and control conditions. One third grade and one fifth grade from four different schools were assigned randomly to the

treatment or control group. Demographic and achievement variables were similar in the four schools.

Lessons were 30 minutes long and were taught twice each week by one of the investigators. Direct instruction was the most important component of ISL. Fourteen different strategies designed to increase comprehension were taught through the use of metaphors and analogies. For example, students were taught to be "reading detectives" to increase evaluation skills. Traffic signs (e.g., Stop! Say the meaning in your words.) were used to help students monitor their progress. Lessons included direct instruction about what reading strategies are, their importance, and how to use them. Each strategy was modeled and explained prior to the students engaging in specific activities for practice.

The effectiveness of the treatment was assessed using two standardized reading tests and by having students read and correct two passages containing errors and missing words. Students in the experimental group performed significantly better than controls on the passage reading tasks. Paris and Jacobs (cited in Paris e al., 1984) subsequently interviewed each child in the experimental classes and found that these children were significantly more aware of reading strategies than they had been prior to receiving the training. In addition, children with the highest scores in reading awareness were also the ones who received the highest scores on the four measures of reading comprehension described earlier.

Paris and his associates (1984) provide promising evidence that children can be taught to improve their comprehension skills. The internal validity of their study was excellent. Further research with different populations is necessary before external validity can be achieved.

More recently, Cross and Paris (1988) investigated the relationship between children's awareness of reading strategies and reading comprehension. Using multivariate profiles of reading skills, they identified subgroups of children who responded differently to metacognitive training.

Eighty-seven third graders and 84 fifth graders from eight intact classes participated in the study. Two classes from each grade received training, with students in the other four classes serving as the control group. To diminish threats to internal validity, experimental and control groups were drawn from different schools. Classes were assigned randomly to either the treatment or the control condition.

The assessment measures consisted of the Gates-MacGinitie Reading Tests to measure comprehension and a cloze task and an error detection task to measure the effective use of reading strategies. A structured interview and a strategy ratings task assessed reading awareness.

The training consisted of the Informed Strategies for Learning (ISL) described in the earlier study (Paris, et al., 1984). There were three phases each lasting 5-6 weeks. Phase one dealt with

making students aware of reading strategies, including planning and developing goals for comprehension. In the final phase, the children learned to monitor their progress. During this training period, the experimenters spent more time in the control classrooms than in the experimental rooms. Time was spent showing movies and teaching lessons that were not related to reading.

Cluster analysis was used to identify subgroups of children with significantly different reading skill profiles. Each child was rated on the dimensions of metacognition and comprehension. Analyses were conducted four times: the fall pretests of third and fifth graders and the spring posttests of both grades. The experimental groups in both grades made significant gains in the use of metacognition and reading strategies when compared to children in the control groups. There was a trend for increasing congruence between metacognition and reading comprehension that emerged from the beginning of third grade to the end of fifth grade.

Direct instruction about reading strategies increased awareness and comprehension for most children. Third graders with a pretest cluster rating of poor in both comprehension and awareness were the only subgroup not to improve in either area. The authors suggest that either some initial awareness is needed for less skilled readers to improve comprehension through metacognitive training, or there is a need for more intense intervention.

The intervention described by Cross and Paris (1988) suggests that cognitive training is an effective way to increase comprehension skills for most third- and fifth-graders. Further research is needed to determine whether these strategies are appropriate for special populations, such as the learning disabled. In order to increase the practical application of this kind of intervention, future studies should evaluate the effectiveness of using classroom teachers as trainers.

Using a procedure called reciprocal teaching, Palincsar (1984) investigated the effects of teaching poor readers to use metacognitive strategies. Students were taught four strategies: question generating, predicting, clarifying, and summarizing. Through direct instruction, modeling, and corrective feedback, students learned to use these strategies to improve their comprehension skills.

Palincsar (1984) describes reciprocal teaching as an interactive dialogue. Everyone in the group takes turns being the teacher. The teacher is responsible for asking a question relevant to a passage that the group has read. In addition, the teacher summarizes the passage, clarifies any questions, and predicts what might happen in the next passage. The teacher calls on someone to answer the question and gives corrective feedback. The students who are not in the role of teacher are asked to comment on the teacher's question and statements. The adult teacher initially models the

appropriate behaviors. Subsequently, s/he prompts and shapes students' behaviors when they are in the role of teacher.

Subjects were 21 seventh graders who attended rural schools in the midwest. According to standardized tests administered by the school district, the students' reading comprehension skills were below average, with the group average being 2 years below grade level. There were four groups of students: two were taught by remedial reading teachers, and two were instructed by classroom teachers.

A multiple baseline design was used to evaluate the reciprocal teaching intervention. Each group was assessed under the following conditions: baseline, intervention, maintenance, and follow-up. Teachers participated in three training sessions. Reliability checks were conducted during the intervention phase which took place for 16 to 20 days. Instructional periods were 25 to 30 minutes each day.

During each of the 4 to 10 days of baseline, students were instructed to read a passage silently and carefully so that they would be able to answer comprehension questions when they finished reading. The percentage of correct answers was graphed for each student. During the intervention phase, students were assessed in the same manner after each training session. Maintenance began on the first day following the intervention and was conducted in the same manner as baseline. The maintenance phase occurred for 5 consecutive school days. Eight weeks after

maintenance, follow-up assessment was conducted for 3 consecutive days in the same manner as baseline. Graphs were shared with students daily during baseline, maintenance, and follow-up and on a weekly basis during the intervention phase.

During baseline, students typically answered comprehension questions at an accuracy level of 40%. Accuracy increased steadily during the intervention phase. By the fifteenth day of reciprocal teaching, all groups scored above 70%. Gains continued during maintenance with only a slight decline in performance during follow-up.

The results of Palincsar's (1984) research are encouraging. The use of classroom teachers is appealing since it would be possible to incorporate a reciprocal teaching model without increasing costs to the school system.

Another study conducted by Palincsar and Brown (1984) with the same population included two control groups and an additional treatment group (locating information). Groups were taught by Palincsar and by classroom teachers. Again, the results are encouraging. Reciprocal teaching was the only condition that increased comprehension skills. Three months after treatment, children in the reciprocal teaching group demonstrated an average gain of 15 months in comprehension scores.

Further investigation of the reciprocal teaching model is warranted. Future studies with teachers as group leaders should

include control groups. It also would be beneficial to evaluate this model with younger children and with special populations.

Dewitz, Carr, and Patberg (1987) evaluated the relative importance of organizing information for students versus teaching them a specific strategy to increase comprehension. Four treatment groups were implemented: training in the use of a modified cloze procedure designed to teach children to integrate background knowledge with text information; a structured overview developed to enable students to organize text information; a strategy that combined the cloze training and the structured overview; and a control group. Subjects were 101 high-, middle-, and low-ability fifth-grade students in four heterogeneously grouped classes.

Prior to the study, teachers were given five 2-hour training sessions. They were observed during the intervention and were given additional assistance as needed. Teachers in each condition were trained to explain the purpose of the strategy being taught, model the procedure, provide guidance and feedback as students practiced using the technique, and to encourage the transfer of the skill to different learning situations.

In the structured overview group, the teacher provided students with an outline that was designed to organize text information, encourage discussion, and activate the students' prior knowledge. The outline was presented on an overhead projector each day with particular attention given to sections that were the

emphasis of the daily lesson. Students also were provided with individual handouts of the structured overview.

Subjects in the cloze training group were taught to use a modified cloze procedure to facilitate the integration of background knowledge and text information. Based on the Gestalt concept of closure, this technique emphasizes the impulse to supply missing elements in order to complete a structure. To complete the cloze exercises, students were taught to relate their prior knowledge to information presented in the text and to search for clues in the text by looking both forward and backward for semantic and syntactic information. Students were provided with a self-monitoring checklist to guide them in the use of these strategies. The checklist contained six questions that served as reminders to think about prior knowledge and forward and backward clues when completing cloze exercises. At the beginning of each lesson, the use of the cloze procedure and the checklist was reviewed.

Instruction in the combined treatment group utilized the structured overview, the modified cloze procedure, and the self-monitoring checklist. The control group worked on supplemental social studies skills such as map reading.

Each group used their regular social studies textbook and followed the normal sequence of instruction. The intervention took place over an 8-week period and included 24 lessons that were given during the students' social studies class period.

Posttest scores of both literal and inferential comprehension gains indicated that the cloze strategy yielded superior results when compared to the treatments that did not teach this strategy. These gains transferred to unfamiliar texts and were still apparent 4 weeks after treatment.

The results of this study indicate that the modified cloze procedure is an effective model for teaching literal and inferential comprehension. Through the use of direct instruction, modeling, guided practice, and a self-monitoring checklist, high-, middle-, and low-ability fifth graders made significant gains in their understanding of familiar and unfamiliar texts. The time needed to prepare daily lessons, however, might discourage teachers from using this technique.

Most studies designed to improve reading comprehension skills involve regular education students. Abrahamsen and Shelton (1989) designed a program to meet the needs of students placed in learning disabilities classes. Based on the theory that syntactic and semantic complexities interfere with the ability of LD students to understand what they read, these researchers modified a social studies passage in an effort to increase comprehension. Subjects were 92 junior high school students who received LD services on a resource basis. Eligibility requirements for the LD program included average ability with a significant discrepancy between ability and achievement. The students spent two class periods a

day in an LD setting. During the remaining four periods, they were in regular classrooms.

Students were assigned randomly to a control group or one of three treatment groups. The control group read an unchanged passage from a social studies text. The treatment groups read the same passage with syntactic modifications, with semantic modifications, or with both syntactic and semantic modifications. All versions of the text were at a seventh-grade reading level.

The comprehension assessment consisted of 10 questions, including 1 inference question, 1 vocabulary question, and 8 factual questions. Students read the passage appropriate to their group assignment silently and then they were given the 10 questions in written form. The examiner read the questions aloud and asked the students to write their answers.

Using a one-way analysis of variance, significant differences were obtained among the various groups. According to the post hoc measure used to determine the source of these differences, comprehension was significantly better in the group reading the passage with semantic and syntactic modifications, and in the group with the passage containing syntactic changes alone. Semantic changes alone did not result in significant improvement.

Abrahamsen and Shelton's study (1989) indicates that LD students' comprehension in content area subjects can be improved through the modification of texts. It seems impractical, however, to expect teachers to rewrite textbooks for their students. It would

seem more reasonable to evaluate the effectiveness of teaching students about linguistic complexities, including ways of simplifying what they read.

Borkowski, Wehing, and Carr (1989) also designed a study to meet the specific needs of LD students. Seventy-five LD students, ranging in age from 10 to 14, were assigned randomly to one of four conditions: reading strategies plus complex attribution; reading strategies plus attribution; attribution control; or reading strategies control. The only difference between the first two conditions was that students in the complex attribution were taught the importance of attributional beliefs before strategy instruction in summarization skills was introduced. Both conditions included attribution training during strategy instruction. Students in the attribution control condition only received the reading strategy instruction. Conversely, students in the reading strategies control condition only received attribution training.

In only five training sessions, students in the combined attribution conditions showed a 50% improvement in the ability to summarize paragraphs compared to a 15% gain in the strategy-only condition. Interestingly, there were no significant differences among the four conditions in changes in attributional beliefs. It seems likely that this intervention was too brief and specific to alter the longstanding negative beliefs of LD children. Future research is needed to evaluate the effect of a longer treatment

period that includes attribution training that is general as well as domain specific.

The quality of the research design of reading comprehension studies has been criticized. In a methodological analysis of research involving strategy instruction, Lysynchuk et al. (1989) evaluated studies that appeared in six leading educational journals. Surveying all issues from 1977 to 1988, they found 37 studies that evaluated teaching reading comprehension strategies to children in Grade 8 or below. Four of the authors read each study independently and rated it using 24 internal and 6 external validity criteria. Agreement was better than 94% for each rating.

Of the 30 criteria rated, there were studies that failed to meet as many as 13. Some of the most common failures to meet internal validity criteria included lack of information regarding the amount of time that trained and controlled subjects spent on dependent variable tasks, lack of treatment fidelity checks, and the use of inappropriate statistical analyses.

Although the studies evaluated are listed, the authors do not cite how many criteria specific studies passed or failed. They do, however, indicate that some of the most poorly designed studies have been the impetus for major curriculum revisions in reading textbooks. They conclude that the reading community needs to become more responsible in the evaluation of research studies, and that future research must be designed in keeping with traditional methodological criteria.

There also has been criticism about the generalizability of findings from studies evaluating the effectiveness of comprehension instruction. For example, much of the research has been conducted using artificial factors such as providing specific scripts for teachers to follow, using people outside of the school system to implement the treatment, and conducting investigations in settings that are not representative of a typical classroom. Recently, a research team at Michigan State University (Duffy et al., 1987) demonstrated that teachers can make effective decisions about what techniques to use when teaching comprehension skills. Students whose teachers made their own decisions about planning and implementing instruction benefited from strategy instruction. These authors conclude that research findings are meaningful only when studies are conducted in naturalistic environments under the normal conditions of the classroom.

Recent research indicates that there are adaptations to the reading curriculum that effectively increase the comprehension skills of poor readers. Techniques that incorporate existing personnel are particularly appealing since school systems are more apt to implement changes if additional funding is not required.

In order to reach reliable and valid conclusions, future studies must be designed following methodologically sound standards. Too often educators fail to evaluate the quality of experimental studies, implementing programs that are based on inadequately designed research.

Population

In the educational setting, children identified as learning disabled (LD) must meet criteria established by the federal government. Among these criteria is a significant discrepancy between ability and achievement that cannot be explained by physical handicaps, mental retardation, or environmental disadvantage. This definition of LD is primarily one of exclusion and is not very helpful in terms of planning remediation.

Researchers have attempted to isolate variables that discriminate between children with and without learning disabilities. Although there are no definitive answers to explain the underachievement of LD students, there are emerging trends in the literature that have important instructional implications. Current views of the cognitive and affective characteristics of LD children are reviewed in this section.

Cognitive Characteristics

One finding common to a number of studies points to a deficit in metacognitive skills. According to Palincsar and Brown (1987), metacognition refers to the awareness and knowledge of cognitive strategies and the monitoring and regulation of cognitive activity.

Investigating problem solving in LD and regular students, Slife et al. (1985), operationalized knowledge of cognition by asking students to predict their scores on an arithmetic test. Regulation of cognition was defined by the students' ability to identify which of their attempted solutions were correct and which were incorrect.

Subjects were 48 elementary students who scored within the average range on the Wechsler Intelligence Scale for Children-Revised (WISC-R), including 24 LD students and 24 regular education students. Each of the regular students was matched to an LD subject on the basis of knowledge of mathematics and performance on a test similar to the one used as the dependent variable.

Each subject was given 10 seconds to look over a set of 10 arithmetic problems and predict how many s/he would solve correctly. After completing the test, subjects were asked to identify right and wrong answers. Subjects were timed on the identification task. When compared to their regular education counterparts, the LD group was significantly less accurate on both the prediction and identification tasks. There were no significant differences between the two groups in the amount of time to complete the identification task.

Since Slife and his colleagues (1985) matched the groups on intelligence and achievement, their results suggest that LD students display weaknesses in metacognitive skills. These children seem to have difficulty assessing their own skills and monitoring and regulating their responses.

In an evaluation of purposeful reading skills in elementary school children, Grabe (1989) found that less able readers did not benefit from situations in which they were able to identify critical information. Subjects were 43 fourth-graders who were labeled as

more or less able readers based on a median split of their reading scores on the Iowa Test of Basic Skills. The mean grade equivalent scores were 4.3 for the less able group and 6.6 for the group identified as more able. Students read stories on a computer and answered questions for each story. Stems from a multiple choice question were shown at the top of the computer screen. A paragraph from the story appeared below the question and students were asked to indicate if the paragraph contained the information necessary to answer the question. If the paragraph did contain the answer, the text disappeared from the screen, and the full multiple choice question appeared.

Analyses of the results indicated that better readers were significantly more skilled in the identification of critical information and at answering comprehension questions than less able readers. A secondary analysis evaluated the impact that locating relevant information had on performance on the comprehension questions. Interestingly, the ability to locate critical information seemed to influence the performance of the more able readers but did not affect the less able readers' scores on the multiple choice questions.

These findings again suggest that the difference between students who do well in school and those who have difficulty may be in the area of metacognitive skills. It cannot be assumed that once students learn how to locate relevant information in a story,

they will be able to put it together in ways that contribute to their ability to understand what they read.

As a result of his research, Wansart (1990) disagrees with the notion that LD children are inactive, passive learners. Using a system of classifying strategic problem solving and exploratory behaviors, Wansart (1990) analyzed the ability of elementary school children to solve the Tower of Hanoi problem. This problem involves moving a series of graduated discs placed on one of three posts to a target post in as few moves as possible. Subjects were 20 children between the ages of 10 1/2 and 12 1/2; half were in regular classes and half were in LD self-contained classes.

An analysis of the results indicated that there were no significant differences between the two groups in the strategy type initially employed or in exploratory behaviors. There was a significant difference in the final strategy type used by each group, with a greater proportion of the regular education group using higher level strategies. In other words, regular education students advanced to a more sophisticated level of problem solving than did LD students.

Because all students made gains in their level of efficiency, Wansart (1990) suggests that the difference between regular education and LD students is not in how they learn, but rather in their rate of learning. Before these results can be generalized to classroom instruction, additional studies involving verbal problem solving are needed. In addition, it would be important to

investigate whether rate of learning could be increased by teaching LD students more efficient ways of solving problems.

In an effort to separate the cognitive deficits associated with learning disabilities from those associated with attention deficits, Felton, Wood, Brown, Campbell, and Harter (1987) investigated verbal memory and naming deficits in LD and control children who were classified as being with or without attention problems. Subjects were 45 students eligible to receive LD services who demonstrated a discrepancy of at least 1 1/2 years between expected and actual reading level and 53 children who had at least average ability and average achievement in reading. The majority of children in both groups were male and all subjects were between the ages of 8 and 12. Controlling for age and receptive language, results indicated that there were distinct differences in the cognitive deficits of the two groups. Deficits in word retrieval and rapid naming were identified in the LD group but not in the poor attention group. The children identified as having attention problems displayed deficits in rote verbal learning and memory that were not apparent in the LD group.

The results of this study point to a distinction between the cognitive deficits of LD children and children with attention problems. These differences have important implications in terms of appropriate instruction for these two groups. Generalization is limited, however, due to the small sample size, the restricted

number of cognitive variables investigated, and the fact that subjects for the study were not randomly selected.

Felton and Wood (1989) attempted to rectify the methodological weaknesses of the earlier study (Felton et al., 1987) by investigating a wider range of cognitive skills in a large sample of randomly selected children. Subjects were 485 first graders, ranging in age from 6 to 8. Each subject was tested individually by a psychologist. The assessment process required approximately 3 hours and included tests of reading and verbal and nonverbal cognitive skills. Teacher and parent interviews were conducted to assess each subject's ability to pay attention. Subjects were characterized according to their level of impairment in attention and beginning reading skills. Again, specific deficits were attributed to each group. Weaknesses in the area of memory were characteristic of children with attention problems. Children with low reading skills displayed specific deficits in naming and phonemic awareness.

This study replicated previous findings that the cognitive deficits associated with reading and attention problems are quite different. Further, it suggests that these deficits can be identified as early as first grade. In order to increase internal validity, future studies should address the method and quality of instruction children have been exposed to since teaching styles may influence cognitive skills differentially.

Based on previous research suggesting that LD students do not apply strategies when they read, Montague, Maddux, and Dereshiwsky (1990) investigated qualitative and quantitative differences between children with and without learning disabilities. Subjects were 72 randomly selected students from the 4th, 5th, 7th, 8th, 10th, and 11th grades in a predominantly middle class school district. After listening to an audio tape of a story as they read it to themselves, students were asked to retell the story exactly as they had read and heard it. Analyses of the content of the retold stories indicated that there were significant differences between the responses of students identified as learning disabled and their normally achieving peers. In all grade levels, LD students recalled fewer units of information and fewer internal responses of the characters in the story. These authors conclude that there is a need for further research with LD students to investigate the effect of direct instruction in the use of strategies that facilitate the processing of story elements.

Affective Characteristics

Children identified as learning disabled represent a heterogeneous group. Indeed, recent longitudinal research on the behavioral characteristics of LD children identified seven distinct subtypes (McKinney, 1989). Despite their behavioral differences, many LD children share common experiences in school. Inherent in the discrepancy model used to determine eligibility for LD services

is the fact that these children demonstrate academic deficits. Their common experience is school failure.

Research concerning affective responses to failure is prevalent in the LD literature. The construct of locus of control (LC) has been examined frequently and will be reviewed in this section.

Evolving from social learning theory (Rotter, 1954), LC involves the attribution of control over events. Individuals having an internal locus of control attribute the source of control to their own behavior. In contrast, individuals with an external locus of control see events as being determined by fate, luck, or the actions of others. There is evidence in the social learning research that children follow a developmental pattern in which internality increases with age. Four and 5 year olds tend to attribute both success and failure to external factors. By the age of 6 or 7, normal children become internal for success. Internality for success and failure usually occurs by the age of 10 or 11. Research in the field of learning disabilities suggests that developmental increases in internality may occur differently in LD children.

For example, the research of Rogers and Saklofske (1985) indicates that LD students tend to attribute both success and failure to external factors at a higher level than their normally achieving peers. These researchers suggest that the external orientation of LD students has a negative effect on their persistence in learning situations, creating a cycle of failure and lack of effort which mutually reinforce each other.

In an effort to determine whether external orientation is a function of school failure, Grolnick and Ryan (1990) compared low achieving children and LD students. Children placed in LD classes were significantly more likely than the low achieving group to perceive control of success or failure as being determined by external forces.

Lewis and Lawrence-Patterson (1989) investigated the locus of control of LD children and their perceived locus of control by significant others. Subjects were 24 white males between the ages of 8 and 12 placed in self-contained LD classes and their parents and teachers. The comparison group consisted of 26 white males also between the ages of 8 and 12 randomly selected from regular education classes and their parents and teachers. Children completed a questionnaire designed to assess locus of control. Parents and teachers completed the same questionnaire with the directions that they were to predict their child's answers.

Regular education students obtained significantly higher scores on internal locus of control for total LC and for success experiences than LD students. There were no significant differences between the two groups for failure experiences. No significant differences were found between the regular education students LC ratings and the perceptions of their parents and teachers. The LD children's and their parents' perception of student locus of control were similar. However, teachers rated their LD students as having a

more internal locus of control for success experiences than the students perceived for themselves.

This comparison of the LC orientation of regular education and LD students suggests that children identified as LD do not attribute success to their own efforts at as high a level as NLD children. Although LD parents appear to be aware that their children do not take credit for their successes, teachers indicated that they were not aware of the external orientation of their students.

The results of this study are limited due to the small number of children included and the homogeneity of the sample. Future studies should include more demographic variables as well as larger samples. Despite these shortcomings, there is evidence that LD children need experiences that will enhance their understanding of the relationship between their behavior and outcomes.

Because LD children tend to lack competence in at least one academic area, it may be that they experience more adult control than normal children, thereby increasing external attributions for their behavior. Martin and Henderson (1989) investigated the exploratory behavior of LD children in independent situations and in settings with a supportive adult in one of two nonintrusive conditions. The first type of supportive intervention was labeled active interest and included immediacy cues such as eye contact, forward leaning, relaxed posture, and close, but nonintrusive, proximity. The second condition was called focusing and included

the immediacy cues described above together with active modeling of exploratory behavior by the adult.

Subjects were 25 young children (mean age = 6.9 years) identified as being eligible for LD services. All children participated in three sessions with a familiar adult. During the first session, children were assessed on tasks designed to measure different levels of exploratory behavior. As a result of performance on these tasks, children were assigned to low-, moderate-, or high- exploratory groups. The other two sessions consisted of independent exploration and one of the two supportive interventions. Supportive interventions were assigned randomly.

Although there were no significant differences between the two supportive conditions, children engaged in significantly more exploratory behaviors in supportive as compared to independent conditions. The authors concluded that these results are consistent with Vygotsky's theory that children learn as a result of social support.

Interestingly, only one child in the initial exploratory assessment was identified as high-exploratory. Previous work with normal children found 30-40% identified as high-exploratory during the assessment phase. These findings are consistent with the suggestion that LD children tend to have an external orientation.

Although the majority of studies have found that LD children's locus of control tends to be more external than internal,

contradictory results also have been reported. For example, Heavey, Adelman, Nelson, and Smith (1989) found no differences in perceived control between their sample of LD and regular education students. Subjects were 54 LD students and 73 regular education students with a mean age of 13. As a part of a study investigating the relationship between learning problems, anger, perceived control, and misbehavior, students completed The Perceived Control at School Index (PCSI). The PCSI is a 16-item questionnaire which assesses the degree to which students perceive themselves as being self-determining at school. Each item is rated using a 6-point Likert scale, ranging from 1 (never) to 6 (always). Although validation studies had indicated that special education students obtained lower scores than regular education students, both groups in this study reported comparably moderate PCSI mean ratings. The authors suggest that differences in the degree to which particular schools and programs emphasize external control may explain the unexpected results in this study. These findings indicate a need for additional studies of within- and between-school differences in perceived control. Contrasts between special and regular education samples are necessary and should include an exploration of differences within special education categories.

A review of the literature suggests that there are significant differences between the cognitive and affective characteristics of LD children and their normally achieving peers. These differences

have important instructional implications. Learning experiences need to be structured so that LD students can see the relationship between their effort and academic success.

Further research is needed to explore the relationship of strategy instruction, not only in the improvement of academic functioning, but also as it affects locus of control orientation. Classroom instruction which provides concrete examples of the effect of individual behavior on results may increase internality and students' decisions to use the strategies that have been taught.

Summary of the Research

Early cognitive-behavioral interventions with children focused on decreasing disruptive behaviors. There is evidence, however, that these strategies are appropriate for the remediation of the academic weaknesses of LD children. These children tend to be passive learners who do not see the relationship between task performance and their own effort and skill (Ryan, Short, & Weed, 1986). Theoretically, cognitive-behavioral techniques facilitate active involvement in the learning process.

In order to avoid the methodological weaknesses of earlier studies, future research must be carefully designed. Variables such as engaged time and treatment materials should be controlled. To avoid overgeneralization, operational definitions must be included, and some measure of treatment fidelity should be reported.

Chapter 3

Methodology

Population and Sample

The target population to which the results of this study were designed to generalize is elementary and middle school children who have been identified as learning disabled. The accessible population consisted of 60 LD students in grades 3 through 8 who attended two schools in a predominantly white, middle class school district in southeast Virginia. The accessible population was determined eligible to receive special education services based on criteria established by the federal government. Specifically, a multidisciplinary team reviewed educational, medical, psychological, and sociological data and determined that there was a significant discrepancy between average ability and academic underachievement that could not be explained by physical handicaps, mental retardation, or environmental disadvantage.

The sample for this study included 39 LD students whose parents gave permission for them to participate in the project. There were 19 students in the treatment group--16 boys and 3 girls. Included in the control group were 16 boys and 4 girls for a total of 20 children. The mean age in the treatment group was 11 years, 8 months; 11 years, 4 months was the mean age in the control group.

Intact classes were assigned to the treatment or control condition. The three teachers whose classes were assigned to the treatment condition participated in a training course that will be described in the intervention section of this chapter.

Procedures

Data Gathering

Pre- and posttests assessed reading comprehension and locus of control. The comprehension subtest of the Gates-MacGinitie Reading Tests was used as the measure of reading comprehension. Locus of control was assessed using the Nowicki-Strickland Locus of Control Scale (N-SLCS).

Pretests were administered during a 2-week period prior to the implementation of the teacher training component of the project. Posttesting was completed during a 2-week period following the intervention. The assessment procedures are described in detail in the instrumentation section of this chapter. Tests were administered by the investigator, a certified school psychologist.

Intervention

Using Meichenbaum and Goodman's (1971) model of self-instructional training (SIT), children in the treatment group were taught that good readers use specific strategies to improve their comprehension, and that students can improve their skills by becoming aware of and monitoring their thinking as they read. SIT is designed to help students guide and control their performance

through the use of self-statements and consists of five steps: an adult model verbalizes problem-solving strategies while performing a task; the student performs the task while the model verbalizes strategies; the student guides his/her actions by talking aloud; the student whispers instructions; and, finally, the student uses covert instructions to perform the task. The initial problem-solving strategies modeled by the adult provide the child with important cues, including: identification of the problem ("What is it I have to do?"); focusing attention ("Now, carefully stop and repeat the instructions."); self-evaluation and reinforcement ("Okay, I'm doing fine."); and coping skills ("Just erase the line . . . If I make an error I can go slowly and carefully.") which incorporate error-correction options (Meichenbaum and Goodman, 1971, p. 117.).

Components demonstrated to improve training effects in previous research were incorporated in the current study. These components included putting teachers in control of planning instruction (Duffy et al., 1987) and the use of a reciprocal teaching model (Palincsar and Brown, 1984). Strategies similar to those successfully implemented in the research of Palincsar and Brown (1984), Paris et al. (1984), and Dewitz et al. (1987) were utilized in the study.

Children were instructed to think of themselves as detectives who search for clues when they read. Students were taught a four step process: summarize ("What did I just read? Tell the main idea in my own words."); clarify ("Does what I'm reading make

sense? If not, think of ways to clear up my confusion."); question ("Think of questions the teacher might ask about what I just read."); and predict ("Use clues to figure out what might happen next."). Posters describing each step were displayed in the classroom. In order to encourage children to monitor their performance, each student was provided with a "Reading Detective" flip chart which consisted of cards similar to the posters. In addition, a strip depicting symbols for each strategy was attached to each student's desk.

In an attempt to control the effects of engaged time and types of materials, children in the treatment group used their normal textbooks, and instruction took place during the regularly scheduled reading period. Transfer training was given during the time scheduled for content area instruction.

The intervention was implemented for 5 weeks. Teachers had daily contact with their students, and the project was incorporated into the established instructional program. Subjects in the control group were exposed to their normal routine of reading instruction.

Prior to treatment implementation, teachers participated in 3 hours of training conducted by the investigator. During the second week of the intervention, the teachers and the investigator met for a 1-hour brainstorming session. Subsequently, teachers were given informal feedback based on classroom observations. Classroom observations also served as treatment fidelity checks.

The training, which is presented in detail in Appendix B, involved communicating a conceptual framework for understanding the comprehension deficits of LD students. Teachers were taught to match reading instruction with the cognitive and affective needs of their students. Throughout the training, teachers were encouraged to contribute suggestions. In fact, some of the original materials were modified as a result of this process. For example, the "Reading Detective" cards originally were designed to be put in envelopes. The teachers indicated that this method would be difficult for students to manipulate and suggested that the cards be put on rings to make flip charts.

Ethical Considerations

The research proposal was reviewed and approved by the Human Subjects Research Committee of the College of William and Mary. The proposal also was approved by the supervisor of special education and the superintendent of the local school district.

Parental consent was obtained for children participating in the study. Protection of the privacy of individual participants was assured by guaranteeing the anonymity of responses and explaining the confidential use of the research data collected. Upon request, general findings of the study were available to the school division and to the parents of participants.

Instrumentation

1. The Comprehension subtest of the Gates-MacGinitie Reading Tests was administered as pre- and posttest measures of

reading comprehension. The Gates-MacGinitie is a norm-referenced group survey test that provides out-of-level norms. Out-of-level norms make it possible to assess children at their reading level rather than at the level appropriate for their grade placement. There is evidence in the literature to support the use of out-of-level tests with underachieving students. For example, Smith, Johns, Ganschow, and Mastel (1983) compared the Gates-MacGinitie scores of underachieving fourth graders on out-of-level and on-level tests. Their data indicated that out-of-level testing provided a more accurate assessment of achievement than on-level testing.

All items on the test are multiple choice. Short passages are presented, and the child responds to questions relevant to what s/he has read.

The test was normed on a stratified sample based primarily on the Fourth Count of the 1970 U.S. Census which presents data based on school districts. The sample included 100,000 students and was stratified on the basis of geographic location, school district size, family income, and years of education completed by the adult population. Representative proportions of blacks and Hispanics were included in the sample.

Kuder-Richardson Formula 20 reliability coefficients were computed from the standardization sample and are reported in the test manual. The reliability coefficients of the comprehension subtests are high, ranging from .88 to .93.

In order to establish content validity of the comprehension subtests, passages at each level were chosen according to a plan that progresses from simple stories at the primary level to expository writing in a variety of disciplines at the upper levels. Calfee (1985) indicates that, if the test is used as a general measure of comprehension, this procedure of establishing content validity is adequate.

In general, the reviews of the Gates-MacGinitie are positive. In the 1985 Mental Measurements Yearbook (MMY), Calfee says, ". . . this battery is a prototype of the contemporary standardized reading test" (p. 593). He indicates that the test is appropriate for program evaluation and research.

In a separate review in the 1985 MMY, Rupley concludes that the Gates-MacGinitie functions well as a measure of reading ability for evaluation purposes. In his opinion, comprehension passages progress sequentially in level of difficulty, and questions require the ability to make inferences as well as the ability to answer literal questions. He notes that one of the strong features of the Gates-MacGinitie is the provision for out-of-level testing.

2. Subjects' locus of control orientation was assessed by the Nowicki-Strickland Locus of Control Scale (N-SLCS). This scale is a group administered self-report inventory designed for children between third and twelfth grades. It is a paper and pencil test consisting of 40 items that can be answered yes or no. Questions were read aloud, and the children circled a yes or no response.

The N-SLCS was normed on over 1000 boys and girls in grades 3 through 12. Children in the sample were mostly white and represented all SES levels. Mean scores are provided separately for boys and girls.

Questions were derived from an initial pool of 102 items constructed using Rotter's (1954) definition of internal-external control. A team of clinical psychologists was asked to complete the test answering questions in an external direction. Items with incomplete agreement were dropped, leaving 59 questions. Using item analysis, the authors reduced the scale to its current form of 40 questions. Examples include: "Do you feel that when you do something wrong there's very little you can do to make it right?" "Do you believe that most problems will solve themselves if you just don't fool with them?" "Are some kids just born lucky?"

Nowicki and Strickland (1973) report reliability and validity studies in the *Journal of Consulting and Clinical Psychology*. Estimates of internal consistency using the split-half method yielded a coefficient of .63 for grades 3, 4 and 5. Test-retest reliabilities from third, seventh, and tenth grades suggest that reliability increases with age, with coefficients ranging from .63 to .71.

Investigating construct validity, the authors found significant correlations between scores on the N-SLCS and three other locus of control measures. Conversely, N-SLCS scores were not significantly related to scores on a social desirability scale.

Nowicki and Strickland (1973) report negative correlations between N-SLCS scores and both socioeconomic level and achievement. The authors conclude that internality is related to higher SES as well as to higher achievement, especially in males. Their data also indicates that internality increases with age.

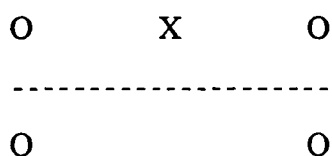
Nowicki and Barnes (cited in Nowicki and Strickland, 1973) found the N-SLCS to be sensitive to change following therapeutic intervention. Subjects were 291 seventh-, eighth-, and ninth-grade boys from predominantly black ghetto schools who participated in a 1-week structured camp experience. In this setting, counselors attempted to teach the relationship between behavior and consequences. Campers were significantly more internal on a readministration of the N-SLCS following the intervention.

In her presidential address to the American Psychological Association, Strickland (1989) indicates that over 700 studies have been completed with the N-SLCS, and that it has been translated into more than two dozen languages. Cross-cultural research supports the relationship of internal locus of control and academic achievement.

The studies reviewed suggest that the N-SLCS is a reliable, valid instrument for the assessment of locus of control in children. In fact, it has been described as the "best measure of locus of control . . . available for children" (Robinson & Shaver, 1973, p. 208).

Research Design

The nonequivalent control-group design diagrammed below was used in this research study.



This design was used because the treatment had to be administered to intact groups, making random assignment of subjects to experimental and control groups impossible. In this design, groups are assumed to be equivalent and pretests are administered to allow statistical control of any differences.

According to Borg and Gall (1989), the main threat to internal validity of the nonequivalent control-group design is the possibility that posttest differences may be due to preexisting differences between the experimental and control groups. In this study, analysis of covariance was used to reduce the effects of any initial differences between groups.

Campbell and Stanley (1963) indicate that reactive arrangements may threaten the external validity of the nonequivalent control-group design. In an effort to control for this threat to validity, treatment procedures incorporated materials

easily available to classroom teachers and were administered during regular instructional periods.

Specific Null Hypotheses

The following null hypotheses were tested:

1. There will be no significant difference in reading comprehension between the treatment and control groups as measured by the Gates-MacGinitie Reading Tests.
2. There will be no significant difference in locus of control between the treatment and control groups as measured by the Nowicki-Strickland Locus of Control Scale.

Statistical Analysis

The hypotheses were tested using analysis of covariance (ANCOVA). For each measure the pre-test score was used as the covariate, and the posttest score was the dependent variable. ANCOVA statistically reduces the effect of initial group differences by making compensating adjustments to the posttest means of the treatment and control groups (Borg & Gall, 1989). The .05 level of significance was used to determine the effectiveness of the treatment.

Summary of Methodology

The purpose of the current study was to evaluate the effectiveness of a cognitive-behavioral program designed to increase reading comprehension and internal locus of control in elementary school children identified as learning disabled. The accessible population was 60 LD students in grades 3 through 8 in a

predominantly white, middle class school district in southeast Virginia. The sample included 39 students whose parents permitted them to participate in the project.

Intact classes were assigned to the treatment or control group. To diminish the threats to internal validity inherent in the use of the nonequivalent control-group research design, analysis of covariance (ANCOVA) was used to analyze the data. Two null hypotheses were tested at the .05 level to determine whether there were significant differences between the treatment and control groups on the dependent variables of reading comprehension and locus of control.

Chapter 4

Analysis of Results

The purpose of this study was to evaluate the effectiveness of a cognitive-behavioral program designed to increase reading comprehension and internal locus of control in elementary and middle school children identified as learning disabled. Thirty nine subjects were assessed on two variables:

1. Number of errors on the comprehension subtest of the Gates-MacGinitie Reading Tests.
2. Number of external responses on the Nowicki-Strickland Locus of Control Scale.

To diminish the threats to internal validity inherent in the use of the nonequivalent control-group research design, the data was examined using analysis of covariance (ANCOVA). For each measure the pretest score was used as the covariate, and the posttest score was the dependent variable. ANCOVA statistically reduces the effect of initial group differences by making compensating adjustments to the posttest means of the treatment and control groups. The .05 level of significance was applied to determine the effectiveness of the treatment.

The means and standard deviations for pretests and posttests for both groups on the comprehension subtest of the Gates-MacGinitie Reading Tests (Table 4.1) and the Nowicki-Strickland Locus of Control Scale (Table 4.2) are reported below:

TABLE 4.1

Mean Number of Errors and Standard Deviations on the Comprehension Subtest of the Gates-MacGinitie Reading Tests for Treatment (n=19) and Control (n=20) Conditions

	<u>Treatment Group</u>		<u>Control Group</u>	
	<u>Pre-test</u>	<u>Posttest</u>	<u>Pre-test</u>	<u>Posttest</u>
N of Cases	19	19	20	20
Minimum	1.000	0.000	2.000	1.000
Maximum	28.000	28.000	26.000	28.000
Mean	13.263	9.368	13.650	12.050
SD	7.302	6.768	8.184	7.749

TABLE 4.2

Mean Number of External Responses and Standard Deviations on the Nowicki-Strickland Locus of Control Scale for Treatment (n=19) and Control (n=20) Conditions

	<u>Treatment Group</u>		<u>Control Group</u>	
	<u>Pre-test</u>	<u>Posttest</u>	<u>Pre-test</u>	<u>Posttest</u>
N of Cases	19	19	20	20
Minimum	6.000	3.00	10.000	6.000
Maximum	25.000	26.000	23.000	21.000
Mean	17.579	15.737	17.150	14.300
SD	5.048	5.933	4.056	4.703

The analysis of results for each hypothesis is as follows:

Hypothesis H:1:

There will be no significant difference in reading comprehension between the treatment and control groups as measured by the comprehension subtest of the Gates-MacGinitie Reading Tests.

Table 4.3 contains the adjusted means used in the analysis of covariance. Pre-test scores were used as the covariate in order to statistically reduce the effect of initial group differences.

TABLE 4.3

Adjusted Posttest Means on the Comprehension Subtest of the Gates-MacGinitie Reading Tests for Treatment and Control Conditions

<u>Treatment Group</u>	<u>Control Group</u>
9.53	11.89

The results of the analysis of covariance are reported in Table 4.4. The treatment effect was significant ($F=4.687$, $df=1$, $p<0.037$); therefore, hypothesis H:1 was rejected. Students receiving the cognitive-behavioral treatment showed significant improvement in reading comprehension when compared to control group students who were exposed to their normal routine of reading instruction.

TABLE 4.4

Analysis of Covariance Summary Table on Gates-MacGinitie Posttest

<u>Source</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean-Square</u>	<u>F-Ratio</u>	<u>P</u>
Pre-test	1549.017	1	1549.017	133.936	0.000
Treatment	54.202	1	54.202	4.687	0.037

Hypothesis H:2:

There will be no significant difference in locus of control between the treatment and control groups as measured by the Nowicki-Strickland Locus of Control Scale.

The results of the analysis of covariance are reported in Table 4.5. There were no significant differences ($F=0.607$, $df=1$, $p<0.441$) between the treatment and control groups; therefore, Hypothesis H:2 was accepted. The intervention did not appear to be an effective method of increasing internal locus of control.

TABLE 4.5

Analysis of Covariance Summary Table on Locus of Control
Posttest

<u>Source</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean-Square</u>	<u>F-Ratio</u>	<u>P</u>
Pre-test	190.208	1	190.208	7.938	0.008
Treatment	14.559	1	14.559	0.607	0.441

Summary

Two hypotheses were tested using analysis of covariance. For each measure the pre-test score was used as the covariate, and the posttest score was the dependent variable. There was significant

improvement at the .05 level of confidence in the reading comprehension skills of learning disabled students receiving the cognitive-behavioral treatment.

In contrast, the intervention did not appear to be an effective method of increasing internal locus of control. There were no significant posttest differences between groups on the locus of control variable.

Chapter 5

Summary and Conclusions

This chapter is organized into three major sections. First, the study is summarized. Next, conclusions based on an analysis of the data are presented and discussed. Finally, recommendations for future research are proposed.

Summary

Children placed in special education classes often demonstrate weaknesses in reading (Spadafore, 1987). Previous research has found that students identified as learning disabled display metacognitive deficits which interfere with their ability to acquire comprehension skills (Slife, Weiss, & Bell, 1985), and that they tend to have an external locus of control (Lewis & Lawrence-Patterson, 1989; Martin & Henderson, 1989).

Cognitive-behavioral interventions are based on the assumption that internal speech is an important variable in the determination of behavior. A review of the literature demonstrates that academic and behavior changes occur when children learn to modify their self-statements (Fish & Mendola, 1986; Montague & Bos, 1986; Short & Ryan, 1984; Zeidner, Klingman & Papko, 1988). The current study used cognitive-behavioral techniques to teach children specific strategies designed to improve reading comprehension. Theoretically, cognitive-

behavioral techniques facilitate active involvement in the learning process and, therefore, are appropriate for increasing internal locus of control. Previous research (Borkowski et al., 1990) has emphasized the need for instructional programs that provide students with experiences that demonstrate the relationship of effort to achievement.

Within the last decade, a number of studies have investigated methods of improving reading comprehension through strategy instruction. The generalizability of findings from this research, however, is questionable because of the frequent inclusion of artificial factors such as giving teachers specific scripts to follow, conducting studies in laboratory schools, and the use of research teams to implement interventions (Duffy, et al., 1987). The quality of the design of reading studies also has been criticized (Lysynchuk et al., 1989). In a review of 10 years of research, it was found that some of the most poorly designed studies were the impetus for major curriculum revisions in reading textbooks.

Research evaluating comprehension instruction with LD students frequently has been conducted at the secondary level. The current study was implemented to meet the need for methodologically sound research designed to investigate the effect of training elementary and middle school LD teachers in the use of strategy instruction.

The accessible population included 60 LD students in grades 3 through 8 who attended two schools in a predominantly white,

middle class school district in southeast Virginia. The sample for the current study consisted of 39 LD students whose parents gave permission for them to participate in the project. Intact classes were assigned to the treatment or control group. Students whose teachers volunteered to complete the training were assigned to the treatment group. The remainder of the students were assigned to the control group. Students in the control group received their normal reading instruction which consisted of individualized programs that included the use of basal, linguistic and high interest, low vocabulary texts. Performance ratings by their supervisor reflected similar levels of competence among teachers assigned to the treatment and control conditions.

The nonequivalent control-group design was used, and data was examined using analysis of covariance. Two null hypotheses were tested to determine whether the differences between the treatment and control groups were significant at the .05 level of confidence.

The data analysis found that students in the cognitive-behavioral treatment showed significant improvement in reading comprehension as measured by the Gates-MacGinitie Reading Tests when compared to control group students who were exposed to their normal routine of reading instruction. As assessed by the Nowicki-Strickland Locus of Control Scale, the treatment did not affect the locus of control variable.

Conclusions

The current study demonstrated that a cognitive-behavioral program effectively improved the reading comprehension skills of elementary and middle school children identified as learning disabled. An important component of the intervention was a training course for teachers that was designed to communicate a conceptual framework for understanding the comprehension deficits of LD students. The goal of the training was for teachers to learn to match reading instruction with the cognitive and affective needs of their students. Teachers responded positively to the training course, especially to the attempt to merge theory with practice. They seemed eager to share ideas with each other and with the investigator.

Classroom observations indicated that students liked the reciprocal teaching aspect of the intervention. In fact, students at the middle school level referred to themselves as professors rather than teachers! Children identified as learning disabled seemed to enjoy this opportunity to take a leadership role.

The results of this study have several important implications. Because the intervention was conducted by LD teachers during normal instructional periods using easily constructed materials, similar programs could be implemented at very little cost to school systems. Similarly, planning time for teachers was minimal. Following the 4-hour training, teachers spent no additional time planning the implementation of the project.

The findings from this research project paralleled those of previous studies. For example, Borkowski et al. (1985) found that students receiving strategy instruction combined with attribution training made significant gains in their ability to summarize paragraphs. These gains were not demonstrated when students only received the strategy instruction. Attributional beliefs were not changed as a result of including attribution retraining as part of the treatment package. The intervention implemented by Borkowski and his colleagues (1985) consisted of only 5 sessions, and it was thought that a longer training period would be effective in changing attributional beliefs. Apparently, locus of control is a trait that is difficult to alter even in the longer time frame of 5 weeks. Longstanding beliefs about the role of external forces in determining outcomes may be difficult to overcome without intensive intervention.

The lack of significant differences on the locus of control variable also may be related to the involvement of the United States in the Middle East. Both the war and cease fire in the Persian Gulf were declared during the period of time between the pre- and posttesting of the current study. It may be that these world events validated an external locus of control orientation, especially in southeast Virginia which is heavily populated by military personnel.

Recommendations for Future Research

The following recommendations for future study are based on a review of the literature and information gained from the current project:

1. The intervention should be replicated in a more heterogeneous school system to assess generalizability to the target population. The sample for the current study was drawn from a predominantly white, middle class school system.
2. Future studies should include a delayed posttest to determine the maintenance of treatment effects.
3. Pre- and posttesting should include an assessment of metacognitive skills and/or the awareness of the need to use reading strategies.
4. Based on informal observations during the current study, it may be useful to include assessments of teacher morale and student self-esteem in future research.
5. Efforts to increase internal locus of control need to be implemented over a prolonged period of time in diverse settings with frequent demonstrations of the role of individual effort in determining outcomes.

APPENDICES

APPENDIX A

December 10, 1990

Dear Parent:

We are participating in a research project designed to investigate reading comprehension and locus of control in children who have been identified as learning disabled. The research is being conducted by Jane Reilly as part of her doctoral dissertation at the College of William and Mary. In order to obtain information for the project, we would like permission to administer the comprehension subtest of the Gates-MacGinitie Reading Tests and the Nowicki-Strickland Locus of Control Scale to your child. Please explain to your child that s/he will be given these tests which will be group administered. Because the research is designed to guarantee your child's anonymity, all data will be confidential. Statistical analysis will be completed on group scores, and no individual data will be reported.

Please detach the permission form and have your child return it to the LD teacher by Friday, December 14. If you have any questions about the research, please call Ms. Reilly at 850-5351 (day) or 253-0786 (evening). Dr. Roger Ries (221-2345) and Dr. Thomas Ward (221-2358) at William and Mary's School of Education also are available to answer any questions you may have about the research.

Sincerely,

Special Education Supervisor

CONSENT FORM

_____ I give permission for _____ to take the reading comprehension subtest of the Gates-MacGinitie Reading Tests and the Nowicki-Strickland Locus of Control Scale. I understand that the results of these tests will be used for research purposes only.

NAME

DATE

_____ I do not give permission for _____ to take the reading comprehension subtest of the Gates-MacGinitie Reading Tests and the Nowicki-Strickland Locus of Control Scale.

NAME

DATE

APPENDIX B

A Cognitive-Behavioral Program Designed to Increase Reading
Comprehension Skills of Learning Disabled Children
Script for Teacher Training
Session One

Effective readers are aware of the need to use strategies to increase their ability to understand what they read. They know when their reading is not making sense and take steps to correct the problem (Cooper, Warncke, & Shipman, 1988). In other words, good readers have well-developed metacognitive skills. They understand the demands of the task, and they monitor and regulate their performance.

Recent research suggests that children identified as learning disabled have metacognitive deficits that interfere with their ability to understand what they read. LD children do not seem to be aware of the strategies necessary to increase comprehension, and they have difficulty assessing their skills and monitoring their performance. These children also have an external locus of control, attributing both success and failure to factors in their environment rather than to their own effort. The current research project is designed to teach LD children that good readers use specific strategies to improve their comprehension, and that students can improve their skills by becoming aware of and monitoring their thinking as they read.

In the past, studies designed to teach children strategies to increase their reading comprehension skills have included artificial factors such as providing scripts for teachers to follow or conducting investigations in settings such as university laboratory schools that are not representative of a typical classroom. Recently, researchers at Michigan State University (Duffy et al., 1987) suggested that there is a need to replace these "instructional experiments" (p. 354) with studies that are conducted in naturalistic environments under the normal conditions of the classroom. These authors found that teachers can be taught how to make decisions about what techniques to use when teaching comprehension skills, and that students benefit from strategy instruction.

The present study is designed to be implemented by LD teachers who have been trained in the use of strategy instruction. The first session emphasizes a conceptual framework for understanding the comprehension difficulties of LD children. Next week we will focus on using this framework to match reading instruction with the needs of LD students.

I would like to begin with a discussion of the cognitive and affective characteristics of LD children. As you know, children identified as LD must meet certain criteria. Among the criteria, is a significant discrepancy between ability and achievement that cannot be explained by physical handicaps, mental retardation, or

environmental disadvantage. This definition of LD is primarily one of exclusion and is not very helpful in terms of remediation.

Researchers have attempted to isolate variables that discriminate between children with and without learning disabilities. Although there are no definitive answers to explain the underachievement of LD children, there are emerging trends in the literature that have important instructional implications.

One finding common to a number of studies points to a deficit in metacognitive skills among both poor readers and LD children. As described earlier, metacognition refers to the awareness and knowledge of cognitive strategies and the monitoring and regulation of cognitive activity. LD students tend to have difficulty assessing their skills and monitoring and regulating their responses. Further, they do not seem to be aware of the processes necessary to perform tasks successfully. LD students display a tendency to approach tasks passively. Instead of becoming actively involved in the reading process, they seem to think that the purpose of reading is to decode words accurately and to recall in detail what they read (Wixson & Lipson, 1986).

In terms of affective characteristics, LD children represent a heterogeneous group. Indeed, recent longitudinal research on the behavioral characteristics of LD children identified seven distinct subtypes (McKinney, 1989). Despite their behavioral differences, many LD children share common experiences in school. Inherent in the discrepancy model used to determine eligibility for LD services,

is the fact that these children demonstrate academic deficits. Their common experience is school failure.

Research concerning affective responses to failure is prevalent in the LD literature and frequently focuses on the construct of locus of control (LC). Evolving from social learning theory (Rotter, 1954), LC involves the attribution of control over events. Individuals having an internal locus of control attribute the source of control to their own behavior. In contrast, individuals with an external locus of control see events as being determined by fate, luck, or the actions of others.

There is evidence in the social learning research that children follow a developmental pattern in which internal locus of control increases with age. By the age of 6 or 7, normal children become internal for success. Internality for success and failure usually occurs by the age of 10 or 11. Research in the field of learning disabilities suggests that developmental increases in internality may occur differently in LD children. For example, a recent study (Lewis and Lawrence-Patterson, 1989) found that LD students did not attribute success to their own efforts at as high a level as their regular education peers. Furthermore, the parents of LD students were aware that their children did not take credit for their successes, but their teachers indicated that they were unaware of the external orientation of their students.

The literature suggests, then, that there are significant differences between the cognitive and affective characteristics of

LD children and their normally achieving peers. These differences have important instructional implications. Curriculum based on cognitive-behavioral theory is an attempt to match instruction with the specific needs of LD children.

As you know, behavioral programs for children originally explained all action within a stimulus-response model. Studies in the 1950s concentrated on demonstrating that behavior could be predicted, controlled, and modified through the manipulation of external variables. It soon became apparent, however, that behavior changes often did not generalize beyond the settings in which they were implemented.

In the early 1960s, psychologists became interested in cognitive-behavioral theory which emphasizes the effect of self-statements on thoughts, feelings, and behavior. In other words, we don't simply respond to stimuli. Rather, we respond to our perception of stimuli, and our perception is influenced by what we tell ourselves about the stimuli.

Cognitive-behavioral programs are based on the assumption that children can learn to identify the role that internal speech plays in their responses, and that by changing the kinds of things they say to themselves, they can modify their behavior. For example, Meichenbaum and Goodman (1971) developed self-instructional training (SIT) to teach children to use self-statements to control their behavior.

SIT consists of five steps:

1. An adult model verbalizes problem-solving strategies while performing a task.
2. The student performs the task while the model verbalizes strategies.
3. The student guides his/her actions by talking aloud.
4. The student whispers instructions.
5. Finally, the student uses covert instruction to perform the task.

The initial problem-solving strategies modeled by the adult provide the child with important cues, including identification of the problem, focusing attention on skills required to complete the task, self-evaluation, self-reinforcement, and strategies for correcting errors.

Through modeling and rehearsal, cognitive-behavioral procedures encourage active participation in the learning process. These strategies have been effective in the remediation of a wide range of problems, including those that are related to deficits in cognitive and affective skills.

In the area of reading, Davey (1983) suggests that you can model strategies that effective readers use by selecting a passage that contains contradictions or ambiguities. While your students read silently, read the passage aloud. As you read, indicate when something does not make sense, and model techniques that you use to clear up confusion.

Next week, we will discuss emerging trends in reading comprehension instruction. It is interesting to note that, although there is clear evidence that strategy instruction is an effective way to increase comprehension skills, most basal textbooks do not reflect current research and investigators find little emphasis on strategic reading in classrooms (Pressley & Harris, 1990).

Session Two

Research investigating various aspects of reading dates back to the beginning of experimental psychology in the late 19th century with studies that investigated the correlation of reading disability and neurological dysfunction. Current research emphasizes that reading is an interactive process. From an interactionist perspective, reading involves both the text to be read and the person who is reading.

Moving away from a search for pathology, the focus of recent research involves an attempt to identify optimal conditions for learning to read. These studies suggest that children can be taught to improve their comprehension skills through direct instruction. The earlier assumption that understanding occurs naturally once decoding skills have been learned no longer is acceptable.

Within the last decade, a significant number of studies have investigated methods of improving children's comprehension skills. As we discussed last week, criticism about the generalizability of findings from these studies emphasizes a need for research that is conducted in settings that are representative of typical classrooms (Duffy et al., 1987).

The quality of the design of research on strategy instruction also has been criticized. In 1989, a group of professors and graduate students (Lysynchuk et al., 1989) used commonly accepted validity standards to evaluate comprehension studies that

had been published in leading educational journals over a period of ten years. Of the 30 criteria rated, there were studies that failed to meet as many as 13. Some of the most common failures to meet validity criteria included lack of information about the length of the intervention, lack of treatment fidelity checks, and the use of inappropriate statistical analyses. These researchers noted that some of the most poorly designed studies have been the impetus for major curriculum revisions in reading textbooks.

An up-to-date review of strategies that improve children's memory and comprehension skills (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989) indicates that strategy instruction applies what we know about how the efficient mind works. After evaluating the research, these authors conclude that effective strategies involve steps that are easy to teach, can be taught as part of the normal reading instruction program, and use materials that are available to classroom teachers. They advocate a "small is beautiful" approach, teaching only a few strategies and teaching them well. The reciprocal teaching model that we will implement in the current project meets these criteria.

A recent article in the American Psychologist (Glaser, 1990) cites reciprocal teaching as an excellent example of instructional programs that are based on a cognitive analysis of human performance. Developed by Palincsar and Brown (1984), reciprocal teaching is an interactive dialogue. Everyone in the reading group takes turns being the teacher. The teacher is responsible for asking

a question relevant to a passage that the group has read. In addition, the teacher summarizes the passage, clarifies any questions, and predicts what might happen in the next passage. The teacher calls on someone to answer the question and gives corrective feedback. Students who are not in the role of teacher are asked to comment on the teacher's questions and statements. The adult teacher initially models the appropriate behaviors. Subsequently, s/he prompts and shapes the students' behaviors when they are in the role of teacher. Research conducted by Palincsar and Brown (1984) indicates that poor readers made significant gains in comprehension skills after receiving instruction based on a reciprocal teaching model.

Students are taught a four step process:

1. Summarize ("What did I just read? Tell the main idea in my own words.")
2. Clarify ("Does what I'm reading make sense? If not, think of ways to clear up my confusion.")
3. Question ("Think of questions the teacher might ask about what I just read?")
4. Predict ("Use clues to figure out what might happen next.")

Using these strategies, children learn that reading is supposed to make sense and that, when misunderstandings occur, there are strategies that can be used to clear up confusion. With teachers and students taking turns, the use of strategies is demonstrated

and practiced. Teachers model the strategies that good readers use and give children who are having difficulty appropriate cues. Students have the opportunity to observe mature processing skills and teachers observe their students' processing of text. The teacher gives cues, corrects errors, and reinforces appropriate performance. The eventual goal is for students to internalize strategies that will improve their performance.

During the intervention, you will be asked to pace instruction to meet the needs of your students. When reading with your students, use the reciprocal teaching model to teach students how to summarize, clarify, question, and predict as ways of increasing their ability to understand what they read. During independent reading, students will use their reading detective flip charts to regulate and monitor their performance. Using self-instructional training, teach students first to verbalize the strategies aloud, then to whisper instructions to themselves, and, finally, to instruct themselves covertly.

Now let's brainstorm ways of teaching the strategies.

Purposeful Reading

First, we want to introduce the concept that good readers use specific strategies to help them understand what they read. The Reading Detective card on the flip chart is designed to remind children that good readers act like detectives when they read. They search for clues to help comprehend the material that they are reading.

Palincsar (1986) suggests using a football game metaphor. Good teams use strategies or game plans, and they use specific strategies to accomplish particular goals. In choosing a strategy, they consider the strengths and weaknesses of their own team and those of the opposing team. As they play, they evaluate whether the strategies are working, making revisions when necessary. Similarly, good readers have to be aware of specific strategies that will increase their comprehension. They have to understand the demands of the task -- what are they expected to know when they finish reading? They have to understand their own strengths and weaknesses. They have to select strategies that match their strengths and weaknesses with the demands of the task, and they have to monitor and evaluate their performance.

Can you think of other ways to communicate the purposeful nature of reading?

Summarize

Let's brainstorm ways of teaching students to summarize, to identify the main idea.

Examples:

Paraphrase what you have read; say it in your own words.

Identify the topic sentence in the paragraph.

Omit trivial, irrelevant, or redundant information.

Clarify

Students need to monitor their performance so that they know when their reading is not making sense. When

misunderstandings occur, they need to use fix-up strategies to clear up their confusion.

What strategies do you use when reading material is confusing?

Examples:

Re-read confusing passage.

Read passage more slowly.

Read ahead.

Check context to figure out unfamiliar words.

Use prior knowledge.

Seek help -- look up unknown words in the dictionary, ask a peer or the teacher for assistance.

Question

Students need to be taught to ask themselves questions as they read.

Examples:

Model questions that focus on important information in the text.

Model questions that integrate information in the text.

Help students practice generating questions by providing cues and corrective feedback.

Predict

Teach children to activate prior knowledge and to use clues in the text in order to figure out what might happen next.

Lessons

1. Each lesson is introduced by reminding students that:
good readers use specific strategies to increase their understanding of what they read;
when they make an effort to use strategies, their performance will improve.
2. Teach and/or review the four strategies:
Model specific statements and/or questions to verbalize when reading; guide the children as they practice using the specific steps modeled by the teacher; children first verbalize strategies out loud, then whisper instructions to themselves, and, finally, verbalize statements and questions internally as they read.
3. Introduce the reading selection for the day's lesson.
Encourage students to activate their prior knowledge to make predictions about the content of the text.
Introduce new vocabulary words.
4. Select a teacher from the group. After the group reads the first paragraph (silently or aloud), the designated teacher asks a question and group members respond. The teacher summarizes the text and asks the group if they have any additions to the summary. The group discusses any confusion regarding the text. The group predicts what will happen in the next paragraph, and a new teacher is chosen.

5. During the beginning stages of the intervention, you will have the primary responsibility for maintaining the dialogue. As your students become more competent, transfer responsibility for the dialogue to them while you provide cuing and corrective feedback.
6. In your classroom, display the reading detective charts listing the steps to be followed when reading.
7. Allow children to use individual flip charts when they read to remind them to monitor and regulate their performance.
8. In order to promote transfer and generalization, encourage students to use the procedure when they read material in their content area subjects.

Example of a lesson using reciprocal teaching (Cooper, Warncke, & Shipman, 1988):

Teacher: "Today we're going to take turns being the teacher. First, I will be the teacher, and then I will call on one of you to be the teacher. After we read a section of our story, we are going to use the four steps we have been learning to help us understand what we have read. Remember the four steps are: summarize, clarify, question, and predict." Discuss any background information and vocabulary that will be needed to understand the story. "Now silently read the first paragraph. When everyone has finished, I will be the teacher."

After everyone has read the passage, say: "This paragraph was about _____. There was something I didn't understand though. What did the second sentence mean? Let's reread that. Who can explain it to me? I think a good question to ask on a test about this paragraph would be _____. I think the next part will _____."

"Let's read the next part and I will choose one of you to be the teacher."

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