# INTEGRATING PSYCHOLOGICAL PRINCIPLES OF MOTIVATION WITH COGNITIVE STRATEGY INSTRUCTION

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## ABSTRACT

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By integrating principles of motivation with instruction and helping students be more aware of mental processing psychologists and teachers enable students to become independently engaged in the learning process. More research is needed to examine the integrated role of teacher as instructor and motivator in order to determine how to increase competency and intent to learn.

This research re-examines part of the data of the Teacher Explanation Project which demonstrated that teachers who explain to poor readers the mental processing associated with learning strategies in reading, when it is used and how to apply it can increase students' awareness of the lesson content and student achievement. This study examines through which mediating variables cognitive strategy instruction worked to increase reading achievement by demonstrating 1) the relationship between cognitive strategy instruction and motivational strategies at two different grade levels; and 2) the effect on third and fifth grade reading achievement of teachers' use of instructional and motivational strategies.

Third and fifth grade teachers of low-ability reading groups were randomly assigned to treatment or non-treatment conditions. The treatment consisted of training in a cognitive approach to reading instruction that taught students to use strategies to resolve problems

in reading. Trained assistants grouped and coded thirty motivational statements into five major categories and subcategories:
1) consequences contingent on task performance (reward and evaluating effort, ability and achievement subcategories); 2) motives and long term goals; 3) intrinsic value and meaning of tasks; 4) communicated expectations (positive and negative subcategories); and
5) communicated time limits. The reading portion of the Stanford Achievement Test was used as the pre- and posttest achievement measure. Researchers conducted student interviews of awareness of lesson content after the reading lesson.

Results indicate that treatment increased the use of motivational statements and that teachers' use of motivational statements is grade-related. Furthermore, treatment seems to work through some, but not all categories of motivational statements to increase achievement. Finally, awareness does not appear to be a mediating variable.

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# CHAPTER I

# NATURE AND BACKGROUND OF THE STUDY

## The Problem

School psychologists are often involved in classroom consultation as part of their professional functions (Bergan, 1985; Gutkin & Curtis, 1982). They provide services such as diagnosis of difficulties and advice about the nature of a problem and ways to deal with a case to the teacher who implements treatment recommendations with the student (Gutkin & Curtis, 1982). One important area of consultation for the school psychologist is the development and planning of techniques that would promote effective learning. Effective learning refers to engaging in the processes of learning. Students who are effective learners are engaged in activities that increase students' competence in the areas that Paris, Lipson and Wixson (1983) have called "skill and will". Effective learners master knowledge and the mental processes necessary for learning and have an intent to learn (Corno, 1986).

In order to develop and plan strategies to promote effective learning and provide effective consultation, a psychologist must know, both on the theoretical and practical levels, what works best (Conoley & Conoley, 1982). On the theoretical level, a school psychologist must integrate two domains: (1) the cognitive learning and instructional theories that emphasize the mediational processes necessary in

constructing meaning (Nicholls, 1979; Wittrock, 1986; Weinstein & Mayer, 1986) and (2) the motivational literature that focuses on ways in which students are and become interested and engaged in learning (Ames & Ames, 1984; Ames & Ames, 1985). On the practical level, a school psychologist must be able to make some recommendations that would enable students to demonstrate competence and to develop an intent to learn by which they will be able to focus internal resources and attend to the learning task. To enable students to be effective learners, the recommendations of the psychologist should focus on the what the student does as he or she is engaged in learning activity, not on acquiring knowledge as an outcome.

This study examines what can be done to help a certain group of students, low achieving and poor readers in the elementary school classroom, become more effective in the domain of reading and reading comprehension. The students were participants in a study conducted by the Teacher Explanation Project to determine the effectiveness of teachers' explanation of cognitive and metacognitive strategies on student awareness of lesson content and student achievement. The literature suggested and the TEP researchers believed that the participating students may be ineffective as readers because they do not possess the necessary skills to comprehend text (declarative knowledge), or because they are not knowledgeable about self-monitoring strategies (procedural knowledge) (Baker & Brown, 1984). However, it may also be true that accompanying these cognitive and metacognitive deficiencies, the low group readers may also lack positive motivational experiences, a lack which can also prevent them from effectively using skills. The students may have experienced

repeated failures, a lack of positive reinforcement or non-contingent praise. In addition, the students may have low self-esteem, view themselves as incompetent, and may be characterized generally as learned helpless (Wigfield & Asher, 1984). In any case, both the teacher and the psychologist are faced with the problem of discovering how best to help the low group reader develop both the skill and the will necessary for effective learning.

## Need for the Study

To meet the important challenge of enabling students to be effective learners, school psychologists can turn to the extensive, growing, modern learning and motivational literature for possible solutions. In the past fifteen to twenty-five years, the study of both learning and motivation has undergone dramatic changes. The emphasis in the literature of learning, and the instructional models that evolve from learning theories, has moved from theories of associationism, behaviorism and a cognitive, Piagetian constructivism to theories of information processing (see Resnick, 1983, for a historical review of learning theories). According to the information processing perspective, learning occurs when the mind creates (1) schemata, or frameworks for relating experiences and building a "prototype" of the common features of a set of experiences, and (2) scripts which are "organizing structures" that "come from rational analysis and formal instruction" (Calfee & Drum, 1986, p.809).

Based on information processing theory there are two research trends in the areas of reading, mathematics and science: (1) research on the learner as mediator of information, and (2) research on the instructional experiences that would provide organizing structures for

better processing. Researchers interested in improving reading comprehension, for example, have demonstrated that (1) students mediate instruction, (2) good readers use metacognitive strategies, (3) older students are more aware of the mental processes associated with using skills, and that (4) students improve their achievement scores on reading tests when instruction includes cognitive and metacognitive strategies (the organizing structures) (Doyle, 1983; Winne, 1985; Roehler, Duffy, Putnam, Wesselman, Sivan, Rackliffe, Book, Meloth & Vavrus, 1987).

Also influenced by information processing theory, researchers interested in classroom motivation are examining the cognitive-motivational mediators of behavior. The cognitive direction in motivational research replaces earlier emphases on the intrapsychological or behavioral forces affecting behavior (Ames & Ames, 1984, 1985). Classroom motivational research has two focal points: one that emphasizes the cognitive-motivational constructs as mediators of students' behavior, and the other that emphasizes the effects of teachers' behaviors. Researchers in classroom motivation examining cognitive-motivational mediation of behavior have studied concepts such as self-efficacy, locus of control, intrinsic motivation and motivation to learn. Studies of students' attributions and locus of control point to the utility of these concepts for predicting achievement (Wittrock, 1986; Smith, 1987; Naveh-Benjamin & Yi-Guang, 1987; Doljanac, 1987).

Researchers interested in the effects of teachers' behaviors have studied the effects of teachers' motivational or instructional strategies on students' cognitive-motivations such as goal

orientations and attributions, expectancies for success or failure, and value of task, on students' engagement on task and school achievement (Brophy & Merrick, 1987; Brophy, Rohrkemper, Rashid and Goldberger, 1983; Corno, 1986; Dweck, 1986; see Brophy & Good, 1986; Deci, 1975; and Lepper & Greene, 1978).

Unfortunately, most research in classroom instruction and motivation has studiously separated the two roles of the teacher as instructor and as motivator. For example, providing extrinsic reinforcements such as rewards or praise has not been integrated into instructional practice, but has been added only as special techniques that would increase a particular student behavior. But the linkage between instruction and motivation is important for establishing greater internalized motivational controls in students. Linking motivation and instruction can help students by providing the strategies to help the student selectively attend and encode information, while increasing the students' intent to learn (Kuhl, 1985). Moreover, features of instruction such as the nature of the task and the way it is presented may act as motivational strategies. The features of instruction may increase the student's intent to learn by increasing the student's expectations for success or by increasing the value of the task so that the student is willing to invest effort in its completion.

Only recently, with the increased understanding and documentation of students' thought processes, researchers are beginning to view the relationship between instruction and motivation as intertwined. For example, Brophy (1986) lists motivational strategies that can be integrated into the instructional process, such as planning for

novelty and variety, modeling interest in learning, and communicating desirable expectations and attributions. In addition, Sivan and Roehler (1986) found that there was a high correlation between cognitive strategy instruction and certain kinds of motivational statements. Likewise, Corno and Rohrkemper (1985) view instruction and motivation as interdependent in their presentation of self-regulated learning in which they discuss the relationship of setting and delivery to students' motivation. Nevertheless, further research is needed to explore the relationship of instructional method and motivational strategies.

Researchers in instruction and motivation have acknowledged developmental differences in children. In the area of reading comprehension, for example, the differences appear in children's use of metacognitive strategies. Younger students use different reading strategies than do older students (Myers & Paris, 1978). In studies of motivation in children, younger children differ from older children in their achievement motivation (Stipek, 1984) and in their conceptions of ability and effort (Nicholls, 1979, 1984). Notwithstanding the evidence regarding developmental differences, researchers have not examined the effectiveness of motivational strategies at different ages. Moreover, they have not studied the application of integrated instructional and motivational strategies at different times in a child's life.

In summary, motivational and learning/instructional researchers have explored some of the consequences of a cognitive approach for students and teachers. Students are active mediators of motivational and instructional information. Teachers' instructional and

motivational strategies affect students' cognitions, their behaviors and their achievement. Researchers have also shown that developmental differences exist in both cognitive strategy use and motivation. However, most studies continue to separate knowledge about the cognitive elements of learning and instruction with the cognitive elements of motivation. Most researchers fail to integrate the instructional and motivational roles of the teacher. The link between motivational and instructional strategies is explored by a few researchers who are interested in increasing students' cognitive control of learning. More studies are needed to determine how different patterns of motivational and instructional strategies are related. In addition, studies are needed to examine the effects of instructional and motivational strategies on students' motivation and achievement. Furthermore, the effectiveness of different motivational and instructional strategies on students' of varying ages needs to be examined. Such studies offer the possibility of improving the effect of psychologists' and teachers' efforts to empower students and to increase students' control over the learning process.

The data base of the Teacher Explanation Project (TEP) provided an opportunity to examine learning/instruction and motivation as integrated processes. The TEP focused primarily on learning and instruction. TEP researchers conducted four studies which examined the hypothesis that it may be necessary when working with poor readers for teachers to explain explicitly, in consistent ways over extended instructional periods, the mental processing associated with the (learning) strategy, when it can be used, and how to apply it in a flexible manner. In the first experimental study, TEP researchers

found that treatment teachers, those trained to explain mental processing associated with using reading skills as strategies, were more explicit in their explanations than control group teachers, and the treatment teachers' low group students were significantly more aware of lesson content than their control group counterparts (Duffy, Roehler, Meloth, et al., 1986). In the second experimental study, treatment teachers were more explicit than treated-control teachers when explaining the mental processing of students using reading skills as strategies. Moreover, the low-group students of treatment teachers were more aware of lesson content and scored better on nontraditional and standardized reading achievement measures (word study). There were, however, no significant differences in student achievement on a standardized comprehension test (Duffy, Roehler, Sivan et al., 1987). The TEP research demonstrated that teachers can explain complex cognitive tasks which results in a gradual restructuring of student understandings over time. In addition, the results of the TEP research have answered some questions about what methods work best to increase achievement and promote effective learners. These findings represent an important contribution to the understanding of learning processes. However, more can be discovered about the treatment effects by examining the mediating mechanisms through which the treatment operates. This study examines two mediating mechanisms: 1) the motivational communications of the teacher, and 2) student awareness of the lesson content. By examining the mediating variables, this study integrates the role of the teacher as both instructor and motivator. In addition, this study examines the differences between the effect of third and fifth grade teachers' communications on

student achievement. Thus, the present study provides valuable information about how instruction and motivation work together to increase learning and achievement at different developmental levels.

In conclusion, certain student populations present the psychologist and teacher with the problem of finding the best methods that will enable them to be effective learners. Traditionally, researchers have separately studied the effectiveness of teachers' instructional and motivational activities. The work of the TEP contributed important knowledge about the effectiveness of teaching students to view blockages to meaning as a problem solving activity. However, the researchers of the TEP did not account for 1) the effect of instructional strategies on motivational statements; 2) the relationship among teachers' instructional and motivational strategies on students' achievement; and 3) the differences between third and fifth grade teachers communications and their effects on achievement from a developmental perspective. This study addresses these three problems by investigating the mediating variables through which the TEP treatment operated. Such an analysis may provide a more complete response to teachers who ask what works best to increase student achievement and promote effective learning.

## Purpose of the Study

The main purpose of this study is to re-analyze some of the TEP data in order to determine the role of mediating variables through which the treatment operated to effect student achievement. In particular, this extension of the original analysis of the TEP data is to determine how cognitive strategy instruction and motivational strategies work together or separately to influence achievement. In

addition, there are three specific purposes of this study. Specifically, I am interested in determining if teachers' use of motivational statements is related to instructional method and grade. Second, I am interested in examining the influence on reading achievement of teachers' use of instructional and motivational strategies. Third, I wish to establish if the effect on achievement of teachers' instructional and motivational strategies differs between third and fifth grades.

The study will address the following three questions:

(1) What is the effect of grade and cognitive strategy instruction on teachers' use of motivational statements?

(2) How do cognitive strategy instruction and motivational statements affect third grade students' reading achievement?

(3) How do cognitive strategy instruction and motivational statements affect fifth grade students' reading achievement?

To answer the first question, the study examines the relationship between motivational strategies as expressed in the statements of third and fifth grade reading teachers while teaching their low reading groups, and two different methods of instruction, a traditional basal text approach and a cognitive-strategy approach.

In order to answer the second and third questions, the study examines the effect of a cognitive strategy approach to instruction in combination with five major categories of motivational strategies on the standardized reading achievement test scores. Third and fifth grade low group readers were analyzed separately.

This study has implications for theorists as well as practitioners. For theorists, the results of the study may clarify the relationship between motivational approaches, instructional methods and student achievement. For practitioners, the findings from this study may prescribe what instructional and motivational strategies are most effective for improving student outcomes for specific groups of students.

## Definition of Terms

In this section, I define the terminology used in this study to describe the instructional methods used in the treatment, treated-control and control groups and the categories of motivational statements.

The terms used to describe instructional methods are:

Cognitive strategy instruction is defined as instruction in the use of reading specific strategies and metacognitive strategies. Its purpose is to teach reading as a sense-making activity. Cognitive strategy instruction constituted a part of the original training (also called treatment) provided by the TEP which focused on the strategic nature of the content of teachers' communications. It does not reflect the training teachers received in the presentation of strategic content.

Reading specific strategies are those deliberate strategies used by readers to make sense of what they have read. Looking for cue words in a sentence to discover the meaning of an unknown word is an example of a reading specific strategy.

Metacognitive strategies are those relatively stable strategies used by learners to monitor comprehension and evaluate progress towards

goals. Self-questioning as a method for enhancing comprehension is an example of a metacognitive strategy.

Basal text instruction with teacher's guide refers to the traditional instructional method used by teachers who follow the teacher's guide published with the textbook. In this method, isolated skills are taught as topics, not as sense-making activities designed to improve comprehension. Treated-control and control groups used the basal text with teacher's guide. The treated-control group additionally received training in management principles from the First Grade Reading Study (Anderson, Evertson & Brophy, 1979).

Teachers' motivational statements are used to infer motivational intent and are used synonymously with motivational strategies. The categories of motivational statements are:

Category 1: Consequences contingent on task performance are statements that provide either symbolic or tangible rewards, or statements that positively or negatively evaluate a student's ability, effort or achievement.

Category 2: Motives and long term goals are statements that attach a personal and specific value to achievement of learning or performance goals.

Category 3: Intrinsic value and meaning of task are statements that emphasize the inherent value of learning or engagement on a task.

Category 4: Communicated expectations and predictions are statements reflecting teachers' perceptions of how the learning process will be for the student, whether the student will or will not find the task difficult, enjoy the task, or do well after investing effort.

Category 5: Communicated time limits are statements that warn students to work harder because time is limited.

## Methodology

This study used the data collected from the 1982-83 and 1984-85 experimental studies of the Teacher Explanation Project (TEP) (Roehler et al., 1985, 1987). The TEP data used in this study included transcripts of reading skill lessons, ratings of the lessons for degree of implementation of the treatment (cognitive strategy instruction), student scores on a reading achievement test, and measures of student awareness of lesson content. Fifth grade teachers and students participated in the 1982-83 study, while third grade teachers and students participated in the 1984-85 study. In each study, teachers were randomly assigned to two groups. In one group, teachers employed their regular instructional procedures and the basal text over the course of the year. In the second group, teachers used a cognitive strategy approach to instruction.

A list of motivational statements derived from the third and fifth grade teachers' transcripts of reading skill lessons was combined with a list of statements used by Brophy, et al. (1983). The total list of thirty motivational statements was grouped into five major categories and several subcategories. Transcripts of teachers' lessons were coded by categories, subcategories and individual statements.

The first research question asked if instructional method and grade affected teachers' use of motivational statements. Five analyses of variance were performed with grade and treatment group as independent variables and one of the categories of motivational statements as the dependent variable in each of the analyses. The

preliminary five analyses were followed up with analyses of the subcategories.

The second research question asked how cognitive strategy instruction and motivational statements affect student achievement in third grade. A three step analysis was used to answer this question. In the first step, an analysis of covariance was used to determine if the treatment influences achievement. The pretest was used as a covariate. In the second step, analyses of covariance were performed with pretest and one of the categories of motivational statements used in each analysis as covariates. These analyses provided information on whether the treatment effect worked through the motivational statements to influence achievement. In the third step, analyses of covariance were also performed with student awareness added as a third covariate. The achievement measure was the dependent variable. Awareness was used as a covariate because it had been found to be influenced by treatment in both third and fifth grades and positively correlated with achievement in third grade. The analyses in the second and the third steps produced different models of how teachers can affect student achievement. Specifically, the models represented the way in which the treatment, motivational statements and student awareness work together or separately to influence achievement.

The third question again asked how cognitive strategy instruction and motivational statements affect achievement for <u>fifth</u> grade students and teachers. The analyses of the fifth grade data were the same ones used for the third grade data.

## Limitations of the Study

The most serious limitation of the study is that the data were collected primarily to examine the effect of cognitive strategy instruction on student achievement, not on teachers' use of motivational strategies. As a result, information about teachers' cognitions which would verify the intent of their motivational statements is missing. Consequently, no causal statements can be made regarding the influence of teachers' motivational statements.

A second limitation of this study exists in the degree of generalizability that can be established. The study can generalize only to low reading groups in elementary classrooms in lower and middle class communities. In addition, the implications regarding teaching method may not be generalizable beyond the direct application of the specific training in cognitive strategy instruction used in the study. Furthermore, the generalizability of the treatment is possible only to the extent that the specific elements of the original TEP treatment that constitute what has been called cognitive strategy instruction are applied.

## Plan for the Dissertation

The dissertation is organized into five chapters beginning with a discussion of the teachers' and school psychologists' problem of enabling students to be effective learners in Chapter I. In Chapter II, I continue with a review of pertinent literature, while in Chapter III I present an explanation of the methodology, and in Chapter IV I present the data analysis and results. I conclude in Chapter V with a discussion of the results and the importance and implications of the study.

# CHAPTER II

# REVIEW OF THE LITERATURE

## Introduction

The common goal of instruction and motivation is to develop students who are engaged in the process of learning. Such engagement is characterized by an internalized capacity for activity. Independent functioning during engagement in learning activities requires that students see themselves as possessing a strong sense of personal agency which demands "the development of competencies, self-precepts of efficacy, and self-regulatory capabilities for exercising self-directedness" (Bandura, 1986, p.38). Helping students develop the tools of personal agency is not limited to providing either motivational or learning strategies; it is the combination of both factors. Thus, teachers must supply both the instructional and motivational framework to help students develop the tools of personal agency (Corno & Rohrkemper, 1985; Brophy, 1983). An instructional framework designed to develop tools of personal agency might include explicitly teaching students and providing them practice in the cognitive strategies that characterize better and older students. A motivational framework might include changing students' beliefs about the causes for success or failure and by increasing the value they attach to learning and achieving.

Teachers and psychologists concerned with students' independent

and self-regulating behavior while engaged in the process of learning can look to cognitive psychology and the information processing model for direction. Cognitive psychologists interested in learning/instruction and motivation have indicated three areas for future investigations into what combination of methods work best to help students become effective learners (Garner, 1987; Brophy, 1986, Wittrock, 1986). First, researchers should examine the relationship of instructional method and motivational strategies. Second, they should determine the effect of both motivational and instructional strategies on achievement. Third, researchers should determine if the effectiveness of motivational and instructional strategy use is age-related. In this study I explore the three directions suggested by previous research as they pertain to third and fifth grade low-group reading instruction. Therefore, the three purposes of this study are (1) to examine the relationship between instructional method and motivational strategies at two different grade levels; (2) to determine the effect on reading achievement of instructional method and motivational strategies; and (3) to determine if the effect of instructional and motivational strategies on student achievement is age-related.

In this chapter, I review the supporting research for this study. In the first section of this literature review, I consider the influence of cognitive psychology on learning, instruction and motivation. In the second section, I examine student mediation of instruction, and argue that cognitive strategy instruction is an instructional framework for developing in students the capacity for controlling their learning. In the third section, I discuss cognitive

approaches to theories of classroom motivation and explain their role in developing independent and effective learners. Age-related effects on instruction and motivation are discussed within the second and third sections respectively. Fourth, and last, I argue for the integrated study of instruction and motivation.

## Influences of Cognitive Psychology on Learning, Instruction and Motivation

Information processing theory has changed the way psychologists and educators think about learning and motivation. Earlier views of instruction have conceptualized instruction as if it were a technology whereby teachers' actions produced student behaviors. According to this paradigm, by identifying or creating teacher behaviors and then exposing students, students, as passive subjects of teachers efforts, would learn. Even when operating from a Piagetian view of cognitive constructivism, the view of instruction remains a unidirectional technology. The role of the teacher is to set up an environment conducive to promoting active interaction between student and activity so that students may engage in their natural activities (Resnick, 1983).

Teachers trained in the traditional theories of motivation view motivation either as totally in the hands of the teacher or as a result of the students' internal needs and drives. In either case, teachers do not have a way to affect students' intent to learn, nor are they able to help students choose to apply what they learned in class. Motivation in the classroom is described primarily from the perspective of a stimulus-response paradigm. Skinner (1953) and other behaviorists do not separate learning and motivation. Learning occurs

through reinforcement, and those behaviors reinforced more frequently are likely to be repeated and increase in frequency. According to behaviorist theory, students rewarded for learning a spelling list would be more likely to continue learning.

In addition, motivation has been seen as a need-driven psychological process. Maslow (1954) and others have suggested that people act to satisfy needs which are hierarchically structured. Students, according to this theory, act to satisfy their inner demands, such as needs to meet physiological demands, needs to increase, support and enhance esteem, and needs to know and understand. Although Maslow's theory can explain why the hungry or psychologically distressed child does not learn, satisfying deficiency needs and meeting growth needs does not explain how teachers can create interest or increase the engagement of students on cognitive tasks, or why students engage in one task rather than another. Nor does Maslow's theory explain the steps teachers can take to help students feel competent and in control of their learning.

Thus, from the perspective of earlier instructional paradigms and motivational theories, the student was not an active participant in his or her learning. The implication for teachers was that they were concerned with outcomes, rather than increasing student engagement in learning activities. However, the recent period of research in cognitive psychology has resulted in the removal of these theoretical and conceptual barriers to the study of learning, instruction, and motivation.

A central principle of information-processing theory is that information is more easily understood, learned and remembered when

associations are made between new material and organized information which has developed out of prior knowledge and experience. Associations between new information and organized schema enlarge the existing organizational framework, thus permitting future accommodation of new knowledge or new experiences into the cognitive organizations.

In the information processing approach, teachers take into account students' mediation of instruction, specifically organizing and relating new information to already existing cognitive organizations. One method for organizing information that a teacher may use is to prepare advance organizers. Another method is for teachers to teach specific mediational strategies to students. For example, a teacher has a class of mixed good and poor readers and she knows that poor readers do not possess or use comprehension monitoring strategies. Therefore, she might use a method such as reciprocal teaching (Palinscar & Brown, 1984) to train students in comprehension fostering skills while using a reading passage as the basis for class discussion.

Student mediation is not limited to mediation of instruction. In the following example, we see how students interpret a teacher's remark and how they perceive their failure results from their prior experiences. Following a statement that a test is going to be difficult, a student who has failed may attribute the failure to the tests' difficulty while another may be sure that failure was due to lack of ability. Both students have built cognitive structures or schemata of success and failure by which they process present experiences. Teachers who take into account students' mediation of

motivational strategies, may need to change the students' attributions for success and failure or attach value to learning and its outcomes.

In summary, cognitive psychologists have unveiled and illuminated students' mediational processes, thus helping teachers and psychologists understand the effects of students' mediation of meaning in the process of learning (Doyle, 1983; Weinstein, 1983), the effects of teaching on students' mental processes and the effects of teaching on student achievement (Baker & Brown, 1984). The research in cognitive psychology has also influenced the way teachers and psychologists conceptualize their role in the classroom. Instruction is no longer merely transmitting knowledge to students who then show what has been learned by performing well on evaluation measures. Instead, teachers and psychologists are responsible for promoting effective learning. Teachers and psychologists provide students with the means to control their learning and intent to learn by means of both instructional and motivational strategies that enhance the students' competence, self-regulation, and conscious beliefs and values. Thus, in order to develop students who are effective learners, teachers should understand students' mediation of instruction and motivational strategies.

## Student Mediation of Reading Instruction

As we have seen in the previous section, cognitive psychologists introduced an explanation of how learning occurs in which students' mediation of instruction is an important element. Students' cognitive processes have been a major focus of researchers interested in learning, reading comprehension and the effects of student mediation on achievement (Wittrock, 1986; Weinstein & Mayer, 1986). In this

section of the literature review, I have narrowed my focus to the area of research that has most relevance to this study, the relationship between student mediation and reading instruction. The research on students' cognitive processes involved in reading comprehension and student mediation of reading instruction can help teachers and psychologists prepare the most effective methods for developing self-regulating behavior in students.

Students' Cognitive and Metacognitive Strategies

> Success in solving problems and reasoning depends on cognitive skills: mastery of these skills can be characterized as strategic knowledge consisting of cognitive processes that set goals and choose plans or methods in problem settings. (Greeno, 1983, p.76.)

Reading comprehension is not usually taught as an activity within itself; rather it results from instruction in rules of grammar, vocabulary and language skills. Teachers usually present a new vocabulary list, and a series of grammatical rules, perhaps the rules for finding the main idea of a story, spelling rules, and rules governing cause and effect relationships. The rules and vocabulary are supposedly sufficient for students to "comprehend" the text when engaged in silent or oral reading of a text in a group or individually. The students show their comprehension by answering the teacher's questions or those in the text (Collins & Smith, 1980). Thus, in typical reading instruction, comprehension is not taught as a sense-making activity. When reading comprehension is viewed as a problem solving and reasoning activity, it requires knowledge of cognitive strategies to break down blockages to meaning.

What are these cognitive strategies used by students to make

sense of text? Researchers investigating information processing in people, characterize cognitive strategies as being situation/task specific, and as reflecting idiosyncratic decision-making. Messick (1984), for example, defines strategies as the steps taken in certain situations and for particular tasks that are "reflective of conscious or unconscious decisions among alternative approaches" (p.61). Likewise, Paris, Lipson & Wixson (1983) define strategies as the deliberate use of skills. Being strategic in reading means making decisions about the extent of comprehension, about the steps that need to be taken to increase comprehension, the appropriateness of the steps, the alternatives actions that may be available, the intentions and capabilities of the student and the value of the effort involved.

Metacognitive strategies and reading-specific strategies are two types of cognitive strategies. Some researchers reserve the term cognitive strategies only for the deliberate use of skills, or what Garner (1987) calls situation specific executive processing. I am using the term cognitive strategies and cognitive strategy instruction to include both metacognitive and reading specific strategies. Reading specific strategies are those strategies designed to foster comprehension and make cognitive progress (Palinscar & Brown, 1984; Garner, 1987). Readers implement reading specific strategies when specific, non-automatic actions are required to make sense of what has been read. For example, a student is aware that she does not understand the meaning of a sentence because of an unknown word. The process of stopping and employing some deliberate method to uncover the meaning of the word is an example of a specific strategy.

Metacognitive strategies are those relatively stable strategies

used by learners to assess their own cognitive resources, to monitor comprehension and evaluate decision-making/problem solving processes, and to choose between alternative strategies. (Baker & Brown, 1984; Costa, 1984; Garner, 1987). Brown and Baker (1984) list six metacognitive strategies used in reading:

1. Clarifying the purposes of reading;
2. Identifying the important aspects of a message;
3. Focusing attention on the major content rather than trivia;
4. Monitoring ongoing activities to determine whether comprehension is occurring;
5. Engaging in self-questioning to determine whether goals are being achieved; and
6. Taking corrective action when failures in comprehension are detected.

In the example of the student who stops when she doesn't understand the meaning of a word, metacognitive strategies were used in the monitoring of comprehension, taking corrective action, and reevaluating to see if the sentence made sense.

In summary, students use two types of cognitive strategies to make sense of their reading, reading specific strategies and metacognitive strategies. In this study, both types of strategies are included in an instructional method called cognitive strategy instruction.

Differences in Strategy Use

Students differ in their use of cognitive strategies depending on their age or educational experiences. These differences have implications for teachers and psychologists who are concerned with providing students with appropriate methods of increasing control over

their learning. (See Garner (1987), Yussen, Matthews and Hiebert (1982), and Baker and Brown (1984) for extensive reviews.) In this section, I discuss the differences in strategy use between young and old students, and good and poor students and review some of the techniques that researchers have used to increase students' use of cognitive strategies and to increase student achievement.

Age-related differences in metacognitive knowledge show that younger children have less knowledge of cognitive strategies. In a study of second graders and sixth graders, the younger children were not aware of the cognitive nature of reading, while the older children were (Myers & Paris, 1978). The younger students emphasized decoding rather than problem-solving strategies on comprehension tasks.

Differences in metacognitive awareness are also seen in students who are marginal or are poor readers. Forrest and Waller (1980) found age related differences as well as achievement related differences in students' metacognitive awareness. Poorer readers in sixth grade and younger readers in third grade demonstrated similar emphases on decoding and limited strategic repertoires. When Paris and Myers (1981) compared differences in comprehension and memory skills of fourth grade good and poor readers, they found poor comprehenders deficient, relative to the good comprehenders, in active monitoring strategies. Brown and Day's (1983) study demonstrated that although high school students can summarize a fifth grade academic text, remedial readers have not demonstrated this ability by the time they reach college. In addition, young and poor readers have difficulty in metacognitive skills such as evaluating texts for clarity, internal consistency, or compatibility for known facts, and interpreting

temporal relationships between what is happening now and what will happen next (Baker & Brown, 1984, Garner, 1987).

The age-related and competency-related differences in students' use of cognitive strategies are associated with differential achievement gains. Researchers have established that the presence of certain cognitive processes predicts student achievement. For example, Peterson, Swing, Braverman and Buss (1982) report that independent of student ability, students who reported using cognitive strategies for understanding and relating information taught back to prior knowledge, performed better on achievement tests that students who did not report using such strategies. A follow-up study with a more diverse population and in a naturalistic setting (Peterson, Swing, Stark & Waas, 1983) confirmed the results of the earlier study. Attending, understanding of the lesson, and either engaging in specific cognitive processes or engaging in them more frequently were significantly related to student achievement.

Training Programs to Increase Cognitive Strategy Use

Certain populations either do not possess or do not use cognitive strategies, and because they do not use the appropriate cognitive strategies, some students achieve less in comparison to those students who do use cognitive strategies (Roehler et al., 1987). Researchers have designed techniques and training programs to improve students' use of cognitive strategies. Baker and Brown (1984) suggest three characteristics of successful training programs: (1) training and practice in the use of skills as strategies for specific tasks; (2) instruction in metacognitive strategies to improve the use of the task specific strategies; and (3) information that increases the awareness

of the significance, utility and rationale of the tasks.

Two additional characteristics should be added to Baker and Brown's list. 1) Training students should take into account their prior knowledge and possible incompatible conceptions (Resnick, 1983). 2) Instruction should transfer the strategic responsibility from the teacher to the student (Garner, 1987, Sivan, 1986, Palinscar & Brown, 1984).

In transferring the responsibility of learning to the student, the role of teacher becomes that of empowering agent, a role similar to that assigned to the teacher in Vygotsky's (1978) notion of the zone of proximal development. Learning, according to Vygotsky, occurs through the interaction of student and teacher. The teacher acts as the more knowledgeable person in relationship with a student, and stretches the student's present skill level beyond what she is able to do independently. Knowledge, skills and cognitive strategies are transmitted through the interaction between teacher and student. They are learned and practiced within the relationship, with the teacher gradually removing his or her presence, until the student is capable of independent action.

The five characteristics of successful training programs can result in use of cognitive strategies, achievement and student control over their learning. The TEP studies (Roehler et al., 1985, 1987) on which this study is based, can be placed within the research on training programs. Palinscar and Brown (1984) and Paris and his research team (1984) have also experimented with cognitive strategy training programs.

The instructional activities designed by researchers to increase

students' strategy use in reading have some shared characteristics and some distinct characteristics. One way that they differ is that the instruction is either non-directed or directed, explicit instruction in cognitive strategies within the context of the actual reading. Palinscar & Brown's (1984) work on reciprocal teaching is an example of non-directed instruction in cognitive strategy use. In contrast, the TEP studies (Roehler et al., 1985, 1987) are examples of explicit instruction in cognitive strategy use.

Palinscar and Brown (1984) taught students to use summarizing, questioning, clarifying and predicting by instructor and student taking turns in leading classmates through the four strategies. In reciprocal teaching there is no explicit explanation of strategy use, or use of reading-specific strategies. Studies on reciprocal teaching have found that it significantly increases reading comprehension in low-achieving junior high students. In the Roehler and Duffy studies (1985, 1987), researchers told students explicitly how to use both reading-specific and metacognitive strategies when encountering blockages to meaning, and to view reading as a sense-making activity.

Researchers have also differed in the preparation of materials provided to teachers engaged in cognitive strategy instruction. Paris and his colleagues (Paris, Cross, DeBritto, Jacobs, Oka & Saarnio, 1984; Paris & Jacobs, 1984) prepared units and supplementary materials for teachers to use in instruction of third and fifth grade minimally strategic readers for four months. The purposes of the instructional material was to increase students' strategic knowledge, their use of cognitive strategies and their achievement. Although, Paris et. al (1984) found no treatment or grade effects on conventional measures of

reading comprehension, fifth grade subjects were superior to third grade subjects on performance on an error-detection measure and a cloze measure. The experimental groups' performance exceeded that of the control group on the same measures. Duffy and Roehler's (1985, 1987) research studies of 1982-83, and 1984-85 did not provide extra materials to the teachers; it used the school district's prescribed reading materials.

Summarizing Cognitive Strategies and Reading Instruction

To summarize, cognitive strategies can have two effects on student reading comprehension (Winne & Marx, 1982; Paris & Jacobs, 1984). First, metacognitive awareness can lead students to realize that they do not understand the passage they are reading and help them make a choice between available alternative strategies. Second, reading specific strategies can provide a student with the means to increase comprehension. Therefore, theoretically, cognitive strategies provide students with methods to control their learning. But young and poor readers do not possess, nor do they use the strategic knowledge that older and better readers use. Researchers assume that training in cognitive strategy use can help readers who lack sufficient metacognitive and reading specific knowledge to gain control over their reading. The control developing out of use of cognitive strategies should result in increased achievement.

## Students' Mediation of Motivational Strategies

> Knowledge, transformation operations, and constituent skills are necessary but insufficient for accomplished performances. Indeed, people often do not behave optimally even though they know full well what to do.
> (Bandura, 1986, p. 390)

Some students fail to learn or apply what they have learned. Although they may have acquired knowledge and skills and strategies, students remain ineffective learners because they lack "will" -- the motivation, interest and desire to learn or apply what they have learned (Corno, 1986; Paris, Lipson & Wixson, 1983). Teachers and psychologists must find some means to increase students' interest and engagement in learning and performing classroom activities.

In the previous section, we have seen how teachers can use what is known about students' cognitive processes to increase the effectiveness of instruction. In this section, we will learn how teachers' can use what is known about students' cognitive processes to improve the students' motivated behaviors.

Cognitive Processes: Expectancy X Value Theory

Students' mediation of their environment "form a set of interpretive processes useful for accomplishing a variety of academic tasks" (Corno & Mandinach, 1983, p. 89). The interpretive processes used to increase attention, interest, engagement and control over learning are called cognitive motivational processes and are organized within the framework of the expectancy x value theory (Feather, 1982; Parsons, 1983).

Expectancy x value theory is based on the assumption that the cognitive mediation of events and self influences future behavior. In this theory, the effort people are willing to expend on a task is the product of (a) the success they expect (and the rewards contingent on that success) if they invest effort; and (b) the value of engaging in a task or the value that success or failure (and reward) holds for them.

The following discussion of students' mediation of motivational strategies is divided into two sections, one focusing on expectations for success, and the second on the value of engagement on task and success on task.

Students' Expectancies for Success

This section reviews the theory and research associated with the expectancy term of the expectancy x value model.

Perceived expectancy for success is influenced by a student's perception of the stability of the causes to which he or she has attributed success or failure, and by a student's sense of efficacy, which is determined by perceived competence and perceived control over the outcome (Weiner, 1979, Bandura, 1986). In an elaboration of the basic model, Parsons (1983) found that students' expectancies for success were caused by students' self-concept of ability, which, in turn, was determined by the students' perception of the effort involved and the difficulty of the task.

The expectancy model suggests that students who view academic successes as internal (personally caused), stable (likely to reoccur), and controllable, will probably have higher performance expectations and be more engaged than students who do not make such attributions. Only when the causes of failure are perceived as being the sole responsibility of the student, unlikely to be affected by remediation or instruction, or beyond the students' control, then failure should lead to lower expectations for success and reduced motivated behavior. Persistent failure attributed to stable causes such as lack of ability results in learned helplessness (Dweck & Goetz, 1983).

Perception of ability is developmentally linked (Stipek, 1984).

Perceived competence is inaccurate, overestimated, and generally positive in younger children until about the second grade. Young children perceive high ability as learning or success on a task, and effort means more learning. For older children, ability is perceived as a capacity, and expending effort can mean low ability. Younger children also overpredict future success despite past evidence of failure. By third grade, students predictions reflect cumulative past failures.

Researchers have found a relationship between perceptions of ability and of control and achievement. de Charms (1976) and Harter and Connell (1981) have found that students who perceive themselves capable achieve more than students who do not have this self-perception. Students high in internal locus of control do better on test scores and have better grades than do students of equal intelligence who are low in internal locus of control (Messer, 1972; Lefcourt, 1976; Harter & Connell, 1981).

Implications of students' expectancies for teachers. Expectancy research has implications for teachers' activities. The importance of perceptions of ability and internal locus of control in explaining separate portions of the variance in academic achievement has led researchers to examine the effects on student attributions of teacher evaluations and expectations and attribution training programs (Wittrock, 1986). Changing attributions has been found to be an effective means of increasing students' personal responsibility and achievement (deCharms, 1976).

Based on the assumption that perceived ability to successfully control an intended action is one requirement for the activation of

self-regulatory strategies (Kuhl, 1985), we infer a positive effect of attribution training on students' engagement . Research supports such an inference. Students have been able to take more responsibility for their actions when treated as "origins" rather than "pawns" (deCharms, 1976). Students performed better when lack of effort, rather than lack of ability, was emphasized as the cause of failure (McCombs, 1984).

Teachers' "evaluation" statements and "communicated expectations and predictions" are two categories of teachers' motivational statements that I have used in this research because they have been recognized as a means of influencing students' attributions (Brophy, 1982a; Ryan, Connell & Deci, 1985). In this study, I have grouped evaluation statements into three subcategories: evaluating achievement, effort or ability. Evaluations of achievement refer to statements that provide information concerning the quality of performance of an activity. If an evaluative statement is negative or noncontingent, it does not enhance feelings of competence (see Brophy, 1979, for an analysis of the use of praise). Evaluations of effort and ability refer to statements that provide feedback about the level of effort or the level of ability of a student. The effect of evaluative statements and teacher expectancy statements on students' attributions is discussed in the following section.

<u>The effect of teachers' evaluation and expectancy statements on students' attributions</u>. In his review of the literature on self-fulfilling prophecy and teacher expectation effects, Brophy (1982b) notes that three points have been agreed upon by scholars in the field. First, expectations can function as self-fulfilling prophecies. Second, the self-fulfilling prophecy effects on student achievement

are not clear or unequivocable. Third, sometimes teachers' expectancies of student behavior may be, in actual case, a reflection of correctly perceived student behavior.

An interesting aspect of teachers' expectations is the effect they may have on students' attributions. For example, a teacher introducing the task as difficult may contribute to those students' perceptions of their ability, thus influencing the effort they expend and their engagement on task. Furthermore, the praise teachers' use may reflect their expectations and signal attributions to effort or ability. "You did a good job; keep on working hard", is praise given for performance, but also for the effort the student gave. Students may have various interpretations of this statement. It may mean that the students did not have the ability and needed to work hard. Parsons (1983) found that students' expectancies were mostly related to their self-concepts of ability and perceptions of teachers' and parents' beliefs about their abilities.

Students attributions and subsequent engagement may be influenced by teachers' expectations as expressed in task presentation statements. If, in the situation above, the task had been introduced as difficult, then students would feel that they were able to control their performance, and the statement would result in increased self-concept. However, if the task were preceded by the statement, "I know you'll all be able to do this", students might interpret the praise as reflecting poor ability, and only with the effort were they able to complete the task successfully. In this case, the students' self-concept and willingness to engage in more difficult tasks is diminished. Brophy et.al. (1983) studied the effect of statements

which present classroom tasks on student engagement. They found that students were less engaged when teachers made statements that had negative expectations, and were more engaged when teachers made no introductory statements; positive statements had no effect. Although not suggested by Brophy, one explanation of these effects is that negative expectation statements affect the students' attributions.

Summary of students's and teachers' expectations. Students' mediate success and failure experiences and set up expectations for future success or failure based on past experience and attributions for success or failure. Teachers' evaluation and expectancy statements can affect students' attributions, but the effectiveness of their statements depends on the age of the student, and the type of attribution teachers encourage. Changing students' attributions is one way of increasing the probability that students will engage in learning tasks.

## Students' Beliefs about the Value of Engagement and Success

> ... we are not concerned as much with students' attributions about the causes of success or failure as with their attributions about their reasons for participating in academic activities in the first place. (Brophy, 1986, pp.2-3)

Academic motivational researchers have centered their study on students' mediation of their experience and self as it relates to expectancies for success. To a lesser extent, researchers have studied students' valuing cognitions. Valuing cognitions can be separated into cognitions that value learning for its own sake and those that attach value to success or failure on a task. The first group of valuing cognitions, valuing learning for its own sake, are referred to by

Brophy (1983) as motivation to learn. "In specific situations, a state of motivation to learn exists when students engage themselves purposively in classroom tasks by trying to master the concepts of skills involved" (Brophy, 1983, p.1). Statements that teachers make that emphasize the importance of learning the task because of the inherent value of learning for the student have been categorized as "intrinsic value and meaning of task" statements.

The intrinsic interest value of a task for the student partially explains why a student engages in a task and continues to work. However, not all tasks in class are intrinsically interesting. Furthermore, younger children are more likely to be intrinsically motivated, i.e. believe that they act to meet their own needs, than older children. Older children are more extrinsically motivated, i.e. they act for rewards associated with performing the task and attaining the outcome (Stipek, 1984).

The second group of valuing cognitions are those that attach value to the performance of the task and the outcome associated with the task. According to Parsons (1983), the value of engaging in a task is a function of the immediate intrinsic or interest value of the task (like Brophy's motivation to learn), the value attached to attainment, and the utility value of the task for some future goal. Thus, engagement and achievement on the task depends on the perceived characteristics of the task, and the extent to which the task meets the student's needs, helps her to achieve her goals, and affirms personal values of the individual (Parsons, 1983).

Attainment value is related to the age, social group, and personal needs to achieve of the individual. Academic achievement, for

example, is not a "value" for kindergarten and first grade students (Stipek, 1984). Again in adolescence, as peer approval becomes important, academic achievement may or may not be a valued behavior (Stipek, 1984). Utility value depends on the value of the what is learned for a future goal and is not dependent on the how interesting or enjoyable a task may be at the present. Utility, like attainment value looks at the task as a means to an end. In this study, statements of attainment value and utility value made by teachers are categorized under the heading of "motives and long term goals".

The effect of teachers' valuing statements on students behavior. Teachers attach value to the learning or outcome of the task in order to initiate and facilitate sustained engagement. There are three kinds of statements teachers can use to attach value to the performance or outcome of a task. They can use statements in the "intrinsic value and meaning of task category", in the "motives and long term goals category" and in the "contingent on performance category".

Using "intrinsic value and meaning of task statements" they show the value of learning or performing or learning by explaining the importance of the skill as an end in itself. Sometimes teachers may use themselves as models with whom the student can identify. An example of this kind of statement is "I like learning these rules, they work, they make sense."

Teachers who use statements in the category "motives and long term goals" speak to the usefulness of the task for the student, the relevance of learning for the students' interests, or by showing how the task is student is learning may be a way to enhance the students' self-image. An example of this category of statement is

> If you are able to decide one important thing all of the sentences in the paragraph are telling about, it may help you to remember about what you read.

Teachers may attach value by offering a reward: teacher's approval, grades, hanging the work on the board, or leading the lunch line. Teachers' statements that reward and evaluate have been grouped together in this study in the category of "contingent on performance". Verbal and symbolic rewards facilitate conceptual learning more than tangible rewards (Barringer & Gholson, 1979).

The other-regulation/self-regulation continuum has been a useful framework for explaining the effects of teachers' statements on students' valuing cognitions. Students who perform or learn for external rewards can be considered other-regulated. Self-regulated students, on the other hand, experience learning or performing a task as pursuit of their goals and needs (Ryan, Connell & Deci, 1985). Statements in the "contingent on performance category" promote other-regulation, while "motives and long term goals" and "intrinsic value and meaning of task" statements promote self-regulation.

Statements in the mode of external regulation weaken already existing intrinsic motivation. Lepper (1983) has shown that intrinsic motivation decreases when students perceive themselves as working to achieve a goal. However, if the approval or reward is not anticipated, it does not result in lowered intrinsic motivation. Value and goal statements may be a more optimal means of increasing student interest in learning and sustaining engagement. Brophy (1983) cites Condry and Chambers (1978), Kruglanski (1978), and Lepper (1983), as scholars who have shown that

> quality of task engagement is higher and concern about quality of output or product is greater when people choose to engage in tasks for their own reasons than when they engage in the tasks for exogenous reasons (to earn reward or avoid punishment) or are distracted by other exogenous considerations (the need to meet time limits or production schedules; the desire to win a competition). (Brophy, 1983, p.3)

Summary of views and research on valuing statements. Students' mediate performance and learning through cognitions, specifically through value cognitions associated with performing or learning a task or the outcome of the task. The value of a task can be external to the student like rewards, or internal to the student like inherent interest of the task or the attainment of a personal goal. Teachers can influence students' behavior by focusing on either internal or external values. For example, teachers' use of reward statements promote external regulation of learning which is detrimental to task engagement and intrinsic motivation. However, teachers who emphasize the value of learning by calling attention to the purposes and meanings of the task can move students' behavior towards the goal of independent learning and intent to learn.

## Need to Study Motivation and Instruction for Effective Learning

The central problem posed by this study was to determine what combination of instructional and motivational strategies work best to help the low group reader develop both the skill and will necessary for effective learning. Teachers and psychologists who are concerned with enabling students to be self-regulated, independent and engaged must provide them with the means to achieve competency. Furthermore, teachers need to influence students who lack motivation by changing

their attributions about success and failure and their perceptions about the value of classroom activities.

Information processing theory underlies recent research and assumptions regarding students' learning processes and the instructional and motivational activities in which teachers and psychologists are engaged. According to information processing theory, students mediate instruction and motivational strategies. In reading, different mediational skills characterize readers who are good and poor. Both cognitive motivations and cognitive strategies differ for younger students and readers from older ones. In the context of motivation, students mediate the expectancies and evaluations of teachers and make attributions which can enhance or detract from further efforts to learn or perform. They also mediate the values that teachers have attached to the learning and the outcomes.

The instruction that enhances the poor and younger students' control over reading comprehension in particular and learning in general, frames learning as a sense-making activity. The focus on sense-making has led me to believe that the kinds of motivational strategies teachers would use when they employ cognitive strategy instruction are those that enhance a sense of competency and an internal locus of control, and focus on value of the process of learning and learning outcomes rather than rewards for performance.

In addition, the research supports the assumption that teachers who use motivational strategies which increase motivation to perform and motivation to learn enhance intentionality, responsibility and self-efficacy. When students sense greater self-efficacy and act with intentionality, their achievement increases. Moreover, motivational

strategies lead to increased self-regulation by strengthening the effect of training in cognitive strategy, and by increasing students' intent to learn, willingness to apply the strategies taught, and expectancy for success.

Thus, there are some indications that cognitive strategy instruction and cognitive motivational strategies may be related. In addition, there are indications that teachers' use of cognitive strategy instruction and cognitive motivational strategies are developmentally related. Moreover, the research also points to positive influences of motivational strategies and cognitive strategy instruction on student achievement. However, there is no research at present that specifically examines the relationship between cognitive strategy instruction and teachers' use of motivational statements, and how the relationship changes at different grades. In general, there is little research that examines differences in students' achievement while examining grade, motivational and instructional strategies.

The lack of previous research and the isolated research supporting relationships of motivation, instruction and grade and the effect on student achievement of different motivational strategies and instructional methods has led to asking the following research questions. These research questions relate instructional and motivational variables as they would combine in teaching to help students become independently engaged in learning activities.

1. What is the effect of grade and cognitive strategy instruction on teachers' use of motivational statements?
2. How do cognitive strategy instruction and motivational

statements affect third grade students' reading achievement?

3. How do cognitive strategy instruction and motivational statements affect fifth grade students' reading achievement?

# CHAPTER III

## DESIGN AND PROCEDURES OF THE STUDY

This study was designed to examine the relationship between instruction and motivation, to identify relationships between teachers' instructional and motivational strategies and student achievement, and to determine if third and fifth grade teachers' motivational and instructional strategies differ in their effect on student achievement.

The present study is part of a larger research project, the Teacher Explanation Project (TEP) at the Institute for Research on Teaching. Project staff conducted a series of four studies over the academic years 1981-1985. The data for this study are part of the TEP 1982-83 (Roehler et al., 1985) and the 1984-85 (Roehler et al., 1987) experimental studies of fifth and third grade teachers and students.

The design and procedures section includes five major subsections: (1) the subjects, (2) the instructional methods used by teachers, (3) the categorization of motivational statements, (4) the measures, (5) the data collection procedures, and (6) the procedures for analysis of the data.

### Subjects

In this section a description of the general population from which the sample was selected is presented, followed by a discussion of the sample of subjects.

## Population

Researchers drew the teachers for this study from a population of third and fifth grade reading teachers who teach low group readers in a midsize urban midwest community. In 1982-83, 83 fifth grade teachers taught reading, including 16 teachers who taught a fourth and fifth grade split, and 23 teachers who taught a fifth and sixth grade split. In 1984-85, 77 third grade teachers taught reading, including 13 who taught a second and third grade split and 16 who taught a third and fourth grade split. Table 3.1 shows the number of third and fifth grade teachers from which the sample was drawn.

Table 3.1

Number of Third and Fifth Grade Teachers in Population

| | 4th & 5th | 5th | 5th & 6th | TOTAL |
|---|---|---|---|---|
| 1982-83 | 16 | 44 | 23 | 83 |
| | **2nd & 3rd** | **3rd** | **3rd & 4th** | **TOTAL** |
| 1984-85 | 13 | 48 | 16 | 77 |

The student population for this study consisted of third and fifth grade students in low reading groups. There were a total of 12,831 elementary school students in 1982-83. Out of that number, 1798 were in fifth grade. In 1984-85, there were a total of 11,822 students enrolled; 1643 students were in third grade. Table 3.2 shows the total population of third grade students in 1984-85 and fifth grade students in 1982-83 who were enrolled at the time of the study.

The population of this community is racially and ethnically mixed. Integration is achieved either through busing or racially mixed

neighborhoods. In 1982-83 the ethnic distribution of the student

Table 3.2

Total Enrollment and Enrollment of Third and Fifth Graders

| 1982-83 | TOTAL ELEMENTARY | TOTAL FIFTH GRADERS |
|---|---|---|
| | 12,831 | 1798 |
| 1984-85 | TOTAL ELEMENTARY | TOTAL THIRD GRADERS |
| | 11,822 | 1643 |

population was 62% white, 24% Black, 10% Hispanic, and 2% both American Indian and Asian. In 1984-85, the ethnic breakdown was very similar. The student population was 61% white, 25% Black, 19% Hispanic, 3% Asian and 2% American Indian. Table 3.3 shows the ethnic and racial components of the student population.

Table 3.3

Ethnic Breakdown of Student Population

| | American Indian | Black | Asian | Hispanic | White |
|---|---|---|---|---|---|
| 1982-83 | 2% | 24% | 2% | 10% | 62% |
| 1984-85 | 2% | 25% | 3% | 10% | 61% |

The per capita income of residents in this urban community was $8,380 in 1981, $9,145 in 1983, and $10,398 in 1985. In 1982-83, the families of 22.56% of the children enrolled in the elementary schools received Aid to Families with Dependent Children (AFDC). In 1984-85, the families of 24.95% of the elementary school students received AFDC. In general, students were from working-class and middle-class homes.

## Sample

Teachers. Twenty-two volunteer fifth grade reading teachers from an urban midwest community participated in the 1982-83 TEP study. Researchers stratified teachers on the basis of management ratings obtained in a baseline measure into high, medium and low managers and randomly assigned to treatment and control groups. Eleven were taught to recast reading skills as problem-solving strategies, and make decisions about what to say about the mental processing one employs when using reading skills as problem-solving strategies. The second group which formed the control group received no training, but did receive one management session.

Nineteen third grade volunteer teachers from the same urban midwest community and one third grade teacher employed by a neighboring suburban school district participated in the 1984-85 study. Because management was determined in the 1982-83 study not to be a factor in the implementation of the training, researchers did not stratify teachers in the 1984-85 study based on management. They were randomly assigned to treatment or treated-control groups.

The ten third grade teachers assigned to the treatment group received refined forms of the training in content in comparison to the training provided the treatment teachers in the earlier study. In addition, the training began earlier, was spaced over a longer period of time, and included assistance in planning lessons. The 1984-85 teachers were observed twice the number of times as the teachers in the 1982-83 study. The additional observations were to ensure that the 1984-85 teachers continued to implement the treatment. However, data was collected at similar 4-6 week intervals as in the earlier

study.

The ten teachers who served as a treated control group received guidance in the use of management principles from the First Grade Reading Group Study (Anderson, Evertson & Brophy, 1979) during two two hour group sessions. The management principles are listed in Appendix A. Researchers told the treated control group of teachers that the purpose of the study was to validate the original findings at the third grade level.

In total, 21 teachers were trained to teach students to use a reasoning process in reading. Of the 21, 11 fifth grade teachers were trained in the 1982-83 study and 10 third grade teachers were trained in the 1984-85 study. Twenty-one teachers participated but were not trained to teach students in the use of cognitive strategies. Eleven fifth grade teachers in the 1982-83 study constituted the control group. Ten third grade teachers participated in the 1984-85 study as a treated control group. Table 3.4 shows the number of teachers who participated in the 1982-83 and 1984-85 studies.

Table 3.4

Teachers Participating in Study

| | Treatment | Control/ Treated control |
|---|---|---|
| 1982-83 (5th grade) | 11 | 11 |
| 1984-85 (3rd grade) | 10 | 10 |

Students. Students participating in the TEP studies were students in low reading groups taught by the participating teachers. In the participating schools, teachers identified students as poor readers (between one and two years below grade level) and placed them

in low reading groups on the basis of scores on the Stanford Achievement Test and the recommendations of previous teachers.

The number of students in the low reading groups varied among classrooms. In the fifth grade classrooms, the number ranged from 4 to 22 with an average group size of 12.05. There were an average of 12 students in the reading groups of treatment teachers and 12.1 students in the control teachers' reading groups. In the third grade classrooms, group size varied from a low of 3 to a high of 16. The average group size in the third grade classrooms was 7.15. The number of students in groups taught by treatment teachers averaged 6.8, while the average number of students taught by control teachers was 7.5. Table 3.5 shows the average number of students in third and fifth grade treatment and control reading groups.

Table 3.5

Average Number of Low Group Students in Each Classroom

| | TREATMENT | TREATED CONTROL/ CONTROL | MEAN |
|---|---|---|---|
| THIRD GRADE | 6.8 | 7.5 | 7.15 |
| FIFTH GRADE | 12.0 | 12.1 | 12.05 |
| MEAN | 9.4 | 9.8 | |

## Instructional Methods

Participant teachers in both studies used either of two instructional methods in the teaching of reading skills: teaching isolated skills using the basal textbook and accompanying teacher's guide, or teaching skills as problem-solving strategies within the context of an ongoing reading lesson. The second method is called

cognitive strategy instruction. The treated control and control group teachers using the traditional basal textbook approach focused on isolated skills to be taught as topics or memorized procedures. They taught the skill or series of skills by explaining the rule, showing examples and providing practice. For example:

Rule: The same word can have more than one meaning.

Example: The balloon is lighter than air.

The man used a lighter to start the fire.

Practice: Underline the word that means the same as the word in the numbered sentence.

The treatment teachers using cognitive strategy instruction, taught students to employ a reasoning process when encountering a problem in reading by modeling for students the mental acts involved in strategic reading. Cognitive strategy instruction, as implemented in this study, provided students with (a) a means to reflect on the activity they were engaged in, and (b) appropriate steps that would lead to an outcome that made sense. In the example described above of a word that has two meanings, the students might be instructed to (a) see if the sentence made sense; (b) look for contextual clues that would help them understand the meaning of the word; (c) fill in the meaning; and (d) check to see if it made sense.

The length of the lesson, as measured in the length of transcript (26 lines of transcript equals one page), varied with the instructional method used. Transcripts of third grade teachers were, on the average, longer than those of fifth grade teachers. Transcripts of trained teachers were longer than those of control and treated-control teachers. Table 3.6 shows the average length of teachers'

lessons.

Table 3.6

Average Length of Lessons in Pages of Transcript

| | TREATMENT | TREATED CONTROL/ CONTROL | MEAN |
|---|---|---|---|
| THIRD GRADE | 16.61 | 14.71 | 15.66 |
| FIFTH GRADE | 15.52 | 12.65 | 14.08 |
| MEAN | 16.04 | 13.63 | 14.85 |

## Categorizing Motivational Statements

Statements made by teachers during instruction, either to individuals, to small groups or to the whole class, have been used in motivational research to infer teachers' motivational intent and strategy. Brophy et al. (1983) used motivational statements as a variable in the study of the relationship between teachers' expectation statements communicated during the presentation of tasks and students' engagement on those tasks. Marshall (1987) examined teachers' statements as indications of their attempts to motivate students to learn or perform. In this study, motivational statements are defined as teachers' statements which might generate, facilitate and maintain students' interest and engagement in the task at hand.

A list of eighteen empirically derived types of motivational statements (Brophy et al., 1983) were added to another twelve types of statements to comprise the total list of thirty types of motivational statements. The researcher read the teachers' transcripts from the TEP and found the additional twelve types of statements. The decision to include the twelve additional types of statements was supported by theories of motivation that suggested that such statements might

affect the students' interest or engagement on a task. For example, a statement like, "Those who finish on time will get A's", was an indication that the teacher was using positive reinforcement, and therefore would denote a type of motivational statement to include in the list. (See Appendix B for the list of thirty motivational statements.) The different types of statements were grouped in categories based on theoretical similarities to facilitate the reporting of the results.

The researcher revised the types of statements for the final coding. The revisions included changes in the wording of the types of statements and changes in categorization. Finally, the thirty types of statements fit into five major categories of motivational statements, and a number of subcategories. In Appendix C the complete breakdown of the thirty statements into categories and subcategories is reported. The five major categories are:

(1) consequences contingent on task performance;

(2) motives and long term goals;

(3) intrinsic value and meaning of tasks;

(4) communicated expectations; and

(5) communicated time limits.

Two graduate students, trained to identify examples of the thirty kinds of motivational statements, coded the 1982-83 and 1984-85 transcripts of the teachers' reading lessons. During the coding, the graduate students encountered difficulties in three areas. The first problem they encountered was differentiating between instructional statements and motivational statements, especially when the teacher was modeling a procedure. For example, the coders raised the question

whether the following sentences matched the type of motivational statement "teacher uses self as example". The topic of the lesson was cause and effect; the teacher is talking.

> All right. It was a warm day so the children went barefoot. What happened, Mrs. Bodine? What happened? It was a warm day so the children went barefoot. That's what happened. Now I'm going to think about why did that happen. Why did the children go barefoot? It was a warm day. I answered the why question by putting in because. I did not change the idea of the sentence. This is my thinking that is going on.

The graduate students coders had a problem in coding modeling because a person can learn and be reinforced through observing the actions or effects of actions of another person (Bandura, 1986). Therefore, it was difficult for the coders to distinguish between the model as instruction or motivation. In this study, the decision was made to view modeling statements as motivation. There was no overlap with the measures of teachers' explanation.

The second problem coders encountered was scoring statements of performance feedback. The coders asked, was an "OK" the same as a "good"? On examination of the use of good, the coders decided that when "good" was used either as a procedural interjection used by teachers for continuity in the question and answer period, or as a means to indicate the correctness of the answer, it was not coded as a motivational statement. However, if it appeared as a qualitative judgment contingent on performance, it was considered motivational. Frequently the difference between motivational and procedural was easy to distinguish because of the nature of the student's answer or because of elaboration on the part of the teacher. For example, "Very good, you changed that 'i' back to 'y'.", was coded as a motivational

statement, as was "very good" interjected in a series of "Okay"s to a specific student response.

The third problem the coders confronted was technical: how to code more than one sentence that seemed to express the same point. In the following example, the underlined parts of the sentences were coded for "importance of skill".

> The main thing we are talking about today was base words. Finding base words in big words, so that when we see big words, we break them down so they're not so hard to read so we can figure out what those "uh oh" words are. When you read, I want you to use all these things, that's why we come back here and we talk about all these kinds of things that you can use when you're reading.

The first underlined sentence clearly tells the student when using the skill is useful. The first part of the second sentence also tells the student when the skill can be used. However, the second part of that sentence is a further elaboration of the same point so it was not scored.

The rules that were established to resolve difficulties when they arose are listed in Appendix D. Twenty-five percent of the transcripts were used to calculate inter-rater reliability. The inter-rater reliability for the coding of the 1982-83 transcripts was .84. Inter-rater reliability for the 1984-85 transcripts was .88.

Explanations of the purpose and characteristics of each category of motivational statement follow in the next sections. In addition, the percent use of the total number of motivational statements is reported for each category of motivational statement. Table 3.7 presents the percentages of motivational statements used by teachers in all categories.

Category 1: Consequences Contingent on Task Performance

When teachers make statements of "consequences contingent on task performance", they present the learning task as a means to an end. The value of performing the task lies in the immediate consequences which are contingent on performance. The purpose of these statements is to stimulate interest and engagement by providing (a) incentives such as rewards or punishments, or (b) positive or negative feedback on the students' achievement, effort or ability.

Table 3.7

Percents of Motivational Statements in Five Major Categories of Motivational Statements Used by Teachers

| MOTIVATIONAL STATEMENT | TREATMENT THIRD | TREATED CONTROL THIRD | TREATMENT FIFTH | CONTROL FIFTH |
|---|---|---|---|---|
| CONTINGENCY | 52 | 65 | 20 | 30 |
| GOAL | 10 | 4 | 30 | 15 |
| VALUE | 32 | 18 | 42 | 30 |
| EXPECTATION | 4 | 6 | 5 | 8 |
| TIME | 2 | 7 | 3 | 17 |

In Table 3.8, the percentages of motivational statements used by teachers in the category of "contingent on performance" are presented. The descriptive analysis of the teachers' use of motivational statements showed 65% of the motivational statements made by third grade teachers who did not receive training (hereafter called untrained teachers) were statements in the category "contingent on

performance", whereas only 52% of the motivational statements used by third grade trained teachers were in this category. Thirty percent of the statements made by fifth grade untrained teachers were "contingent on performance" statements in comparison to only 20% made by trained fifth grade teachers.

The category "contingent on performance" is subdivided into reward and evaluation statements. Six percent of the contingency statements used by trained third grade teachers were statements that offered reward or punishment. Ninety four percent of the contingency statements made by third grade trained teachers were of the evaluation type, with that category further subdivided into achievement evaluation (96% of the evaluation statements) and effort evaluation (4% of the evaluation statements).

Table 3.8

Percents of Contingency Statements in the Reward and Punishment Subcategory and the Evaluation Subcategory

| % OF TOTAL STATEMENTS | 52% TREATMENT THIRD | 63% T.CONTROL THIRD | 20% TREATMENT FIFTH | 30% CONTROL FIFTH |
|---|---|---|---|---|
| % OF CONTINGENCY STATEMENTS | | | | |
| REWARD | 6 | 2 | 35 | 28 |
| EVALUATION | 94 | 98 | 65 | 72 |
| SUBGROUP OF EVALUATION: ACHIEVEMENT | 96 | 93 | 61 | 77 |
| SUBGROUP OF EVALUATION: EFFORT | 4 | 7 | 39 | 23 |

Two percent of the third grade untrained teachers' contingency statements were statements of reward and punishment. Ninety eight percent of the untrained third grade teachers' contingency statements were of the evaluation type, with 93% of those being statements evaluating achievement, and seven percent evaluating effort.

Trained fifth grade teachers used reward and punishment statements 35% of the time and evaluation statements 65% of the time when they made contingency statements. Sixty one percent of the evaluation statements were evaluations of achievement and 39% were evaluations of effort.

Twenty eight percent of the contingent statements made by untrained fifth grade teachers were in the reward and punishment category, while 72% of the contingent statements made by untrained fifth grade teachers were evaluation statements; 77% of those were evaluations of achievement and 3% evaluation of effort.

Category 2: Motives and Long Term Goals

When teachers make statements of "motives and long term goals", they also present the task as a means to an end. The value of performing the task is external to the learning process. However, unlike the consequences contingent on task performance category, the rewards mentioned in the motives and long term goals category are personal and may have a specific value for the student. Teachers communicate the advantages of learning the task in terms of self-image, personal relevance to the students' lives or interests, or students' future need of the skill either in the classroom or in life in general.

Table 3.7 reviews the percentage of statements in this category

students' future need of the skill either in the classroom or in life in general.

Table 3.7 reviews the percentage of statements in this category used by teachers. Ten percent of the motivational statements used by trained third grade teachers were in the category of "motives and long term goals". Untrained third grade teachers used statements in this category only 4% of the time. Thirty percent of the statements made by trained fifth grade teachers were in the category of motives and long term goals. Only 16% of the motivational statements made by untrained fifth grade teachers were statements of motives and long term goals.

Category 3: Intrinsic Value and Meaning of Task

When teachers make statements in the category of intrinsic value and meaning of task, they emphasize the importance of learning the task because of its inherent value. In contrast to the consequences contingent on task performance category and the motives and long term goals category, intrinsic value statements do not promise any rewards. Whereas the value for the student in performing the task as expressed in the consequences and long term goals statements was in terms of rewards exogenous to the task, the value for the student referred to in intrinsic value statements are endogenous to the learning task. Learning, rather than performing the task is important. In making intrinsic value statements, the teacher may use his or her own experiences to demonstrate the value of learning, or may be explicit about the importance of learning the skill as an end in itself. In addition, the teacher may show the students how learning the task is part of a pattern, and that the new information is related to, an outgrowth of, and consistent with previous work.

teachers made statements in this category 20% of the time. Forty-two percent of the statements made by trained fifth grade teachers were value statements, while only 28% of the statements made by untrained fifth grade teachers were in this category.

Category 4: Communicated Expectations and Predictions

Unlike the previous categories of motivational statements, when teachers make statements in the category of communicated expectations and predictions, they do not focus on the value of learning or performing the task for the student. Instead, when teachers make statements in the communicated expectations and predictions category, they focus on the teacher's perceptions or expectations of how the learning or performing process will be for the student. Teachers may make predictions that the student will not like the task or will not do well, or teachers may communicate expectations that the student will enjoy the task, may do well or may do well after investing effort. Communicated expectations and predictions may affect students' own expectations for future success or failure, thus influencing their subsequent performance on tasks.

Table 3.9 shows a breakdown of the expectation statements into positive and negative subcategories. Four percent of the motivational statements made by trained third grade teachers expressed an expectation. Of those, 27% were positive expectations and 73% negative expectation. Six percent of the statements made by untrained third grade teachers were communicated expectations (56% positive, 44% negative). Trained fifth grade teachers communicated expectations in 5% of their motivational statements (27% positive, 73% negative). Eight percent of the motivational statements made by untrained fifth

grade teachers were communicated expectations (31% positive, 69% negative).

Table 3.9

Percents of Positive and Negative Communicated Expectations

| % OF TOTAL STATEMENTS | 4% TREATMENT THIRD | 6% T.CONTROL THIRD | 5% TREATMENT FIFTH | 8% CONTROL FIFTH |
|---|---|---|---|---|
| % OF EXPECTATION STATEMENTS | | | | |
| POSITIVE | 27 | 56 | 27 | 31 |
| NEGATIVE | 73 | 44 | 73 | 69 |

Category 5: Communicated Time Limits

When teachers warn students to concentrate or work harder because time is limited, they do not express a value in learning or performing, nor do they imply an expectation about future success or failure. Therefore, time limit as communicated by the teacher has not been included in the other categories. Nevertheless, such a statement might increase a student's engagement in the task. As such, it meets the criteria for a motivational statement and is included in this study.

The percent use of the communicated time limits category of motivational statements is presented in Table 3.7. Two percent of the motivational statements used by trained third grade teachers communicated a time limit, while 7% of the statements made by untrained third grade teachers were in this category. Three percent of the statements used by fifth grade trained teachers communicated a time limit. In contrast, 17% of the total motivational statements made

by untrained fifth grade teachers communicated time limits.

## Measures

This study used two types of outcome measures: a measure of student achievement and a measure of student awareness of lesson content. Researchers of the TEP developed the student awareness measure. The student achievement measure was the Stanford Achievement Test. In the 1982-83 and 1984-85 studies, instruction in cognitive strategies was measured by a rating instrument which will also be included here. Descriptions of these measures follow.

### Achievement measure

The reading portion of the Stanford Achievement Test (SAT) was used as a pre and post test measure of achievement for the 1984-85 study, but was not used as an achievement measure in the 1982-83 study. While using the same achievement measure as in the 1984-85 study, the present study differs from the earlier 1982-83 study in that it uses the SAT scores for the students as a pre- and posttest achievement measures. Achievement scores were aggregated by classroom.

The SAT is administered by the school district in the late spring every year. The test consists of two subtests, word study and comprehension. Subtest and total scores were collected for the 1984-85 study. Only total scores were collected for the 1982-83 study. The SAT scores obtained for third and fifth graders from the previous spring constituted the pre-test scores, while the scores from the spring of the third and fifth grades served as post-test scores.

### Awareness Measure

"Awareness" refers to students' knowledge of the need to be strategic when encountering a problem in reading. Researchers

interviewed five students in each treatment and control or treated control group immediately after the lesson. In the 1982-83 study, five students were randomly chosen from the reading group. In the 1984-85 study three of the five students were target students who were selected at random before the first observation and interviewed after every observed lesson. The other two students were randomly selected for the interview from the balance of the reading group. The interviews were conducted by trained faculty members and graduate students.

To determine the students' awareness, three basic questions were asked regarding (a) what they had been learning, (b) when they would use it, and (c) how they would use it. The student interviews were audiotaped and transcribed. Two two-member teams rated the student interviews using an instrument called the student awareness measure which had been developed and used originally in the 1982-83 study (Duffy, et al., 1986). The rating instrument for rating students' statements was divided into three categories: (1) what strategy was taught (declarative knowledge); (2) the context or situation in which the strategy should be used or applied (situational knowledge), and (3) how one employs the strategy (procedural knowledge). Each category had four possible ratings. A student's response was rated on a scale of 0 to 4 depending on its depth and completeness. Scores for the three categories were summed. The highest possible score was 12. A copy of the rating criteria is included in Appendix E (Roehler, et al., 1987). Average inter-rater reliability for the awareness measures in the 1982-83 study was .78. The inter-rater reliability for the awareness measures in the 1984-85 study was .84. Student interview

ratings were aggregated by classroom.

Instructional Measure

Researchers used a rating instrument to measure the extent to which treatment, treated control and control teachers used cognitive strategy instruction in their lesson. Although similar in most respects to the instrument used in the 1982-83 study, the rating instrument for the 1984-85 study was modified to reflect findings regarding specific characteristics of teacher explanation (Rackliffe, 1986). The revisions in the 1984-85 rating instrument included rating instruction for the means used to present the information and the intra- and inter-lesson cohesion.

The present study used the ratings of four elements common to both the rating instrument of the 1982-83 study and the 1984-85 study. The four elements of the rating instrument, which are listed in Appendix F, provided information about (1) what the task is; (2) the usefulness of the task; (3) how to decide which strategy to use; and (4) how to perform the strategy. Each of the four subcategories was rated on an explicitness scale of 0 to 4 (with 0 being the absence of the criterion and 4 being an exemplary presence of the criterion). Raters were trained and tested in the use of the explanation rating form until they reached the acceptable criterion for inter-rater reliability of .80. The average inter-rater reliability for the rating teams through all the observations during the academic year was .92 for the 1982-83 study and .81 for the 1984-85 study.

## Data Collection Procedures

The 1982-83 and 1984-85 studies involved two sets of classrooms: a treatment group and a control or treated-control group. Teachers

were requested to teach a skill lesson that was part of the routine basal text instruction when observed. Members of the research team observed and audiotaped five reading skill lessons in the 1982-83 study and six lessons in the 1984-85 study over the period of the school year. In both the 1982-83 and 1984-85 studies, the observers collected data at intervals of between 4-6 weeks. Researchers used the first lesson observed prior to training as a baseline measure. Transcriptions of the audiotaped lessons became the data source for instructional methods and motivational statements. Immediately following the observed lesson, the researcher took five low-group students individually to a nearby room or to the hallway outside the room to interview them. The interviews were then transcribed and rated for data for student awareness. Teachers administered the achievement tests to their students during regular class time.

Data collection procedures were identical for the treatment and treated-control and control groups. However, researchers observed treatment teachers in the 1984-85 study an additional five times, at approximately two to three weeks after the six designated data collection observations. The purpose of these additional observations was to monitor the teachers' implementation of the training. Although audiotaped, these lessons were not part of the teacher data used in the study.

## Analyses of Data

The analyses of data proceeded in three stages. In the first stage I reviewed the results of the 1982-83 and 1984-85 TEP studies, and performed supplementary analyses on the TEP data to compare the effects of grade and treatment condition on lengths of the observed

reading skill lessons, explicitness of instruction, and student awareness. In addition, I tested for significant posttest achievement gains in the 1982-83 and 1984-85 studies.

After examining the data from the 1982-83 and 1984-85 studies, I included in the second stage descriptive statistics and correlations between teachers' use of motivational statements and explanation ratings, and teachers' use of motivational statements and student awareness.

The purpose of the third stage of the analyses of data was to answer the three research questions of this study. The first question asked what was the effect of grade and cognitive strategy instruction on teachers' use of motivational statements. I performed two-way analyses of variance with grade and training as independent variables and teachers' use of motivational statements as the dependent variable. Each category of motivational statement was analyzed separately.

The second and third questions asked how do cognitive strategy instruction and teachers' use of motivational statements affect third and fifth grade students' reading achievement. These two questions each required a separate three-step procedure. A detailed explanation of the three steps follow.

In the first step, one-way analyses of covariance (ANCOVA) on the posttest achievement scores were performed with pretest scores as covariates, and treatment condition as the independent variable. Although this had been done with the 1984-85 achievement data, the 1982-83 achievement scores had not been analyzed in such a manner.

The second step examined if the treatment operates alone or

through motivational statements to increase student achievement. Analysis of covariance was used with pretest and motivational statement as covariates, treatment as the independent variable, and achievement scores as the dependent variable. A total of eleven ANCOVAs were performed; one with each major category and subcategory of motivational statements used as covariates.

In the third step an ANCOVA was used to determine the interrelations between cognitive strategy instruction, motivational strategies, student awareness and student achievement. Student awareness, influenced by the treatment and highly correlated with student achievement in both the 1982-83 and 1984-85 studies, was, therefore, included as a covariate in these analyses. Each category of motivational statements, as well as the pretest scores, were also used as covariates. Treatment was the independent variable and student achievement was the dependent variable.

The next chapter presents the results of the analyses described here. The results of these analyses determine how instruction and motivation work together and how they affect low group student reading achievement. Through these analyses, a plan for empowering students to be effective learners may develop.

# CHAPTER IV

## RESULTS

This study reanalyzes part of the data of the Teacher Explanation Project in order to determine how instructional and motivational strategies work separately or together to influence students' reading achievement. To accomplish this purpose, twenty third grade and twenty-two fifth grade teachers were observed instructing their low group readers. Teachers in the treatment group used cognitive strategy instruction while teachers in the control or treated control group used the basal text and teacher's guide in the regular manner. Researchers rated the transcripts of the lessons for effectiveness in cognitive strategy instruction, and coded the transcripts for motivational strategies. Observers interviewed students immediately following the observed lesson to obtain information about the students' awareness of lesson content. Student achievement was measured by a standardized reading test.

As background to reporting the results of the present study, I will summarize the original findings of the Teacher Explanation Project. I also include supplementary analyses of the original data, continue with descriptive analyses of the data, and conclude by reporting the results of the statistical analyses that answer the following three research questions:

(1) What is the effect of grade and cognitive strategy

instruction on teachers' use of motivational statements?

(2) How do cognitive strategy instruction and motivational statements affect third grade students' reading achievement?

(3) How do cognitive strategy instruction and motivational statements affect fifth grade students' reading achievement?

## Review of TEP Results and Supplementary Analyses

The results of the Teacher Explanation Project studies are reviewed in this section. In the original analyses, the findings regarding the fifth and third grades were never compared. Therefore, in the second section of this review of the TEP studies three supplementary analyses are reported. These analyses were performed to see if there was a difference by grade or treatment condition in the length of the lesson, effectiveness of teachers' explanation, and student awareness. In addition, two t-tests were performed to determine if there were achievement gains between pretest and post-test achievement scores of the third and fifth grade students, irregardless of the treatment condition.

### Review of the TEP Results

In the 1982-83 study of fifth grade teachers and students, researchers found that there is a strong causal relationship between the explicitness of a teacher's instructional talk and student awareness of lesson content. Students of teachers trained to instruct students in the use of strategies as a means to resolve blockages in reading comprehension were more aware of what was being taught, when to use the cognitive strategies taught, and how to use them than

control students. However, researchers also noted that students of trained teachers did not make significantly greater gains on achievement measures than did students of teachers who were not trained (Roehler et al., 1985).

In the 1984-85 study of third graders, Roehler et al. (1987) again found that students of teachers in the trained group were rated significantly higher in overall awareness than students of teachers in the treated control group. They interpreted this to mean that students who received explicit explanations of strategy more accurately mediated instructional information presented during lessons than students who were taught by teachers using the traditional basal text approach. In contrast to the earlier results for fifth graders, however, students of trained teachers were found to gain significantly more on reading achievement tests than students of treated control teachers. More specifically, the experimental students gained more in the word study skills subtest than did the control students, although no significant difference was found for the reading comprehension subtest.

In summary, both studies found significant effects of training on student awareness. However, the studies differed with respect to the effect of the training on reading achievement: no significant effect was found for the fifth grade students in 1983; a significant effect was found for the third grade students in 1985.

Supplementary Analyses

Supplementary analyses were performed to clarify the grade and treatment condition relationship of the original data. A two-way ANOVA

was used to determine if the length of lesson, and therefore more opportunity to use motivational statements, was related to either grade or treatment condition. As seen in Table 4.1, the average length of a lesson was significantly longer for trained teachers ($\underline{d}$ = .61, $\underline{F}$ (1,41) = 4.192, $\underline{p}$ = .048); but there was no significant difference between grades ($\underline{d}$ = .40, $\underline{F}$ (1,41) = 1.805, $\underline{p}$ = .183).

Table 4.1

Analysis of Variance for Length of Lesson

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| MAIN EFFECTS | 86.804 | 2 | 43.402 | 2.999 | .062 |
| TRAINING | 60.672 | 1 | 60.672 | 4.192 | .048 |
| GRADE | 26.132 | 1 | 26.132 | 1.805 | .183 |
| 2-WAY INTERACTION TRAINING X GRADE | 2.461 | 1 | 2.461 | .170 | .682 |
| EXPLAINED | 89.265 | 3 | 29.755 | 2.056 | .122 |
| RESIDUAL | 549.995 | 38 | 14.474 | | |
| TOTAL | 639.260 | 41 | 15.592 | | |

Table 4.2 shows that trained teachers were better at explaining the mental processes during instruction than untrained teachers ($\underline{d}$ = 1.39 , $\underline{F}$ (1,41) = 60.321, $\underline{p}$ = .000), and third grade teachers were better at explaining mental processes than fifth grade teachers ($\underline{d}$ = .87 , $\underline{F}$ (1,41) = 23.757, $\underline{p}$ = .000).

Table 4.3 shows that training significantly increased student awareness ($\underline{d}$ = 1.09, $\underline{F}$ (1,41) = 9.132, $\underline{p}$ = .004), but third grade students did not significantly differ from fifth grade students in awareness ($\underline{d}$ = .36, $\underline{F}$ (1,41) = 1.805, $\underline{p}$ = .183).

Table 4.2

Analysis of Variance of Teachers' Explanation

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| MAIN EFFECTS | 911.407 | 2 | 455.704 | 42.039 | .000 |
| TRAINING | 653.884 | 1 | 653.884 | 60.321 | .000 |
| GRADE | 257.523 | 1 | 257.523 | 23.757 | .000 |
| 2-WAY INTERACTIONS | | | | | |
| TRAINING X GRADE | .078 | 1 | .078 | .007 | .933 |
| EXPLAINED | 911.485 | 3 | 303.828 | 28.028 | .000 |
| RESIDUAL | 411.920 | 38 | 10.840 | | |
| TOTAL | 1323.406 | 41 | 32.278 | | |

Table 4.3

Analysis of Variance of Students' Awareness

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| MAIN EFFECTS | 29.153 | 2 | 14.577 | 5.365 | .009 |
| TRAINING | 24.809 | 1 | 24.809 | 9.132 | .004 |
| GRADE | 4.344 | 1 | 4.344 | 1.599 | .214 |
| 2-WAY INTERACTION | | | | | |
| TRAINING X GRADE | .492 | 1 | .492 | .181 | .673 |
| EXPLAINED | 29.646 | 3 | 9.882 | 3.637 | .021 |
| RESIDUAL | 103.238 | 38 | 2.717 | | |
| TOTAL | 132.884 | 41 | 3.241 | | |

T-tests measured the difference between pre- and posttest scores of the achievement tests for the 1982-83 study and the 1984-85 study irregardless of the effect of training. Previous analyses had shown achievement scores of the students in the treatment group increased in comparison to the scores of the students in the control and treated control groups. However, no data were available to verify that students in both groups had made achievement gains. Table 4.4 and Table 4.5 show that third grade students and fifth grade students, irregardless of their treatment condition made significant increases

in their posttest achievement scores over their pretest achievement scores.

Table 4.4

Analysis of the Third Grade Pretest and Posttest Achievement Scores

| VARIABLE | MEAN | S.D | T VALUE | P VALUE |
|---|---|---|---|---|
| PRETEST | 550.451 | 34.579 | 6.69 | .000 |
| POSTTEST | 586.812 | 17.598 | | |

Table 4.5

Analysis of the Fifth Grade Pretest and Posttest Achievement Scores

| VARIABLE | MEAN | S.D | T VALUE | P VALUE |
|---|---|---|---|---|
| PRETEST | 590.971 | 22.170 | 6.61 | .000 |
| POSTTEST | 610.709 | 15.878 | | |

To summarize, trained teachers in both third and fifth grades taught longer lessons than untrained teachers. Trained teachers better explained mental processes to students than untrained teachers; third grade teachers explained better than fifth grade teachers. Nevertheless, both third and fifth grade students in the treatment groups showed increases in student awareness in comparison to third and fifth grade students in the control and treated control groups. There were no significant differences in awareness between grades. In addition, both third and fifth grade students made significant achievement gains on the posttest measure of reading achievement.

The analyses reviewed in this section demonstrated differences in the implementation of cognitive strategy instruction, achievement and awareness measures due to treatment condition and grade. In the next

section, descriptive and correlational analyses of the categories of motivational statements are reported.

## Descriptive Analyses of the Categories of Motivational Statements

Thirty motivational statements were grouped into five major categories. Two categories of motivational statements, "contingent on task performance" and "communicated expectations and predictions" were further subdivided. This section reports the results of analyses of measures of central tendency and variability and Pearson Product Moment correlations performed on the five major categories and the subcategories of motivational statements.

### Means and Standard Deviations of Motivational Statements

Tables 4.6 and 4.7 show the means and standard deviations of the motivational statements used by teachers in each lesson. In third grade, trained teachers used approximately twice the number of motivational statements than untrained teachers. In fifth grade, trained teachers used approximately five times the number of motivational statements that untrained teachers used. However, inferences based on mean differences may not provide an accurate picture especially given the differences in lesson length between trained and untrained teachers. For example, in looking at the statements in the contingency category, trained third grade teachers used approximately 1 2/3 times the number of statements the untrained third grade teachers used, while the trained fifth grade teachers used three times as many statements as the untrained fifth grade teachers.

Table 4.6

Means and Standard Deviations of Motivational Statements Used by Third Grade Teachers in Each Lesson

| MOTIVATIONAL | TRAINED | | UNTRAINED | |
|---|---|---|---|---|
| STATEMENTS | MEANS | S.D | MEANS | S.D |
| COMBINED | 20.717 | 7.856 | 10.314 | 4.783 |
| CONTINGENCY | 10.833 | 6.704 | 6.551 | 2.156 |
| REWARD | .633 | .375 | .117 | .176 |
| EVALUATION | 10.201 | 6.817 | 6.434 | 2.160 |
| ACHIEVE | 9.833 | 6.781 | 6.000 | 2.091 |
| EFFORT | .367 | .358 | .433 | .306 |
| GOAL | 2.049 | 1.442 | .400 | .438 |
| VALUE | 6.533 | 3.153 | 1.901 | 3.818 |
| EXPECTATION | .850 | .811 | .567 | .545 |
| NEGATIVE | .617 | .637 | .251 | .285 |
| POSITIVE | .233 | .264 | .317 | .404 |
| TIME | .449 | .508 | .717 | .644 |

Table 4.7

Means and Standard Deviations of Motivational Statements Used by Fifth Grade Teachers in Each Lesson

| MOTIVATIONAL | TRAINED | | UNTRAINED | |
|---|---|---|---|---|
| STATEMENTS | MEANS | S.D | MEANS | S.D |
| COMBINED | 15.241 | 5.265 | 3.841 | 3.545 |
| CONTINGENCY | 3.059 | 1.621 | 1.150 | 1.391 |
| REWARD | 1.059 | .658 | .318 | .370 |
| EVALUATION | 2.000 | 1.468 | .832 | 1.388 |
| ACHIEVE | 1.219 | 1.051 | .643 | 1.269 |
| EFFORT | .781 | .688 | .189 | .237 |
| GOAL | 4.595 | 2.313 | .568 | 1.111 |
| VALUE | 6.336 | 3.592 | 1.132 | 2.227 |
| EXPECTATION | .755 | .855 | .309 | .452 |
| NEGATIVE | .555 | .579 | .209 | .474 |
| POSITIVE | .200 | .297 | .100 | .116 |
| TIME | .495 | .446 | .682 | .689 |

Therefore, a logarithmic transformation based on the proportional difference in use of motivational statements may be more informative. Moreover, the logarithmic distribution has a statistical advantage in that it takes a variable which has a positively skewed distribution (as the motivational statements do), and makes it more nearly

symmetric. Furthermore, in the transformed metric, the data adequately meets the assumption of homogeneity of variance of the analysis of variance. In Tables 4.8 and 4.9 the means and standard deviations of the transformed variable are presented. The transformed

Table 4.8

Means and Standard Deviations of Motivational Statements Used by Third Grade Teachers in Each Lesson - Logarithmic Transformation

| MOTIVATIONAL | TRAINED | | UNTRAINED | |
|---|---|---|---|---|
| STATEMENTS | MEANS | S.D | MEANS | S.D |
| COMBINED | 3.023 | .348 | 2.343 | .436 |
| CONTINGENCY | 2.336 | .542 | 1.986 | .283 |
| REWARD | .469 | .214 | .100 | .147 |
| EVALUATION | 2.262 | .577 | 1.969 | .288 |
| ACHIEVE | 2.218 | .598 | 1.906 | .297 |
| EFFORT | .284 | .249 | .340 | .217 |
| GOAL | .986 | .570 | .297 | .290 |
| VALUE | 1.925 | .490 | .700 | .738 |
| EXPECTATION | .531 | .428 | .400 | .321 |
| NEGATIVE | .417 | .369 | .205 | .196 |
| POSITIVE | .191 | .204 | .238 | .277 |
| TIME | .331 | .277 | .477 | .375 |

metric is used in all subsequent analyses.

To summarize the results of these tables, the teachers' use of motivational statements are reported in rank order. The rankings can be seen in Table 4.10. Contingency and value statements were the two categories of motivational statements used most frequently by trained third grade teachers and untrained third and fifth grade teachers. Trained fifth grade teachers used more value and goal statements than any other category of motivational statements. Expectation and time statements were the categories of statements used least frequently by teachers.

Table 4.9

Means and Standard Deviations of Motivational Statements Used by Fifth Grade Teachers in Each Lesson - Logarithmic Transformation

| MOTIVATIONAL | TRAINED | | UNTRAINED | |
|---|---|---|---|---|
| STATEMENTS | MEANS | S.D | MEANS | S.D |
| COMBINED | 2.729 | .379 | 1.352 | .691 |
| CONTINGENCY | 1.294 | .542 | .626 | .518 |
| REWARD | .669 | .354 | .242 | .268 |
| EVALUATION | .979 | .537 | .449 | .519 |
| ACHIEVE | .679 | .538 | .356 | .481 |
| EFFORT | .507 | .367 | .159 | .181 |
| GOAL | 1.623 | .498 | .320 | .464 |
| VALUE | 1.854 | .600 | .522 | .593 |
| EXPECTATION | .477 | .415 | .231 | .269 |
| NEGATIVE | .387 | .336 | .144 | .286 |
| POSITIVE | .160 | .211 | .090 | .105 |
| TIME | .362 | .297 | .459 | .346 |

Table 4.10

Rank Order of Teachers' Use of Motivational Statements

| THIRD GRADE | | FIFTH GRADE | |
|---|---|---|---|
| TRAINED | UNTRAINED | TRAINED | UNTRAINED |
| CONTINGENCY | CONTINGENCY | VALUE | CONTINGENCY |
| VALUE | VALUE | GOAL | VALUE |
| GOAL | TIME | CONTINGENCY | TIME |
| EXPECTATION | EXPECTATION | EXPECTATION | GOAL |
| TIME | GOAL | TIME | EXPECTATION |

Correlational Data

The following correlational data supplement the analyses of variance (to be reported later in the chapter) that have been performed to determine the effects of cognitive strategy instruction and grade on teachers' use of motivational statements. As seen in Table 4.11, third grade teachers' use of all categories of

Table 4.11

Correlations between Training and Motivational Statements - Third Grade

| MOTIVATIONAL STATEMENT | COEFFICIENT | P VALUE |
|---|---|---|
| CONTINGENCY | .298 | .116 |
| REWARD | .717 | .000 |
| EVALUATION | .201 | .198 |
| ACHIEVEMENT | .189 | .212 |
| EFFORT | .042 | .430 |
| GOAL | .769 | .000 |
| VALUE | .788 | .000 |
| EXPECTATION | .214 | .183 |
| NEGATIVE | .333 | .076 |
| POSITIVE | -.008 | .486 |
| TIME | -.264 | .131 |

Table 4.12

Correlations between Training and Motivational Statements - Fifth Grade

| MOTIVATIONAL STATEMENT | COEFFICIENT | P VALUE |
|---|---|---|
| CONTINGENCY | .460 | .016 |
| REWARD | .435 | .021 |
| EVALUATION | .384 | .039 |
| ACHIEVEMENT | .185 | .206 |
| EFFORT | .579 | .002 |
| GOAL | .855 | .000 |
| VALUE | .799 | .000 |
| EXPECTATION | .380 | .040 |
| NEGATIVE | .429 | .023 |
| POSITIVE | .172 | .223 |
| TIME | -.356 | .052 |

motivational statements except positive expectations and communicated time limits correlated positively with training. Table 4.12 presents the correlations for fifth grade teachers' training ratings and use of motivational statements, and shows that all categories of teachers' motivational statements with the exception of "communicated time limits" correlated positively with fifth grade teachers' training ratings.

The next two analyses are correlations between student awareness and teachers' use of motivational statements. These correlations supplement the information provided by the analyses which determine the causes of student achievement. Table 4.13 shows the correlations between student awareness and motivational statements for the third grade students and Table 4.14 shows the correlations for the fifth grade students.

The correlations between the awareness of third grade students and teachers' use of motivational statements show that teachers who use reward, goal, evaluating for achievement statements and negative expectations have students with higher awareness. Students' awareness

Table 4.13

Correlations between Awareness and Motivational Statements - Third Grade

| MOTIVATIONAL STATEMENT | COEFFICIENT | P VALUE |
|---|---|---|
| CONTINGENCY | .248 | .146 |
| REWARD | .533 | .008 |
| EVALUATION | .207 | .190 |
| ACHIEVEMENT | .226 | .170 |
| EFFORT | -.276 | .119 |
| GOAL | .396 | .042 |
| VALUE | .258 | .136 |
| EXPECTATION | .115 | .314 |
| NEGATIVE | .214 | .183 |
| POSITIVE | -.004 | .493 |
| TIME | -.298 | .101 |

decreases when teachers use evaluating for effort statements and communicate time limits.

The fifth grade data showed more significant and stronger correlations between use of motivational statements and student

Table 4.14

Correlations between Awareness and Motivational Statements - Fifth Grade

| MOTIVATIONAL STATEMENT | COEFFICIENT | P VALUE |
|---|---|---|
| CONTINGENCY | .319 | .074 |
| REWARD | .236 | .146 |
| EVALUATION | .275 | .108 |
| ACHIEVEMENT | .030 | .447 |
| EFFORT | .501 | .009 |
| GOAL | .512 | .007 |
| VALUE | .489 | .011 |
| EXPECTATION | .434 | .022 |
| NEGATIVE | .512 | .007 |
| POSITIVE | .195 | .192 |
| TIME | -.208 | .177 |

awareness than did third grade data. Positive correlations exist between all categories of motivational statements except evaluating for achievement which is not correlated and communicated time limits which is negatively correlated with awareness.

In summary, contingency statements, especially reward statements, correlated positively with the part of third and fifth grade teachers' explanation ratings used in this study and student awareness. Goal and value statements showed strong positive correlations with training in third and fifth grades, and awareness in the fifth grade; the relationship was moderately strong with awareness in the third grade. Expectation statements were significantly correlated to fifth grade training and awareness; the relationships were not significant in the third grade. Statements of time limits were negatively correlated with training and awareness in both third and fifth grades.

Summary of the Descriptive Analyses

Contingency and value statements were the most frequently used statements by trained and untrained third and fifth grade teachers. Teachers' use of all categories of motivational statements, except time limits, was positively correlated with their ratings in cognitive strategy instruction. Goal and value statements were the most highly correlated with training, followed by contingency statements and communicated expectation. This pattern was the same for third and fifth grade teachers.

The correlation between student awareness and teachers' use of goal statements was the strongest positive correlation for both third and fifth grades. Communicated time limits were negatively correlated with student awareness in both third and fifth grades. Other relationships did not constitute a recognizable pattern.

The importance of these analyses will be discussed in a later chapter in light of the results of the data analyses to the three research questions that are reported in the next section.

## Data Analyses of the Three Research Questions

This section is divided into three parts; in each part the results of one of the research questions are reported.

### Question 1: The Effect of Grade and Cognitive Strategy Instruction on Teachers' Use of Motivational Statements

Two-way analyses of variance were used to determine the effect of grade and cognitive strategy instruction on teachers' use of motivational statements. A separate analysis was performed for each of the categories of motivational statements. The source tables for these

analyses can be found in Appendices G-K. Effect size (d) was also calculated.

"Contingent on performance" category. In the category of statements "contingent on performance", the trained teachers used significantly more contingency statements than did untrained teachers (d = .64, F (1,41) = 11.859, p = .001), and third grade teachers used more contingency statements than did fifth grade teachers (d = 1.47, F (1,41) = 63.789, p = .000). The grade effect size is especially large and significant.

Training and grade effects were significant in the two subcategories of the contingency category, "reward" statements and "evaluation" statements. Trained teachers used significantly more "reward" statements than did untrained teachers (d = 1.20, F (1,41) = 24.633, p = .000), and the grade effect favored the fifth grade teachers (d = -.54, F (1,41) = 4.527, p = .040).

In the subcategory "evaluation", trained teachers used more statements than did untrained teachers (d = .48, F (1,41) = 7.445, p = .010); third grade teachers made significantly more statements than did fifth grade teachers, (d = 1.60, F (1,41) = 83.822, p = .000). Of those evaluation statements, trained teachers used significantly more statements evaluating achievement (d = .34, F (1,41) = 4.374, p = .043) than did untrained teachers, while third grade teachers made significantly more statements evaluating achievement than did fifth grade teachers (d = 1.66, F (1,41) = 103.170, p = .000). In another subgroup of evaluation statements, evaluating for effort, there were no main effects. However, there was a significant interaction effect (d = -1.44,

$F$ (1,41) = 6.090, $p$ = .018), indicating that the effect of the training was more pronounced for fifth grade than for third grade teachers.

"Motives and long term goals" category. There were significant main effects and an interaction effect in this analysis of statements in the "motives and long term goals" category. Trained teachers used significantly more statements in the "motives and long term goals" category than did untrained teachers ($d$ = 1.29, $F$ (1,41) = 49.033, $p$ = .000). Fifth grade teachers used significantly more goal statements than did third grade teachers ($d$ = -.42, $F$ (1,41) = 5.225, $p$ = .028). There was also a significant interaction effect ($d$ = -.78, $F$ (1,41) = 4.509, p = .040) indicating the tendency of the training to increase use of goal statements was more pronounced for fifth grade teachers than for third grade teachers.

"Intrinsic value and meaning of task" category. Trained teachers used significantly more statements in the category "intrinsic value and meaning of tasks" than did the untrained teachers ($d$ = 1.46, $F$ (1,41) = 46.125, $p$ = .000). There was no significant difference by grade in the mean use of value statements.

"Communicated expectations and predictions" category. Neither training nor grade significantly influenced teachers' "communicated expectations and predictions". There were no significant differences between teachers in grades three or five or those trained or not trained in their use of positive expectations. However, trained teachers used significantly more negative expectation statements than untrained teacher ($d$ = .73, $F$ (1,41) = 5.905, $p$ = .020). Grade did not influence teachers' use of negative expectation statements.

"Communicated time limits" category. Neither grade nor training significantly influence teachers' use of "communication of time limits" statements.

Summary of results for Question 1. As Table 4.15 shows, in general, teachers who were trained to instruct their students in the use of cognitive strategies to resolve problems in reading used more motivational statements than did teachers who used the basal text and teacher's guide. Third grade teachers generally used more motivational statements than fifth grade teachers. These results are substantiated

Table 4.15

The Effect of Training and Grade
on Teachers' Use of Motivational Statements

| MOTIVATIONAL STATEMENTS | TRAINING EFFECT SIZE | GRADE EFFECT SIZE | INTERACTION EFFECT SIZE |
|---|---|---|---|
| CONTINGENCY | .64*** | 1.47*** | NS |
| REWARD | 1.20*** | - .54* | NS |
| EVALUATION | .48** | 1.60*** | NS |
| ACHIEVEMENT | .34* | 1.66*** | NS |
| EFFORT | NS | NS | -1.44* |
| GOAL | 1.29*** | - .42* | - .78* |
| VALUE | 1.46*** | NS | NS |
| EXPECTATION | NS | NS | NS |
| POSITIVE | NS | NS | NS |
| NEGATIVE | .73* | NS | NS |
| TIME LIMITS | NS | NS | NS |

* $p < .05$
** $p < .01$
*** $p < .001$
NS = not significant

by the supplemental analyses which showed that trained teachers were more explicit than untrained teachers, and third grade teachers were rated as better explainers of mental processes than fifth grade teachers.

Summarizing the results of the analyses of specific categories of statements, we see that "reward" and "evaluating for achievement" statements in the contingency category were used more by trained teachers than untrained teachers. Statements in the goal, value and negative expectation categories were also used more by trained than untrained teachers. Grade was a significant determinant of teachers' use of three categories of motivational statements. Fifth grade teachers used more statements in the evaluating for effort and goal categories of statements than third grade students. Third grade teachers used more evaluating for achievement statements than fifth grade teachers.

Question 2: The Effect of Cognitive Strategy Instruction and Motivational Statements on Third Grade Students' Reading Achievement

The process of answering the second research question entailed using a three-step analysis of the relationship of cognitive strategy instruction and motivational statements to student achievement. The three-step analysis examined the effect on students' reading achievement scores of training while controlling for different combinations of covariates. In the first step the covariate was prior knowledge (pretest); in the second step, pretest and motivational statements were covariates; and in the third step, pretest, motivational statements, and student awareness were covariates.

Step 1: ANCOVA with pretest as covariate. The first step in the analysis to determine the effect of cognitive strategy instruction on student achievement was to examine the effect of training on student achievement when prior knowledge (pretest) is controlled. The original 1984-85 study used an ANCOVA (pretest as covariate, posttest

as dependent variable), to test the effect of training on third grade students' SAT achievement score. Table 4.16 replicates the results of the ANCOVA on the 1984-85 study for third graders. Students in the trained group gained significantly more in achievement test scores than did students in untrained group (d = 1.00,(F (1,19) = 8.251, p = .011).

Table 4.16

Analysis of Covariance of Third Grade Achievement Measure

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| COVARIATE: | | | | | |
| PRETEST | 3324.637 | 1 | 3324.637 | 32.801 | .000 |
| MAIN EFFECT: | | | | | |
| TRAINING | 836.328 | 1 | 836.328 | 8.251 | .011 |
| EXPLAINED | 4160.965 | 2 | 2080.482 | 20.526 | .000 |
| RESIDUAL | 1723.104 | 17 | 101.359 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

Step 2: ANCOVA with pretest and motivational statements as covariates. The second step in determining the causes of improved student achievement scores is to examine the effect of training, while accounting for prior knowledge and the effect of motivational statements. Separate ANCOVAs were performed with each of the five main categories of motivational statements and subcategories. The ANCOVA tables for the five main categories of motivational statements can be found in Appendix L. Appendix M shows the ANCOVA tables for the subcategory of "contingent on performance" statements.

Significant training effects occurred when contingency statements (F (1,19) = 7.767, p = .013), expectancy statements (F (1,19) = 7.313, p = .016), and time limits were controlled

($F$ (1,19) = 7.759, $p$ = .013). The three categories of motivational statements were not significant covariates.

When the component subcategories of the contingency category, (reward and evaluation statements) were used as covariates, reward was significant as a covariate ($F$ (1,19) = 9.151, $p$ = .008), but training lost its significance ($F$ (1,19) = .902, $p$ = .356), indicating that reward statements seemed to account for the training effect which resulted in increases in student achievement. When all the evaluation statements were grouped together as a subcategory of the contingency category and used in an ANCOVA as a covariate, the "evaluation" subcategory was not significant and did not influence student achievement. The "evaluation" subcategory is comprised of evaluating for achievement and evaluating for effort. Evaluating for achievement was not significant when used as a covariate ($F$ (1,19) = .264, $p$ = .615). However, when evaluating for effort was used as a covariate, both the covariate and training were significant (effort: $F$ = 4.165, $p$ = .058; training: $F$ = 8.500, $p$ = .010). Moreover, the regression coefficient of the covariate was negative (r = -19.864). This can be interpreted to mean evaluating for effort statements have a negative effect on achievement controlling for training.

When teachers used goal statements and value statements, the two categories of statements accounted for the difference in achievement scores (goal: $F$ (1,19) = 7.170, $p$ = .017; value: $F$ (1,19) = 8.170, $p$ = .011). These results seem to show that achievement differences between students taught by untrained or trained teachers were the result of the teachers' use of goal and value statements. Pretests were significant in every analysis.

Step 3: ANCOVA with pretest, motivational statements and awareness as covariates. The third step to determine predictors of achievement was to examine, by use of ANCOVAs, the relationships between the pretest as a measure of prior knowledge, cognitive strategy instruction, motivational statements, and student awareness. Student awareness was included at this stage because it is associated with achievement, training and motivational statements. The source tables for the analyses of the major categories of motivational statements can be found in Appendix N. Appendix O has the source tables for the subcategories of the contingent on performance category.

An analysis of the relationships between cognitive strategy instruction, motivational statements and student awareness affords the examination of different combinations of variables which could be responsible for increasing achievement. For example, either or motivational statements could work through awareness to increase achievement, or, perhaps, or motivation alone could cause increases in achievement.

Four covariates, namely contingency statements, expectations, time limits and awareness, were not significant. The effect of training was significant when awareness and the pretest were covariates with contingency statements, ($F$ (1,19) = 4.641, $p$ = .048), and approached significance when communicated expectations, awareness and the pretest were controlled ($F$ (1,19) = 4.355, $p$ = .061), and when time limit statements, awareness and the pretest were controlled ($F$ (1,19) = 4.355, $p$ = .54). These results indicate that training alone influenced student achievement.

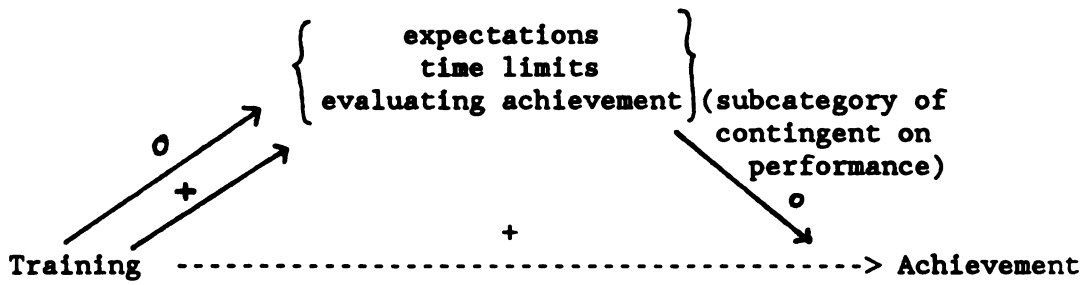
When the subcategories of "contingency" statements were used as covariates with awareness as a covariate, awareness was not significant. The covariate "reward" statements was significant ($F$ (1,19, = 5.165, $p$ = .038), but training was not significant ($F$ (1,19) = .777, $p$ = .392). Evaluation statements was not a significant covariate ($F$ (1,19) = .001, $p$ = .977). However, training had a significant effect when evaluation statements were controlled ($F$ (1,19) = 4.757, $p$ = .046).

An examination of the influence of training, student awareness and the subgroups of the evaluation statements subcategory on student achievement showed that training was significant ($F$ (1,19) = 4.569, $p$ = .049) when evaluation for achievement was a covariate ($F$ (1,19) = .008, $p$ = .103), and, in contrast to the earlier findings, training was significant when evaluation for effort was a covariate ($F$ (1,19) = 5.608, $p$ = .032). Evaluation for effort no longer was significant ($F$ (1,19) = 2.424, $p$ = .140). Student awareness was not significant as a covariate. These findings can be interpreted, within the context of the contingency category, as follows: Reward statements had an effect, but combined with evaluation statements, the effect was wiped out, and training was left as the variable responsible for increased student achievement.

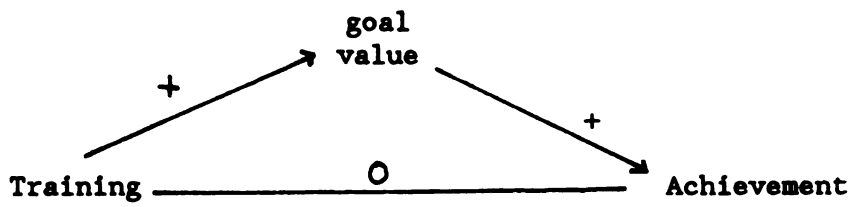
When goal and value statements were used as covariates, they proved to be significant, while training and awareness were not (goal statements: ($F$ (1,19) = 4.212, $p$ = .058); value statements: ($F$ (1,19) = 6.117, $p$ = .026). This finding indicates that the effect of training may work entirely through goal and value statements.

Summary of results for Question 2. The results of the analyses to find the effect of cognitive strategy instruction and motivational statements on third grade students' reading achievement can be summarized in the following statements.

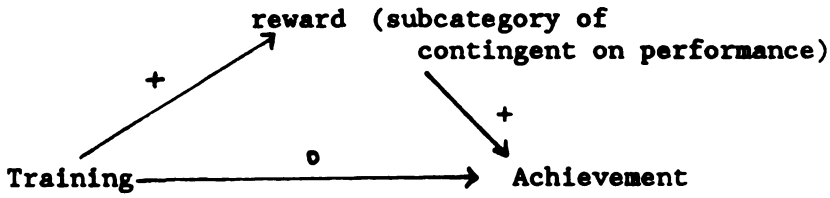
1. Cognitive strategy instruction increases achievement, has a positive effect on teachers' use of "evaluating achievement" statements, but does not have an effect on "communicated expectations" and "communicated time limits". The training does not work through "communicated expectations", "communicated time limits" and "evaluating achievement" statements to increase achievement.



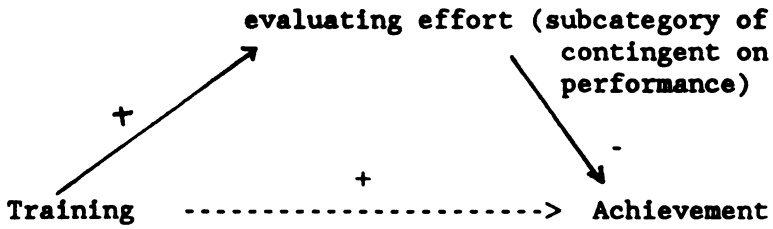

2. Training increases teachers' use of "motives and long term goals" statements and "intrinsic value and meaning of task" statements. Use of these statements with cognitive strategy instruction results in an increase in student achievement. This suggests that the effect of training may work entirely through these types of statements.



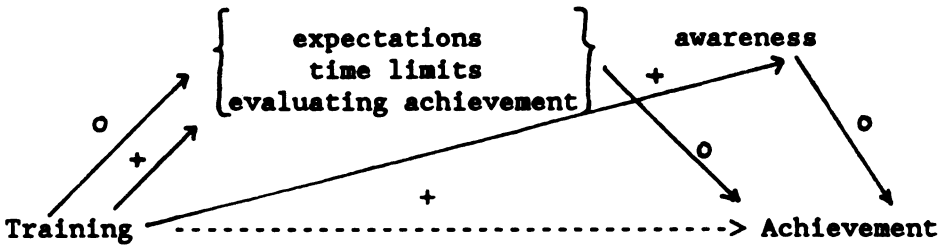
3. Training results in increased use of "reward" statements, a subcategory of "contingent on task performance" statements. Trained teachers' use of reward statements is one of means through which teachers increased student achievement.

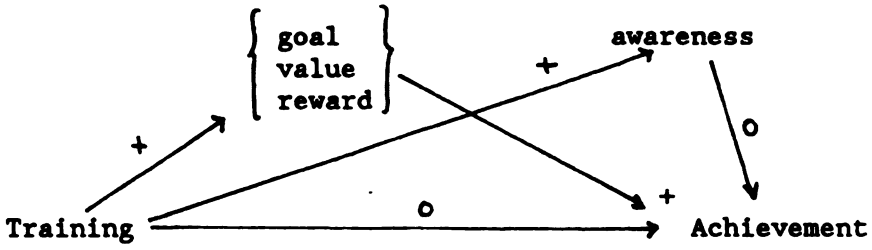


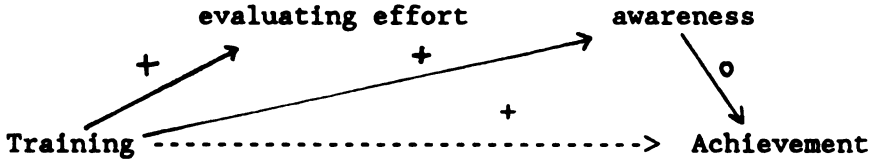

4. Training increases teachers use of "evaluating effort" statements, a subcategory of "contingent on task performance" statements. "Evaluating effort" statements diminish the positive effect of training on achievement.




5. Student awareness did not change the relationships shown in the first three statements of relationships described above, and erased the negative effect of evaluating effort. This can be interpreted to mean that students' awareness of lesson content was not a mediating variable through which the treatment operated to increase student achievement. However, the treatment provided a corrective mechanism for the negative effect of evaluating effort statements in the increased student awareness.




Question 3: The Effect of Cognitive Strategy Instruction and Motivational Statements on Fifth Grade Students' Reading Achievement

The presentation of the results of the analyses of this question follow the same three-step analysis format as that of second question. First, I discuss the results of ANCOVA using only the pretest as covariate. Then, I examine the results of the ANCOVAs with pretest and motivational statements as covariates, and the results of the ANCOVAs

with the pretest, motivational statements and student awareness as covariates. I conclude with a summary statement.

Step 1: ANCOVA with pretest as covariate. The SAT was not used as a dependent variable in the 1982-83 study. Therefore, it was necessary to analyze the 1982-83 SAT achievement data. The same procedure employed in the 1984-85 third grade study (ANCOVA) was used with the 1982-83 fifth grade data.

The ANCOVA performed on the 1982-83 SAT scores showed no difference between students of trained teachers and those of untrained teachers ($d = -.16$, $F(1,21) = .715$, $p = .408$). (This, in spite of the fact that there were significant differences between pretest and posttest scores.) Table 4.16 reports the ANCOVA source table for the fifth grade. Even though there were no effects, the next two series of analyses are still reported.

Step 2: ANCOVA with pretest and motivational statements as covariates. The ANCOVA tables for the five main categories of motivational statements are in Appendix P. Appendix Q presents the ANCOVA tables for the subcategories of the "contingent on performance" category. There were no significant training effects, nor were the motivational statements included as covariates significant. However, the contingency statement category did approach significance ($F(1,21) = 3.475$, $p = .079$), with a negative regression coefficient ($r = -6.475$), indicating that the more teachers used contingency statements, the less students would achieve. The subgroup of evaluating achievement statements under the contingency category, appears to account for negative relationship of contingency statements

and achievement. Evaluating achievement statements approached significance ($F$ (1,21) = 3.344, $p$ = .084), and also had a negative regression coefficient (r = -7.660). Pretest was always a significant covariate.

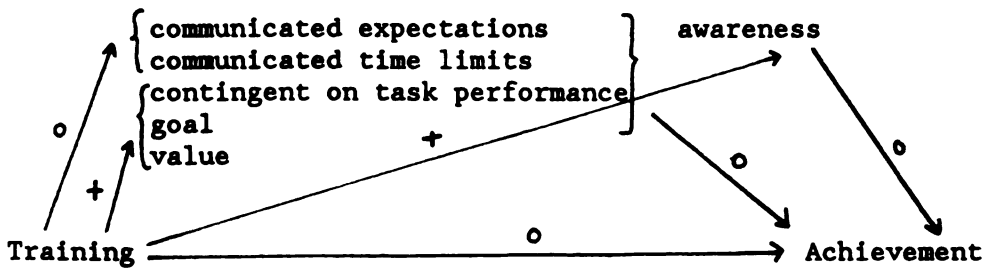
Table 4.17

Analysis of Covariance of Fifth Grade Achievement Measure

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| COVARIATE: | | | | | |
| PRETEST | 3198.975 | 1 | 3198.975 | 30.097 | .000 |
| MAIN EFFECT: | | | | | |
| TRAINING | 75.979 | 1 | 75.979 | .715 | .408 |
| EXPLAINED | 3274.954 | 2 | 1637.477 | 15.406 | .000 |
| RESIDUAL | 2019.459 | 19 | 106.287 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

Step 3: ANCOVA with pretest, motivational statements and awareness as covariates. Appendix R shows the ANCOVA tables for the five main categories of motivational statements. Neither motivational statements nor student awareness were significant or even approached significance. Only the pretest was a significant covariate.

Summary of the results for Question 3. Neither training nor motivational statements influenced students' achievement scores.




Statements evaluating achievement seemed to have a negative, but not

statistically significant effect on students' achievement. Training did not work through awareness to increase achievement.

## Summary of the Results of the Three Research Questions

The results of the analyses to the first question show that, with few exceptions, teachers who used cognitive strategy instruction also used more motivational statements than teachers who use the basal text and teacher's guide.

The results of the analyses to second question show that in the third grade, cognitive strategy instruction worked through goal, value and reward statements to increase achievement. On the other hand, trained teachers' use evaluating achievement statements, expectancy statements or communicated time limits was not related to student achievement. The training worked despite the negative effect of evaluating effort statements because of the influence of student awareness. However, student awareness did not account for a significant portion of the total variance when evaluating achievement statements, expectancy statements, communicated time limits, goal and value statements were controlled. Therefore, it appears that under those conditions it may not be linked to achievement.

The results of the analyses to the third question are less varied. In the fifth grade, neither cognitive strategy instruction, nor students' awareness of lesson content, nor teachers' use of motivational statements predicted students' achievement scores.

The interrelationships of variables in these analyses make understanding of the results difficult. Attempts to explain these findings and the conclusions one can draw from them follow in the next chapter.

# CHAPTER V

# DISCUSSION

In the first four chapters of this report I discussed the theoretical and empirical backgrounds of this study, the design and procedures, and the results of the analyses. In this chapter I summarize the background and limitations of the study, and then review the results and discuss the meaning of the findings. Finally, I conclude with a discussion of the implications of this research for researchers and practitioners.

## Summary of the Study

Underachieving, disinterested or unengaged students are among those students who lack the skill and will to succeed. A seven year old may be disengaged, underachieving and unmotivated for reasons that are different than those of a ten or eleven year old because motivation and cognition are age-linked. Teachers and psychologists are faced with the problem of how to help these students of different ages who attend school but do not participate in the learning process become effective learners.

One approach to helping students become effective learners is to view the role of the teacher and psychologist as that of empowering agent: a person who transfers knowledge and skills to students and increases their intent to learn so that they will be self-reliant and self-regulated learners. The empowering agent motivates and instructs

in ways that increase the students ability for independent activity. The integration of motivational strategies with instructional method reinforces the volitional and self-regulating goals of instruction.

Researchers, teachers and psychologists who view the role of teacher as divided into that of instructor and that of motivator, rather than as an empowering agent, lose the strength of an integrated approach. The effect of instruction alone or motivational strategies alone on students' achievement and intent to learn is, if not diminished, at least mitigated by not integrating teachers' efforts in both domains. For example, students may be aware of how and when to apply strategies but this knowledge may not always increase achievement. On the other hand, students who keep trying to answer a mathematics problem possess an internal locus of control, but their effort attribution does not affect their actual competence.

Thus, practitioners who view themselves as empowering agents are searching for the combination of motivational and instructional strategies that work best to help students become effective learners, to increase student achievement and to enable students to actively engage in the process of learning. In order to evaluate the best methods for increasing self-regulation and intent to learn, teachers and psychologists need theoretical knowledge of how instruction and motivation work, and practical knowledge of how motivational strategies and instructional method interrelate, how they affect achievement, and how the effects of motivational and instructional strategies differ for different grades. Practitioners can be taught the theoretical assumptions that enable students to independently engage in learning such as teachers who teach skills, provide models

of strategic thinking, and help students understand the value of a lesson transfer control of learning to students. Practical knowledge, on the other hand, requires first hand experiences in the classroom or the experiences of others to determine what works best to enable students to become effective learners.

Previous research is limited in providing the needed information based on the experience of practitioners. In fact, research in motivational strategies and instructional strategies raises questions, among them are questions about the interrelationship of instruction and motivation and the possible developmental qualities of instructional and motivational strategies.

The overall goal of this study is to provide psychologists and teachers practical knowledge by discovering which instructional or motivational method or combinations of methods works best to help third and fifth grade low-ability readers develop the "skill and will" to be effective learners. The study has three specific purposes: (1) to determine if teachers' use of motivational statements is related to instructional method and grade; (2) to determine if the effect on reading achievement differs with teachers' use of instructional and motivational strategies; and (3) to determine if the effect on achievement of teachers' motivational and instructional strategies differs between third and fifth grades. The three research questions addressed in this study are:

1) What is the effect of grade and cognitive strategy instruction on teachers' use of motivational statements?
2) How do cognitive strategy instruction and motivational statements affect third grade students' reading achievement?

3) How do cognitive strategy instruction and motivational statements affect fifth grade students' reading achievement?

## Limitations of the study

There are two limitations to this study. First, inasmuch as this study is a reanalysis of data from earlier studies, there are no data with which I can verify teachers' motivational intentions and their effects on student motivation. Second, the findings of this study are limited in the degree of generalizability by the grades and ability levels of the subjects, the subject matter, and the particular training in cognitive strategy instruction teachers received.

## Review of the Results

In this section I summarize the results of the three questions addressed in the study, beginning with a review of the results of Question 1, and continuing with a review of the combined results of Questions 2 and 3.

### Question 1: The Relationship between Cognitive Strategy Instruction, Grade and Motivational Statements

The results of the analyses for Question 1 showed that, generally, training and grade had an effect on teachers' use of motivational statements. More specifically, trained teachers used more statements in the goal and value categories, in the evaluating achievement, evaluating effort and reward subcategories of the contingent on task performance category, and negative expectations in the communicated expectations category than teachers who did not receive training. The training effect approached significance in teachers' use of evaluating effort statements. Third grade teachers

used more evaluating achievement statements than fifth grade teachers. On the other hand, fifth grade teachers used more reward statements and goal statements. A significant interaction effect showed training more pronounced for fifth grade teachers' use of evaluating effort statements and goal statements. Neither training nor grade had a significant effect on teachers' use of positive expectation or time limit categories of motivational statements.

Questions 2 and 3: The Effect of Cognitive Strategy Instruction and Motivational Statements on Third and Fifth Grade Students' Reading Achievement

Generally, cognitive strategy instruction worked through some categories of motivational statements to increase achievement, while other categories of motivational statements were not linked to achievement. Specifically, we see that in third grade classrooms after controlling for "long term motives and goal" statements, "intrinsic value and meaning of task" statements and reward statements, there was no difference between students in the trained or untrained groups. These results show that training had the added effect of increasing use of three categories of motivational statements, and that these three categories of statements were important mechanisms for increasing achievement. However, the use of "evaluating achievement" statements, "communicated time limits", and "communicated negative expectations" did not themselves influence students' achievement or the positive effect of cognitive strategy instruction.

Student awareness was not a significant mediating variable through which cognitive strategy instruction worked to increase achievement when motivational statements were used as covariates. The

pretest was always a significant predictor of student achievement.

Evaluating effort statements had a negative effect on student achievement. However, student awareness of the lesson content which was an outcome of the training was able to erase the negative effect of evaluating effort statements. Thus, results of training had a bigger positive effect on student achievement than the interference due to evaluating effort statements.

In the fifth grade, students achievement scores improved from the their pretest achievement scores, but the improvement could not be attributed to training, awareness or motivational statements.

## Discussion of the Results

In this section, I discuss the results of the three research questions in two parts, a discussion of the results of Question 1, and a discussion of the results of Questions 2 and 3. I conclude the discussion with a proposal for a framework that would aid in understanding the results.

### Question 1:

This discussion centers on the effects of training and grade on teachers' use of motivational statements. In general, teachers' use of some categories of motivational statements is explainable in light of the training in cognitive strategy instruction and the age of the students taught. Teachers' use of the other categories of statements is not as clearly linked.

The training effect in teachers' use of goal statements may be related to one of the characteristics of cognitive strategy instruction, situational knowledge. Situational knowledge in cognitive strategy instruction refers to awareness of and recognition when to

use a strategy. Goal statements are associated with usefulness, and might be the motivational strategy related to situational knowledge. For example,

> When you don't know what a word means, or you don't know how to use a word (because) there's more than one meaning, you say, "Goodness, what does that mean?" Then you have to use context clues.

Greater use of evaluating effort statements and value statements by trained teachers is also theoretically consistent with cognitive strategy instruction. These statements focus on internal, self-regulation mechanisms; teachers who provide skills and cognitive control mechanisms for learning are also concerned with self-regulation. In an example of a teacher using an evaluating effort statement a teacher might say, "You've got to stop playing around and start thinking". When using a value statement, the teacher might show the value of what is presently being learned by relating the present lesson to previous knowledge. For example,

> Remember we were talking Friday, we weren't using brand new words that we never heard of before, but you were using words that we knew, but they didn't make sense where they were, right? They were used in a different way. So that is what we are going to do today.

The training, therefore, seems to have the effect of increasing teachers' motivational efforts to move students to self-reliance and self-control, a goal of cognitive strategy instruction.

However, trained teachers used other-regulation statements like those under the consequences contingent on task performance category. According to Ryan, Connell and Deci (1983), other-regulation

statements can enhance intrinsic motivation when they provide information about the students' efficacy in the context of their choices and autonomy. On the other hand, other-regulation statements, such as reward statements, can be counterproductive to developing independent learners when they are controlling. Reward statements like this one that a teacher said after a correct response, "Now you can choose where to sit because you're so smart", is an example of the controlling kind of other-regulation statements teachers used. The other-regulation statements found, categorized and coded in the "consequences contingent on task behavior" category were all of the controlling type, thus possibly undermining intrinsic motivation and countering other goals of cognitive strategy instruction.

The explanation of why trained teachers use the other-regulation statements like reward statements, evaluating achievement and negative expectation statements is speculative. Trained teachers' use of these statements might be reflective of the teachers' anxiety about their own efficacy when implementing the cognitive strategy instruction. Teachers have been found to have difficulties implementing strategies not consistent with their previous experiences (Berman, McLaughlin, Bass, Pauly & Zellman, 1977; Brophy & Merrick, 1987). Providing rewards may be a means of trying to increase a desired student behavior and to insure against student failure. Evaluating students' achievement provides information to teachers about the relative success or failure of their efforts, thus influencing their sense of competence. Teachers may attribute students' failures to the teachers' lack of ability to implement the training. Making statements of negative expectation like "that was kind of hard; this may be

difficult", or "you may not do well", may be a means of projecting the teachers' own fears that they are having a difficult time with the instructional method. (See Ashton, 1985 for a discussion of teacher's sense of efficacy.)

In short, teachers may be using what appears as other-regulation motivational statements on the surface, for their own personal needs. Nevertheless, the statements are still processed by students and seen by students as reflective of the students' behavior, not the teachers' concerns. (These inferences about students and teachers thoughts are examples of one of the limitations of this study: I am not able to check what teachers were really thinking at the time they made these statements.)

The grade teachers taught also influenced the kinds of motivational statements they used. There is little research to support why teachers of one grade use more statements of a certain kind than teachers of another grade. Therefore, most of this discussion is speculative.

Third grade teachers used more evaluating achievement statements like, "Sure, that's a good clue, parking your car, good for you!", than fifth grade teachers. Perhaps third grade teachers use more evaluating achievement comments than fifth grade teachers because they are interested in providing information about mastery. Students in the early grades need information to help them judge the quality of their performance (Harter, 1981). In addition, it is known (Stipek, 1984) that older children attribute low ability to individuals who were praised after success, but younger students perceive high ability as success on a task. Therefore, the third grade teachers may be

signalling children that they have high ability by making achievement statements like "good answer, that really described the character". Finally, third grade students' achievement may actually be reinforced by the achievement evaluations. Brophy (1979) reported that "it is only with low SES/low ability students in the early grades that praise seems to have genuine reinforcing effects on student learning" (p. 23).

In contrast to why third grade teachers used more evaluating achievement statements than fifth grade teachers, fifth grade teachers may have used less statements because older children are better able to rely on their own judgments of the quality of performance (Harter, 1981).

Fifth grade teachers used more evaluating effort statements than third grade teachers. By the fifth grade, students perceive ability as a capacity, and effort expended as a demonstration of low ability (Stipek, 1984). Fifth grade students are more aware that their placement in their reading group indicates low ability (Stipek, 1988). Therefore, the fifth grade teachers who evaluated effort ran the risk of signalling students they have low ability or confirming already held beliefs of their low ability.

Fifth grade teachers also used more reward statements than third grade teachers. These other-regulating statements were also used more frequently by trained teachers, and could be explained as compensation for the trained teachers' weak sense of efficacy. However, teachers' use of reward statements may also be interpreted as an example of differential behavior toward students about whom they have high- or low- expectations for success (Stipek, 1988). Like the evaluating

effort statements, fifth grade teachers' use of reward statements may be related to lowered teachers' expectations about students' ability. It seems that in third grade, teachers did not act according to expectations of ability because of group placement, but by fifth grade, teachers' using motivational statements were influenced by preconceived notions of students' ability.

The interaction effect of training and grade for evaluating effort statements and goal statements means that training in cognitive strategy instruction resulted in greater use of evaluating effort statements and goal statements for fifth grade teachers than third grade teachers. These relationship may be interpreted to mean that fifth grade teachers who tried harder to implement cognitive strategy instruction, also tried to find the means to increase students engagement and use of the strategies. The interaction effect is consistent with the speculation that fifth grade teachers communicated their lowered expectations of students' ability.

In summary, teachers' use of evaluating effort, goal and value statements is consistent with what the trained teachers learned in cognitive strategy instruction training and complements a goal of cognitive strategy instruction to increase an internal locus of control and self-regulation. Trained teachers use of reward, evaluating achievement, and negative expectation may be the expression of defensiveness at a lack of efficacy in implementing the treatment. Third grade teachers used more evaluating achievement statements than fifth grade teachers because third grade students seem to respond to information about mastery and to positive reinforcement whereas fifth grade students generally do not. However, fifth grade teachers used

more goal, reward and evaluating effort statements that third grade teachers perhaps because they reacting to preconceived notions of their students' low ability.

Questions 2 and 3:

The focus of this discussion is to explain how motivational strategies and cognitive strategy instruction affected student achievement. Generally, it was found that when teachers implemented the training in cognitive strategy instruction they naturally used some motivational statements which had the effect of increasing student achievement. However, looking at the results, one can wonder why all the categories of motivational statements did not have a positive affect on student achievement. Specifically, one may ask: Why didn't communicated expectations, communicated time limits and evaluation of achievement statements effect third or fifth grade students' achievement?

There are two ways to approach the discussion of this question. First, is to look at the relationship between the motivational statements and training. The second approach is to look at the possible effect the three kinds of motivational statements may have had on students.

Looking at the relationship between communicated expectations and communicated time limits and training, one sees that there was no difference in the use of these categories of motivational statements by trained or untrained teachers. This fact might account for training not working through expectations and time limits to increase achievement. However, teachers' use of evaluating achievement statements did increase when teachers' were trained. Therefore, an

alternative explanation is needed.

The following explanation of the lack of effect of communicated expectations, evaluating achievement statements and communicated time limits is speculative. It is based on theories of motivation and what is known about age-related differences in motivation.

Theoretically, teachers' expectations and evaluating achievement statements affect students' attributions (Stipek, 1988). Teachers used more negative expectation statements than positive expectation statements, and therefore, one would expect a negative effect on students' achievement. Thus, one can speculate that the limited influence on student achievement of the three types of motivational statements used here can be explained in terms of the how expectations and evaluating achievement statements were mediated by third and fifth graders.

If third grade students were interpreting the evaluating for achievement statements as attributions to high ability, and were reinforced for their achievement, evaluating for achievement statements might counteract the effect of negative expectations. The result of this double message is, perhaps, that third grade students discounted both the messages sent by their teachers. In fact, this supposition might be true given that neither type of statement had an effect on student achievement. Furthermore, students may have discounted the messages sent because they understood that negative expectation statements and evaluation of achievement were statements that resulted from the teachers' own fear of failure and need for feedback as discussed above.

For fifth graders, the negative expectation statements may have

indicated low ability, and this inference by fifth graders coupled with fewer evaluation of achievement statements than the third grade teachers made, may have had a detrimental affect on fifth grade students motivation.

Statements in the "communicated time limits" category are not expressions of teachers' expectations, nor are they values teachers might attach to the value of learning or performing. Nevertheless, they are motivational in terms of getting the student to become engaged on task. One can speculate that the motivating mechanism of this category of statements is as an additional piece of information with which students' can calculate their expectations for success. Thus, a statement indicating the lesson is coming to a close has a neutral valence. However, if a student desires to succeed, and believes that through increased effort he can get more correct answers, then the communicated time limits might encourage the student to push on at a faster rate. In contrast, the student who does not attribute success to effort, or sees effort as a sign of low ability, may just give up at the teachers' announcement. The problem in working faster to complete work is that the outcome may have a greater number of errors. Thus, communicated time limit statements may have an inherent limitation to their benefits as motivational strategies.

In short, when negative expectation statements, evaluation of achievement statements, and communicated time limits statements were used by trained teachers, they did not have a significant influence on increases in student achievement. When teachers used these three categories of motivational statements, which may have influenced students' attributions for success or failure, they may have been

sending negative messages about ability to succeed to fifth grade students and mixed messages to third grade students. The teachers' motivational messages did influence student achievement.

A second question one might raise is: Why were the categories of intrinsic value and long term goal statements mechanisms by which cognitive strategy instruction increased third grade students' achievement? Training increased teachers' use of goal and value statements. Therefore, one might expect that goal and value statements would be a positive mechanism through which training can increase achievement. However, there is further theoretical substantiation for this finding.

The results discussed in this question are theoretically consistent with a conception of instruction as a process of enabling students to be effective learners. In the attempt to provide the motivational and instructional strategies students might need to independently engage in learning, one might regard cognitive strategy instruction as a method to increase students' control over their learning and increase their sense of competence. One might also reason that goal and value statements enhance self-regulation by focusing on the personal value of the task. Thus, these instructional and motivational strategies represent the teachers' tools for creating and sustaining "skill and will", and support the view that teachers need to use both skill strategies and will strategies to increase achievement and probably, to empower students.

The fifth grade results regarding the use of intrinsic value and long term goal statements are different from the results of the third grade, leading one to question: Why did neither cognitive strategy

instruction, nor motivational statements result in increased fifth grade student achievement? One possible explanation of these results is that intrinsic value and long term goal statements are necessary, but not sufficient to increase student achievement. It may have been the case that for intrinsic value and long term goal statements to be effective, there has to be a minimal level of effectiveness of cognitive strategy instruction to increase the experimental group's achievement over the control group's achievement. In fact, third grade teachers used cognitive strategy instruction better than fifth grade teachers.

The results of this study raise a fourth question. Why were teachers' use of reward statements predictive of achievement in third grade and not in fifth grade? As we have discussed with goal and value statement, the fact that train increased teachers' use of reward statements would lead one to expect that training would work through reward statements to increase achievement. That was, in fact, the case for third grade students but did not occur for fifth grade students.

Drawing on the praise literature (see Brophy, 1979) for a review), one can conclude that third grade students in low ability reading groups would be more suited to being reinforced by reward statements, thereby explaining why reward statements of third grade teachers resulted in increased student achievement. Also drawing on the praise literature (Brophy, 1979), one might explain fifth grade students lack of response to reward statements as due to fifth grade teachers' overuse of reward statements. This explanation is consistent with research findings indicating that the overuse of praise may result in reduced motivation (Brophy, 1979). In the case of fifth

grade teachers using reward statements, there may be an optimal amount of reward statements that results in achievement. Beyond that optimal level, teachers' efforts are ineffective. Fifth grade teachers used between one and half to two times as many reward statements as third grade teachers. Perhaps fifth grade teachers overused reward statements, thus undermining their own efforts to encourage students' behavior.

A fifth question can be asked about the negative effect of evaluating effort statements on third grade students' achievement. Why did cognitive strategy instruction increase third grade students' achievement despite the evaluating effort statements? This question may be answered in two parts. The first part of the answer looks at the effect of evaluating effort statements. The negative effect of evaluating effort statements is counterintuitive to enabling students to become effective learners. Effort evaluations enhance self-regulation, thus leading one to believe that they would increase achievement. However, older students view effort expenditure as a sign of low ability. Thus, effort evaluation may have a negative effect even though attributions to effort give students a greater sense of control over their learning. The findings reported here seem to indicate that third grade students responded to teachers' evaluation of effort as older students do, that is as an indication of low ability.

The second part of the answer explains how the introduction of student awareness into the analysis erased the negative effect of evaluating effort statements on student achievement. Although not a significant covariate in this analysis, student awareness was shown to

be a positive outcome of training in the original TEP data analysis. One can speculate that students who had self-awareness of their knowledge of lesson content used the self-knowledge, rather than teacher information about effort as the basis for continuing effort. Although speculative, this reasoning seems to show the limited effect of teachers' statements from which students' can make attributions about success or failure, especially when students have a strong sense of competence and efficacy. Moreover, the results point to the effectiveness of training in increasing student awareness and achievement despite negative interferences.

A sixth question can be asked about the following results. Training increased student awareness in both third and fifth grades, but only third grade students, not fifth grade students in the trained group showed increased achievement. Nevertheless, fifth grade students, irregardless of training condition, showed a pretest to posttest improvement. Moreover, in the present study, student awareness was never a significant covariate. The question these findings raise is: Why wasn't student awareness linked to student achievement? To begin answering this question, one might speculate that trained and untrained teachers might have taught similar information about the skills that was different from the information measured by the awareness measure, but was, nevertheless, necessary for achievement on standardized achievement tests. This would account for increases in fifth grade student awareness and no increases in fifth grade student achievement.

Furthermore, trained third grade teachers, who were better explainers of cognitive strategy use than trained fifth grade

teachers, may have also been more effective at teaching the "unmeasured" knowledge responsible for achievement gains. This explanation would account for training having an effect on third grade students' achievement but not on fifth grade students' achievement.

To summarize the discussion, the categories of teachers' motivational statements that may influence students attributions for success or failure may not affect student achievement if: (1) use of those statements did not increase as a result of training; and (2) those statements are negative, or can be interpreted as being negative by the student. In addition, these same categories of motivational statements may not affect student achievement when they present information that is contrary to the students' own self-knowledge, sense of competence, feelings of efficacy. Teachers' statements that focus on the value of the task are necessary but not sufficient to increase achievement; teachers must use those statements in conjunction cognitive strategy instruction.

## Developing a Conceptual Framework for the Results

The goal of teachers' instructional and motivational activities is to enable students to be effective learners. The concept of empowerment can describe the actions taken by teachers to help students become effective learners by providing them with tools of personal agency (Bandura, 1986) that help them to experience events as self-determined and volitional, perceive themselves as competent, and demonstrate the ability to regulate their behavior (Corno & Rohrkemper, 1985; Ryan, Connell & Deci, 1985). Effective learning as described here will result in improved achievement on classroom objectives and standardized tests (Corno & Rohrkemper, 1985).

Empowering actions transfer "skill and will" to the students. Teachers enable students to demonstrate competence by providing them with knowledge, skills and learning strategies. They also help students develop an intent to learn by which they will be able to focus internal resources and attend to the learning task. Thus, empowerment refers to the instructional and motivational actions of the teacher that increase students' ability to independently engage in the learning process.

We know that cognitive strategy instruction and goal, value and reward statements can increase achievement. What, then, can be inferred from these data about empowering students? The data seem to support a theory of empowerment that suggests greater self-regulation leads to greater achievement. Teachers in this study who used an instructional method based on cognitive control and motivational strategies which focused on the value of the task were teachers who employed strategies designed for greater self-regulation. These teachers had students who achieved more than students whose teachers used other methods. Thus, the results of this study seem to show that empowered behavior is possible when the transfer of skill to the student is accompanied by an internalization of extrinsic regulation into personal goals and values.

## Implications

The results of this study have implications for those who use instructional and motivational strategies, for those who advise in their use, and for those who study how motivational and instructional strategies can be used to increase achievement and empower students. In this section I discuss the implications of this study for

practitioners and researchers.

First, psychologists and teachers desiring to know what works best to increase self-regulation and intent to learn need to know that there is no simple answer to their question. This study provided an answer for what works with a small group of students under specific conditions. However, the study did provide some directions that may be pursued by practitioners. For example, teachers and psychologists need to be concerned with both instructional and motivational activities. In addition, practitioners must be flexible in their approach to helping students engage more effectively in learning, and aware of differences in the learning and motivational needs of their students. Perhaps a thorough diagnostic evaluation of skill, strategy use and motivation may help teachers in addressing the needs of their students. Harter (1981), for example, developed an instrument which could be used diagnostically to measure intrinsic motivation.

Second, issues surrounding teachers' sense of efficacy need to be addressed by teachers, teacher educators and supervising teachers to insure against personal issues being projected onto students. In addition, psychologists who consult with teachers must be prepared to recognize when teachers are not feeling efficacious, and to help teachers when pressures such as implementing new teaching or motivational strategies affect teachers' performance. Furthermore, teachers' sense of efficacy is an important area that needs to be addressed in research. Results of such research can help teachers and support staff improve the quality of classroom interactions.

Third, this study has implications for those researchers who are interested in how motivational and instructional strategies work.

Researchers must continue study in the area of student mediation of classroom processes. Clearly, measures of student mediation must derive from students' experiences. As seen in this study, the knowledge that was responsible for increasing achievement scores, may not have been the same knowledge measured in the awareness of lesson content measures. Students' thoughts, beliefs, values and feelings must be studied in order to understand the which classroom instructional and motivational processes affect students and how students react.

Fourth, researchers must continue to go beyond research in what and how students' think, to studies of how to influence students to implement strategies and encourage students to learn. In the study of empowerment, it is important to examine the effectiveness of strategies that students use to learn, as well as the effectiveness of strategies teachers use to empower.

Fifth, this study showed the multiple influences on teacher and student behavior and implies the need for further research to examine the intrapersonal as well as interpersonal relations existing in the classroom. These interrelationships require other research methods that can capture more variables. Process-product research, for example, has its place as an initial type of research, but it does not capture the complexity of the classroom. Researchers interested in classroom processes might follow up with ethnographic studies, multiple regressions and path analyses. In addition, researchers might look to studies of changes over time as a means to understand the processes of change. Perhaps, new ways of analysis that capture the individual as well as group level need to be developed.

Finally, the results of this study may have implications beyond the classroom and the school. Psychologists concerned with helping clients effect changes in behavior through cognitive control techniques can benefit from knowing that both information and valuing are necessary for changes to occur. Psychologists interested in issues of control, addiction, and eating disorders might find the results of this study particulary useful.

## Conclusions

By applying the principles of motivation to cognitive strategy instruction, we are able to clarify the mechanisms by which cognitive strategy works to increase student achievement. The relationships between instruction and motivation that are suggested by the data are complex and do not provide easy solutions to the requests of psychologists and teachers for help in developing effective learners. Generally, however, one can conclude from this study that teachers and psychologists who provide their students with the "skills" to demonstrate their competency and the "will" to attend to and engage in learning, enable their students to be more effective learners.

More specifically, the data suggests that there is a relationship between teachers' use of cognitive strategy instruction and their use of motivational statements. Moreover, the use of motivational statements appears to be developmentally linked. However, it is unclear to what extent the relationship between cognitive strategy instruction, use of motivational statements and grade may be contingent on the interaction of teachers' needs, cognitions and plans with students' needs, age and cognitions.

The data also suggests that when training has the effect of

increasing teachers' use of motivational statements, some, but not all of the categories of motivational statements that increased as a result of training are related to achievement. The results seem to indicate that cognitive strategy instruction works through long term goal, intrinsic value and reward statements to increase student achievement. However, it appears that there may be an optimal use of reward statements beyond which they are no longer reinforcing. Furthermore, the positive effect of training also seems able to compensate for motivational statements that have a negative relationship with achievement.

# APPENDICES

# APPENDIX A

## Management Principles from the First-Grade Reading Study (Anderson, Evertson & Brophy, 1979).

a. Teacher provides a standard and predictable signal to get attention.

b. Teacher faces class with small group while students face away.

c. Overview of what is to come is provided.

d. New words and sounds are presented before story is read.

e. Students repeat new sounds or words until said satisfactorily.

f. Teacher presents information.

g. Teacher works with individual students as they practice.

h. Teacher uses a pattern for turn taking.

i. Teacher occasionally questions a student about another student's response.

j. Teacher calls on volunteers only when personal experiences or opinions are related.

k. When call outs occur, teacher reminds the student that everyone gets a turn and he/she must wait.

l. Teacher avoids leading or rhetorical questions.

m. Teacher provides wait time for questions.

n. Teacher provides feedback about incorrect answer.

o. Teacher provides:

   1. answer if answer can't be reasoned out? and
   2. clues if answer can be reasoned out.

p. Teacher makes sure all students hear and understand correct answers.

q. Teacher provides praise in moderation.

r. Teacher provides specific criticism and specification of correct alternatives.

# APPENDIX B

## List of Thirty Motivational Statements

1. apology - for foisting task
2. cues negative expectation - will not like this
3. cues negative expectation - will not do well
4. cues negative expectation - will find hard to do
5. cues positive expectation - expected to enjoy the task
6. cues positive expectation - will find easy
7. cues positive expectation - expected to do well
8. teacher enthusiasm - directly expresses own liking
9. cues value of learning skill: Self Acutalization - skill will bring pleasure or personal satisfaction, will make student happy s/he knows skill
10. encourages learning for positive self-image, self-evaluation
11. asks why skill is useful or important
12. challenge/goal setting - set goal or challenge to attain standard of excellence
13. specific performance feedback for achievement - student personally told how well s/he has done; teacher says good and why good
14. specific performance feedback for effort - student personally told effort has been noted
15. specific negative performance feedback for effort
16. specific negative performance feedback for achievement
17. embarassment - student will be embarassed if doesn't learn skill
18. teacher personalizes - personal beliefs or experiences
19. teacher personalizes - uses self as example
20. cues value of learning skill: Survival Value - need skill in life or society
21. cues value of learning skill: As Tool Or Help For Future Or Further Learning
22. cues value of learning skill: Personal Relevance - ties to personal lives or interests of student
23. teacher personalizes - apologizes for inadequacies
24. recognition - if do well, student promised symbolic reward
25. extrinsic reward
26. threats/punishment - negative consequences for poor performance
27. accountability - student will be tested or carefully checked
28. cues efforts - ecourages students to work hard
29. continuity - relationship between task andprevious work
30. time reminder - better concentrate with time limit

# APPENDIX C

## Coding of Teachers' Motivational Statements

I. Consequences Contingent on Task Performance

A. Reward and punishment

1. Recognition - If the student does well, the teacher promises symbolic reward.

2. Extrinsic reward - If the student does well, teacher promises reward.

3. Threats/punishment - Teacher promises/threatens negative consequences for poor performance.

4. Accountability - Student will be tested or carefully checked. Quality of task performance will be checked and rewarded or punished.

5. Interpersonal competition - Class or task is competitively organized. Reward for individual success.

6. Challenge/goal setting - Setting of goal or challenge to attain standard of excellence; intrapersonal competition; reward is personal.

7. Cooperation - Class or task is cooperatively organized. Reward for group success.

B. Evaluative feedback

1. Achievement

   a. Specific positive performance feedback for achievement. Teacher tells student how s/he did and why the student did well.

   b. Specific negative performance feedback.

2. Effort

   a. Positive feedback for effort.

   b. Negative feedback for effort.

3. Ability - Statements that provide feedback on the ability level of the student.

II. Motives and Long Term Goals

A. Personal relevance - Teacher ties activity to personal lives or interests of students.

B. Survival value - Teacher tells how student will need skill in life or society.

C. Tool or help - Task is described as something student might need in later learning.

D. Embarrassment - Student needs skill to avoid future embarrassment.

E. Self-image - Teacher encourages learning for positive self-image, self-evaluation.

III. Intrinsic Value and Meaning of Task

A. Importance of skill - Teacher asks or explains the importance of learning the skill, as an end in itself.

B. Teacher expresses own liking of activity - Teacher personalizes explanation of importance of task.

C. Teacher relates personal beliefs or experiences - Teacher models importance of task through personal experiences.

D. Teacher uses self as an example - Teacher models importance of task by explaining his/her thinking through steps; focus is on the task.

E. Continuity - Teacher establishes the relationship between task and previous work, uses examples to make the strange familiar, and shows how previous knowledge is consistent with new.

IV. Communicated Expectations and Predictions

A. Negative

1. Student will not like - Teacher cues negative expectation.

2. Student will not do well - Teacher cues negative expectation about achievement.

3. Student will find the task hard to do - Teacher cues negative expectation about ability.

B. Positive

1. Student will enjoy task - Teacher cues positive expectation.

2. Student will do well - Teacher cues positive expectation about achievement.

3. Encourages student to work hard - Teacher cues positive expectation that with an investment of effort, the student will succeed.

V. Communicated Time Limits

Time reminder - Student warned to concentrate better, work harder because of time constraint.

# APPENDIX D

## Rules for Coding Motivational Statements

### General rules

1. Two sentences, when one is an elaboration of the first, are scored as one.

2. Two sentences, where one is another thought, however close, are separately scored.

3. Sequential actions are scored separately.

4. Code only items that are within the reading skill lesson, not preliminary remarks.

5. If the teacher's response following a student's inaudible comment does not specifically refer to an answer or thought, it is not coded.

### Clarifying the kinds of statements

1. Continuity refers to tying in new information to old information, not repeating past information even in a new way.

2. When a teacher uses self as an example, each sentence with "I" in it, gets scored.

3. Teacher personalizes when s/he creates a context in which s/he plays a role to help students identify, imagine, when use of skill is appropriate.

4. When teacher personalizes, the statement setting up her/his action is coded, the following procedural statements are not.

5. Personal relevance refers to present interests as well as creating a context student can imagine him/herself in.

6. Both statements and questions about personal relevance or tool for further learning are coded.

7. Specific performance feedback refers to both the correctness of the answer and the quality of the response. When "very good" or "good" appear, or such statements that generally show positive approval, performance feedback is coded. However, if it is just and acknowledgement like "ok", "alright", or "right" when it means correct, is not coded.

8. Two statements of performance feedback, when separated by other statements, are scored separately.

9. Performance feedback for effort does not refer to behavior such as "You're not listening". It does refer to statements that show the student is thinking, thinking hard. When the teacher says "think about it", code this statement as CUES EFFORT. EFFORT also refers to trying hard.

10. Why skill is important? refers to a question about the importance of skill, not how it is used or when it is used. Think in terms of the difference between "this is important to know because..." and "it is useful in reading science books" (importance) and "we use it to break a word into parts when we have a problem" (procedural use).

# APPENDIX E

## Rating Pupil Awareness

Determine pupil awareness by judging pupil response to the three interview questions and all subsequent elaborating probes which the researcher may have used in conjunction with each question. The criteria for pupil awareness follows:

1. A highly rated response to the question about "what" was being taught must include specific reference to the process involved in completing the task and an example.

   0--no awareness (student does not know, is inaccurate or supplies a response that does not make sense).
   1--the response is a non-specific reference to the task ("We are learning about words.").
   2--the response refers to the name of the specific task which can be done successfully if the process is applied correctly or is an example of what can be done ("We are learning ou words.")
   3--the response includes a specific reference to the process being learned ("We are learning how to sound out ou words.").
   4--the response includes a specific reference to the process and an example ("We are learning how to sound out ou words, like in out.").

2. A highly rated response to the question about "why" or "when it would be used" must specificy both the context in which it will be useful and what he/she is able to do in that context:

   0--no awareness or includes no refrence to the specific task ("I'll get smarter" or "it'll help me when I grow up.").
   1--the response is not specific to the task but it is related to reading language generally ("I'll read better.").
   2--the response refers to an appropriate general category but not to the specific use for what was taught ("I can sound out words better.").
   3--the reponse includes specific reference to what he/she will be able to do but not the context in which it would be useful ("I can sount out ou words better.").

   OR

   specifies the context in which it would be useful but not what he/she will be able to do ("I can use this when I come upon an unknown word in my book.").
   4--the response includes both what he/she will be able to do and the contexct in which it is useful ("When I come upon

an unknown ou word in my library book, I'll be able to sound it out.")

3. A highly rated response to the question about "how will you do it" must include an example of how one does the mental processing associated with successful completion of the task or an appropriate sequence of steps to be followed.

0--no awareness.
1--the response is not specific to the mental processing to be used ("I'll sound out the word.").

OR

is merely an example that does not illustrate conscious understanding of the mental processing to be used ("loud").
2--the response refers to features to attend to but not to the way they are used in doing mental processing ("I say, 'l-ou-d'.").
3--the response identifies some of the features to attend to and some understanding of the mental processing ("If I see a word that has ou in it, I say the sound of ou.").
4--the repsonse includes a sequence of the mental processing or a specific example of the mental processing ("When I meet an unknown word such as loud, I think first... and then...etc.").

## APPENDIX F

### Teacher Explanation Rating

1. Rate how explicit the teacher is in informing students that the task to be learned is a strategy for solving a problem encountered in reading.

   0--the teacher makes no statement about what is to be learned (total absence of...).

   1--the task is named/labeled but there is little information beyond "we will learn about prefixes...".

   2--the task is named/labeled and there is some elaboration beyond "we will learn about prefixes...".

   3--the task is described as an adaptive, flexible strategy ("we will learn how to...") but it is not an exemplar.

   4--an exemplary presentation of the task is an adaptive, flexible strategy to solve a problem encountered when reading.

2. Rate how explicit the teacher is in informing students that the strategy is useful as they read.

   0--there is no statement of where the skill would be used (total absence of...).

   1--the teacher only mentions that the skill is generally useful or useful in reading but does not specify when or why.

   2--the usefulness of the task is related to the future ("when you get in sixth grade...") or is vague or general in stating why or when it is related to particular text ("it helps you get information...").

   3--the immediate usefulness of the skill is illustrated with a specific reference to a particular example but it is not an exemplar.

   4--an exemplary statement of the immediate usefulness of the skill in reading connected text in which one or more concrete examples are used to illustrate.

3. Rate how explicit the teacher is in telling students how to decide which strategy to select for use when encountering a problem in reading.

   0--there is no mention that students will have to select a strategy to solve the problem (total absence of...).

   1--the teacher mentions that this skill can be used to solve a problem but provides no additional information.

   2--the teacher mentions that this skill can be used to solve a problem and provides some information about how to choose the appropriate strategy.

   3--the problem situation is explicitly specified and how to select an appropriate strategy is emphasized but it is not an exemplar.

   4--an exemplary statement of how to recognize that problem exists and how to selct the appropriate strategy.

4. Rate how explicit the teacher is in telling students how to perform the strategy to solve the problem when reading real text.

   0--there is no explanation of how to perform the strategy (total absence of...)

   1--there is an explanation but it is stated as a rule to be memorized or as a procedure to be recalled and no examples are provided.

   2--the teacher talks about the rule and/or procedure as routine to be applied without variation and examples are provided.

   3--the teacher shows students how to follow mental steps and a sequence in a flexible, adaptive manner but it is not an exemplar.

   4--an exemplar description in which the teacher shows students how to follow mental steps and a sequence flexibly and adaptively when performing the strategy.

# APPENDIX G

## Analyses of Variance of Contingency Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. CONTINGENCY CATEGORY | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | 2.807 | 1 | 2.807 | 11.859 | .001 |
| GRADE | 15.097 | 1 | 15.097 | 63.789 | .000 |
| INTERACTION | .266 | 1 | .266 | 1.122 | .296 |
| EXPLAINED | 18.169 | 3 | 6.056 | 25.590 | .000 |
| RESIDUAL | 8.994 | 38 | .237 | | |
| TOTAL | 27.163 | 41 | .663 | | |
| 2. REWARD (SUBCATEGORY of CONTINGENCY) | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | 1.672 | 1 | 1.672 | 24.633 | .000 |
| GRADE | .307 | 1 | .307 | 4.527 | .040 |
| INTERACTION | .009 | 1 | .009 | .132 | .718 |
| EXPLAINED | 1.989 | 3 | .663 | 9.764 | .000 |
| RESIDUAL | 2.580 | 38 | .068 | | |
| TOTAL | 4.568 | 41 | .111 | | |
| 3. EVALUATION (SUBCATEGORY of CONTIGENCY) | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | 1.827 | 1 | 1.807 | 7.445 | .010 |
| GRADE | 20.568 | 1 | 20.568 | 83.822 | .000 |
| INTERACTION | .146 | 1 | .146 | .595 | .445 |
| EXPLAINED | 22.541 | 3 | 7.514 | 30.621 | .000 |
| RESIDUAL | 9.324 | 38 | .245 | | |
| TOTAL | 31.866 | 41 | .777 | | |
| 4. EVALUATION OF ACHIEVEMENT (SUBGROUP OF EVALUATION) | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | 1.060 | 1 | 1.060 | 4.374 | .043 |
| GRADE | 25.007 | 1 | 25.007 | 103.170 | .000 |
| INTERACTION | .000 | 1 | .000 | .001 | .973 |
| EXPLAINED | 26.067 | 3 | 8.689 | 35.848 | .000 |
| RESIDUAL | 9.211 | 38 | .242 | | |
| TOTAL | 35.278 | 41 | .860 | | |

5. EVALUATION OF EFFORT (SUBGROUP OF EVALUATION)

| | | | | | |
|---|---|---|---|---|---|
| MAIN EFFECT | | | | | |
| TRAINING | .254 | 1 | .254 | 3.630 | .064 |
| GRADE | .005 | 1 | .005 | .067 | .797 |
| INTERACTION | .425 | 1 | .425 | .090 | .018 |
| EXPLAINED | .684 | 3 | .228 | 3.262 | .032 |
| RESIDUAL | 2.655 | 38 | .070 | | |
| TOTAL | 3.339 | 41 | .081 | | |

# APPENDIX H

## Analysis of Variance of Motives and Long Term Goal Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| MAIN EFFECT | | | | | |
| TRAINING | 10.723 | 1 | 10.723 | 49.003 | .000 |
| GRADE | 1.143 | 1 | 1.143 | 5.225 | .028 |
| INTERACTION | .986 | 1 | .986 | 4.509 | .040 |
| EXPLAINED | 12.852 | 3 | 4.284 | 19.589 | .000 |
| RESIDUAL | 8.310 | 38 | .219 | | |
| TOTAL | 21.162 | 41 | .516 | | |

# APPENDIX I

## Analysis of Variance of Intrinsic Value Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| MAIN EFFECT | | | | | |
| TRAINING | 17.222 | 1 | 17.222 | 46.125 | .000 |
| GRADE | .163 | 1 | .163 | .435 | .513 |
| INTERACTION | .031 | 1 | .031 | .082 | .777 |
| EXPLAINED | 17.416 | 3 | 5.805 | 15.547 | .000 |
| RESIDUAL | 14.189 | 38 | .373 | | |
| TOTAL | 31.604 | 41 | .771 | | |

# APPENDIX J

## Analyses of Variance of Communicated Expectations Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. COMMUNICATED EXPECTATIONS | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | .384 | 1 | .384 | 2.902 | .097 |
| GRADE | .132 | 1 | .132 | .997 | .324 |
| INTERACTION | .035 | 1 | .035 | .263 | .611 |
| EXPLAINED | .550 | 3 | .183 | 1.388 | .261 |
| RESIDUAL | 5.023 | 38 | .132 | | |
| TOTAL | 5.573 | 41 | .136 | | |
| 2. POSITIVE EXPECTATIONS | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | .002 | 1 | .002 | .048 | .828 |
| GRADE | .084 | 1 | .084 | 1.972 | .168 |
| INTERACTION | .036 | 1 | .036 | .840 | .365 |
| EXPLAINED | .122 | 3 | .041 | .953 | .425 |
| RESIDUAL | 1.620 | 38 | .043 | | |
| TOTAL | 1.742 | 41 | .042 | | |
| 3. NEGATIVE EXPECTATIONS | | | | | |
| MAIN EFFECT | | | | | |
| TRAINING | .546 | 1 | .546 | 5.905 | .020 |
| GRADE | .022 | 1 | .022 | .232 | .632 |
| INTERACTION | .003 | 1 | .003 | .027 | .870 |
| EXPLAINED | .571 | 3 | .190 | 2.055 | .122 |
| RESIDUAL | 3.516 | 38 | .093 | | |
| TOTAL | 4.087 | 41 | .100 | | |

# APPENDIX K

## Analysis of Variance of Communicated Time Limits Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| MAIN EFFECT | | | | | |
| TRAINING | .153 | 1 | .153 | 1.445 | .237 |
| GRADE | .000 | 1 | .000 | .005 | .946 |
| INTERACTION | .006 | 1 | .006 | .061 | .806 |
| EXPLAINED | .550 | 3 | .183 | 1.388 | .261 |
| RESIDUAL | 5.023 | 38 | .132 | | |
| TOTAL | 5.573 | 41 | .136 | | |

# APPENDIX L

## Analyses of Covariance of Third Grade Achievement Scores with Pretest and Motivational Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. CONTINGENT ON PERFORMANCE CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3336.260 | 1 | 3336.260 | 31.539 | .000 |
| CONTINGENCY | 45.244 | 1 | 45.244 | .428 | .522 |
| MAIN EFFECT | | | | | |
| TRAINING | 821.650 | 1 | 821.650 | 7.767 | .013 |
| EXPLAINED | 4191.531 | 3 | 1397.177 | 13.208 | .000 |
| RESIDUAL | 1692.538 | 16 | 105.784 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 2. MOTIVES AND LONG TERM GOALS CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2822.047 | 1 | 2822.047 | 28.313 | .000 |
| GOAL | 714.602 | 1 | 714.602 | 7.170 | .017 |
| MAIN EFFECT | | | | | |
| TRAINING | 250.083 | 1 | 250.083 | 2.509 | .133 |
| EXPLAINED | 4289.322 | 3 | 1429.774 | 14.345 | .000 |
| RESIDUAL | 1594.747 | 16 | 99.672 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 3. INTRINSIC VALUE AND MEANING OF TASK CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2357.108 | 1 | 2357.108 | 23.724 | .000 |
| VALUE | 811.728 | 1 | 811.728 | 8.170 | .011 |
| MAIN EFFECT | | | | | |
| TRAINING | 158.004 | 1 | 158.004 | 1.590 | .225 |
| EXPLAINED | 4294.369 | 3 | 1431.456 | 14.407 | .000 |
| RESIDUAL | 1589.700 | 16 | 99.356 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

4. COMMUNICATED EXPECTATIONS AND PREDICTIONS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 3278.757 | 1 | 3278.757 | 30.578 | .000 |
| EXPECTATIONS | 59.607 | 1 | 59.607 | .556 | .467 |
| MAIN EFFECT | | | | | |
| TRAINING | 784.181 | 1 | 784.181 | 7.313 | .016 |
| EXPLAINED | 4168.425 | 3 | 1389.475 | 12.958 | .000 |
| RESIDUAL | 1715.644 | 16 | 107.228 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

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5. COMMUNICATED TIME LIMITS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 2818.863 | 1 | 2818.863 | 26.180 | .000 |
| TIME | 17.782 | 1 | 17.782 | .165 | .690 |
| MAIN EFFECT | | | | | |
| TRAINING | 818.906 | 1 | 818.906 | 7.606 | .014 |
| EXPLAINED | 4161.326 | 3 | 1387.109 | 12.883 | .000 |
| RESIDUAL | 1722.743 | 16 | 107.671 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

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APPENDIX M

Analyses of Covariance of Third Grade Achievement Scores with Pretest and Motivational Statements in the Contingent on Performance Category

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. REWARD SUBCATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3506.604 | 1 | 3506.604 | 35.694 | .000 |
| REWARD | 898.976 | 1 | 898.976 | 9.151 | .008 |
| MAIN EFFECT | | | | | |
| TRAINING | 88.600 | 1 | 88.600 | .902 | .356 |
| EXPLAINED | 4312.213 | 3 | 1437.404 | 14.631 | .000 |
| RESIDUAL | 1571.856 | 16 | 98.241 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 2. EVALUATION SUBCATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3330.037 | 1 | 3330.037 | 31.617 | .000 |
| EVALUATION | 14.725 | 1 | 14.725 | .140 | .713 |
| MAIN EFFECT | | | | | |
| TRAINING | 859.512 | 1 | 859.512 | 8.161 | .011 |
| EXPLAINED | 4198.874 | 3 | 1399.625 | 13.289 | .000 |
| RESIDUAL | 1685.195 | 16 | 105.325 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 3. EVALUATING FOR ACHIEVEMENT (SUBGROUP OF EVALUATION) | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3320.687 | 1 | 3320.687 | 31.240 | .000 |
| ACHIEVEMENT | 28.018 | 1 | 28.018 | .264 | .615 |
| MAIN EFFECT | | | | | |
| TRAINING | 830.656 | 1 | 830.656 | 7.814 | .013 |
| EXPLAINED | 4383.311 | 3 | 1394.437 | 13.118 | .000 |
| RESIDUAL | 1700.758 | 16 | 106.297 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

4. EVALUATING FOR EFFORT (SUBGROUP OF EVALUATION)

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 2662.408 | 1 | 2662.408 | 29.818 | .000 |
| EXPECTATIONS | 371.874 | 1 | 371.874 | 4.165 | .058 |
| MAIN EFFECT | | | | | |
| TRAINING | 758.929 | 1 | 758.929 | 8.500 | .010 |
| EXPLAINED | 4455.439 | 3 | 1485.146 | 16.633 | .000 |
| RESIDUAL | 1428.630 | 16 | 89.289 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

# APPENDIX N

## Analyses of Covariance of Third Grade Achievement Scores with Pretest, Motivational Statements, and Student Awareness

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. CONTINGENT ON PERFORMANCE CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2687.399 | 1 | 2687.399 | 24.099 | .000 |
| CONTINGENCY | 3.424 | 1 | 3.424 | .031 | .863 |
| AWARENESS | 323.995 | 1 | 323.995 | 2.905 | .109 |
| MAIN EFFECT | | | | | |
| TRAINING | 517.482 | 1 | 517.482 | 4.641 | .048 |
| EXPLAINED | 4211.358 | 4 | 1052.840 | 9.441 | .001 |
| RESIDUAL | 1672.711 | 15 | 111.514 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 2. MOTIVES AND LONG TERM GOALS CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2540.169 | 1 | 2540.169 | 24.070 | .000 |
| GOAL | 444.489 | 1 | 444.489 | 4.212 | .058 |
| AWARENESS | 95.702 | 1 | 95.702 | .907 | .356 |
| MAIN EFFECT | | | | | |
| TRAINING | 166.125 | 1 | 166.125 | 1.574 | .229 |
| EXPLAINED | 4301.067 | 4 | 1075.267 | 10.189 | .000 |
| RESIDUAL | 1583.002 | 15 | 105.533 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 3. INTRINSIC VALUE AND MEANING OF TASK CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2073.512 | 1 | 2073.512 | 20.309 | .000 |
| VALUE | 624.478 | 1 | 624.478 | 6.117 | .026 |
| AWARENESS | 178.565 | 1 | 178.565 | 1.749 | .206 |
| MAIN EFFECT | | | | | |
| TRAINING | 37.686 | 1 | 37.686 | .369 | .553 |
| EXPLAINED | 4352.616 | 4 | 1088.154 | 10.658 | .000 |
| RESIDUAL | 1531.453 | 15 | 102.097 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

4. COMMUNICATED EXPECTATIONS AND PREDICTIONS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 2676.312 | 1 | 2676.312 | 23.634 | .000 |
| EXPECTATIONS | 32.344 | 1 | 32.344 | .286 | .601 |
| AWARENESS | 338.553 | 1 | 338.553 | 2.990 | .104 |
| MAIN EFFECT | | | | | |
| TRAINING | 462.649 | 1 | 462.649 | 4.085 | .061 |
| EXPLAINED | 4185.445 | 4 | 1046.361 | 9.240 | .001 |
| RESIDUAL | 1698.624 | 15 | 113.242 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

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5. COMMUNICATED TIME LIMITS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 2489.898 | 1 | 2489.898 | 21.921 | .000 |
| TIME | 0.197 | 1 | 0.197 | .002 | .967 |
| AWARENESS | 348.231 | 1 | 348.231 | 3.066 | .100 |
| MAIN EFFECT | | | | | |
| TRAINING | 489.661 | 1 | 489.661 | 4.311 | .055 |
| EXPLAINED | 4180.311 | 4 | 1045.078 | 9.201 | .001 |
| RESIDUAL | 1703.758 | 15 | 113.584 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

# APPENDIX O

## Analyses of Covariance of Third Grade Achievement Scores with Pretest, Motivational Statements, and Awareness in the Contingent on Performance Category

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. REWARD SUBCATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3092.248 | 1 | 3092.248 | 29.522 | .000 |
| REWARD | 541.032 | 1 | 541.032 | 5.165 | .038 |
| AWARENESS | 7.871 | 1 | 7.871 | .075 | .788 |
| MAIN EFFECT | | | | | |
| TRAINING | 81.426 | 1 | 81.426 | .777 | .392 |
| EXPLAINED | 4312.910 | 4 | 1078.227 | 10.294 | .000 |
| RESIDUAL | 1571.159 | 15 | 104.744 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 2. EVALUATION SUBCATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2675.652 | 1 | 2675.652 | 24.100 | .000 |
| EVALUATION | .092 | 1 | .092 | .001 | .977 |
| AWARENESS | 351.182 | 1 | 351.182 | 3.163 | .096 |
| MAIN EFFECT | | | | | |
| TRAINING | 528.183 | 1 | 528.183 | 4.757 | .046 |
| EXPLAINED | 4218.727 | 4 | 1054.682 | 9.500 | .000 |
| RESIDUAL | 1665.342 | 15 | 111.023 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |
| 3. EVALUATING FOR ACHIEVEMENT (SUBGROUP OF EVALUATION) | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2686.966 | 1 | 2686.966 | 23.979 | .000 |
| ACHIEVEMENT | .842 | 1 | .842 | .008 | .932 |
| AWARENESS | 338.640 | 1 | 338.640 | 3.022 | .103 |
| MAIN EFFECT | | | | | |
| TRAINING | 511.968 | 1 | 511.968 | 4.569 | .049 |
| EXPLAINED | 4203.263 | 4 | 1050.816 | 9.378 | .001 |
| RESIDUAL | 1680.807 | 15 | 112.054 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

4. EVALUATING FOR EFFORT (SUBGROUP OF EVALUATION)

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 2326.047 | 1 | 2326.047 | 24.423 | .000 |
| EFFORT | 230.878 | 1 | 230.878 | 2.424 | .140 |
| AWARENESS | 224.819 | 1 | 224.819 | 2.361 | .145 |
| MAIN EFFECT | | | | | |
| TRAINING | 534.139 | 1 | 534.139 | 5.608 | .032 |
| EXPLAINED | 4455.470 | 4 | 1113.867 | 11.695 | .000 |
| RESIDUAL | 1428.599 | 15 | 95.240 | | |
| TOTAL | 5884.069 | 19 | 309.688 | | |

# APPENDIX P

## Analyses of Covariance of Fifth Grade Achievement Scores with Pretest and Motivational Statements

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. CONTINGENT ON PERFORMANCE CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3134.332 | 1 | 3134.332 | 32.170 | .000 |
| CONTINGENCY | 338.568 | 1 | 338.568 | 3.475 | .079 |
| MAIN EFFECT | | | | | |
| TRAINING | 3.128 | 1 | 3.128 | .032 | .860 |
| EXPLAINED | 3540.671 | 3 | 1180.224 | 12.114 | .000 |
| RESIDUAL | 1753.742 | 18 | 97.430 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |
| 2. MOTIVES AND LONG TERM GOALS CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3048.190 | 1 | 3048.190 | 27.406 | .000 |
| GOAL | 24.681 | 1 | 24.681 | .222 | .643 |
| MAIN EFFECT | | | | | |
| TRAINING | 68.763 | 1 | 68.763 | .618 | .442 |
| EXPLAINED | 3292.419 | 3 | 1097.473 | 9.867 | .000 |
| RESIDUAL | 2001.993 | 18 | 111.222 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |
| 3. INTRINSIC VALUE AND MEANING OF TASK CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3321.062 | 1 | 3321.062 | 31.022 | .000 |
| VALUE | 165.709 | 1 | 165.709 | 1.548 | .229 |
| MAIN EFFECT | | | | | |
| TRAINING | 2.748 | 1 | 2.748 | .026 | .875 |
| EXPLAINED | 3367.432 | 3 | 1122.477 | 10.485 | .000 |
| RESIDUAL | 1926.981 | 18 | 107.054 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

4. COMMUNICATED EXPECTATIONS AND PREDICTIONS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 3226.697 | 1 | 3226.697 | 29.142 | .000 |
| EXPECTATIONS | 61.351 | 1 | 61.351 | .554 | .466 |
| MAIN EFFECT | | | | | |
| TRAINING | 41.072 | 1 | 41.072 | .371 | .550 |
| EXPLAINED | 3301.398 | 3 | 1100.466 | 9.939 | .000 |
| RESIDUAL | 1993.015 | 18 | 110.723 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

5. COMMUNICATED TIME LIMITS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 3185.970 | 1 | 3185.970 | 28.506 | .000 |
| TIME | 17.619 | 1 | 17.619 | .158 | .696 |
| MAIN EFFECT | | | | | |
| TRAINING | 66.080 | 1 | 66.080 | .591 | .452 |
| EXPLAINED | 3282.674 | 3 | 1094.225 | 9.791 | .000 |
| RESIDUAL | 2011.739 | 18 | 111.763 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

# APPENDIX Q

## Analyses of Covariance of Fifth Grade Achievement Scores with Pretest and Motivational Statements in the Contingent on Performance Category

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. REWARD SUBCATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3333.962 | 1 | 3333.962 | 30.830 | .000 |
| REWARD | 144.367 | 1 | 144.367 | 1.335 | .263 |
| MAIN EFFECT | | | | | |
| TRAINING | 4.544 | 1 | 4.544 | .042 | .840 |
| EXPLAINED | 3347.886 | 3 | 1115.962 | 10.320 | .000 |
| RESIDUAL | 1946.526 | 18 | 108.140 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |
| 2. EVALUATION SUBCATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3086.535 | 1 | 3086.535 | 30.854 | .000 |
| EVALUATION | 294.188 | 1 | 294.188 | 2.941 | .104 |
| MAIN EFFECT | | | | | |
| TRAINING | .581 | 1 | .581 | .006 | .940 |
| EXPLAINED | 3493.745 | 3 | 1164.582 | 11.641 | .000 |
| RESIDUAL | 1800.668 | 18 | 100.037 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |
| 3. EVALUATING FOR ACHIEVEMENT (SUBGROUP OF EVALUATION) | | | | | |
| COVARIATES | | | | | |
| PRETEST | 2723.837 | 1 | 2723.837 | 27.858 | .000 |
| ACHIEVEMENT | 326.974 | 1 | 326.974 | 3.344 | .084 |
| MAIN EFFECT | | | | | |
| TRAINING | 8.510 | 1 | 8.510 | .087 | .771 |
| EXPLAINED | 3534.460 | 3 | 1178.153 | 12.050 | .000 |
| RESIDUAL | 1759.953 | 18 | 97.775 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

4. EVALUATING FOR EFFORT (SUBGROUP OF EVALUATION)

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 3241.040 | 1 | 3241.040 | 28.960 | .000 |
| EXPECTATIONS | 42.578 | 1 | 42.578 | .380 | .545 |
| MAIN EFFECT | | | | | |
| TRAINING | 38.381 | 1 | 38.381 | .343 | .565 |
| EXPLAINED | 3279.934 | 3 | 1093.311 | 9.769 | .000 |
| RESIDUAL | 2014.478 | 18 | 111.915 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

# APPENDIX R

## Analyses of Covariance of Fifth Grade Achievement Scores with Pretest, Motivational Statements, and Student Awareness

| SOURCE | SUM OF SQUARES | df | MEAN SQUARE | F | P VALUE |
|---|---|---|---|---|---|
| 1. CONTINGENT ON PERFORMANCE CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3001.798 | 1 | 3001.798 | 27.762 | .000 |
| CONTINGENCY | 235.399 | 1 | 235.399 | 2.177 | .158 |
| AWARENESS | .133 | 1 | .133 | .001 | .972 |
| MAIN EFFECT | | | | | |
| TRAINING | .170 | 1 | .170 | .002 | .969 |
| EXPLAINED | 3456.243 | 4 | 864.061 | 7.991 | .001 |
| RESIDUAL | 1838.169 | 17 | 108.128 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |
| 2. MOTIVES AND LONG TERM GOALS CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3135.385 | 1 | 3135.385 | 27.020 | .000 |
| GOAL | .324 | 1 | .324 | .003 | .958 |
| AWARENESS | 13.661 | 1 | 13.661 | .118 | .736 |
| MAIN EFFECT | | | | | |
| TRAINING | 100.766 | 1 | 100.766 | .868 | .364 |
| EXPLAINED | 3321.765 | 4 | 830.441 | 7.157 | .001 |
| RESIDUAL | 1972.647 | 17 | 116.038 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |
| 3. INTRINSIC VALUE AND MEANING OF TASK CATEGORY | | | | | |
| COVARIATES | | | | | |
| PRETEST | 3388.739 | 1 | 3388.739 | 30.530 | .000 |
| VALUE | 185.677 | 1 | 185.677 | 1.673 | .213 |
| AWARENESS | 3.763 | 1 | 3.763 | .034 | .856 |
| MAIN EFFECT | | | | | |
| TRAINING | 1.113 | 1 | 1.113 | .010 | .921 |
| EXPLAINED | 3407.465 | 4 | 851.866 | 7.675 | .001 |
| RESIDUAL | 1886.947 | 17 | 110.997 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

4. COMMUNICATED EXPECTATIONS AND PREDICTIONS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 3221.271 | 1 | 3221.271 | 27.179 | .000 |
| EXPECTATIONS | 8.285 | 1 | 8.285 | .070 | .795 |
| AWARENESS | 6.995 | 1 | 6.995 | .059 | .811 |
| MAIN EFFECT | | | | | |
| TRAINING | 50.592 | 1 | 50.592 | .427 | .522 |
| EXPLAINED | 3279.551 | 4 | 819.888 | 6.918 | .002 |
| RESIDUAL | 2014.861 | 17 | 118.521 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

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5. COMMUNICATED TIME LIMITS CATEGORY

| | | | | | |
|---|---|---|---|---|---|
| COVARIATES | | | | | |
| PRETEST | 3193.213 | 1 | 3193.213 | 26.993 | .000 |
| TIME | 10.942 | 1 | 10.942 | .092 | .765 |
| AWARENESS | 15.023 | 1 | 15.023 | .127 | .726 |
| MAIN EFFECT | | | | | |
| TRAINING | 51.745 | 1 | 51.745 | .437 | .517 |
| EXPLAINED | 3283.361 | 4 | 820.840 | 6.939 | .002 |
| RESIDUAL | 2011.051 | 17 | 118.297 | | |
| TOTAL | 5294.412 | 21 | 252.115 | | |

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