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The Effects of Two Motivational Factors on Accuracy and Persistence for Second Graders

Jesse D. Baker
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THE EFFECTS OF TWO MOTIVATIONAL FACTORS ON ACCURACY AND PERSISTENCE FOR SECOND GRADERS

Jesse D. Baker, Ed.D.
Western Michigan University, 1993

Promoting and maintaining motivation in elementary students is an ongoing problem. This study hypothesized that (a) feedback has a greater motivational effect on persistence and on accuracy for second graders than does no feedback, and (b) knowledge of results feedback has a greater motivational effect than does pleasant feeling tone feedback. Evidence from the study showed mixed support for the hypotheses.

The study compared two forms of feedback and the absence of feedback. One group received praise in the form of general, positive statements—classified as feeling tone—about their work while completing mathematics computational portions of the second grade 1989 Stanford Achievement Test (Stanford Achievement Test, 1989) and the fourth grade 1985 California Achievement Test (Harris, 1986). A second group received specific statements—classified as knowledge of results—about their work. A third group received no feedback at all.

There was no evidence that providing feedback provided more motivation to continue with a task than occurred without the feedback. Furthermore, there was no evidence that the provision of knowledge of results statements provided more motivation to continue with a task than occurred with pleasant feeling tone statements.
There was evidence that the provision of feedback produced greater accuracy than occurred without the feedback. However, there was no evidence that the provision of knowledge of results statements produced greater accuracy than occurred with pleasant feeling tone statements.

In this study there is some evidence that young children do produce more accurate results when they receive feedback than they do when they receive no feedback, but the specificity of that feedback is unimportant.

The study aided in understanding the effects of verbal feedback on accuracy and task completion. Elementary educators who use tangible rewards as motivators may enhance task completion and accuracy at the time the reward is provided while reducing students' intrinsic motivation for the future. To help students become intrinsically motivated, educators must consider the effects of verbal feedback.
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The effects of two motivational factors on accuracy and persistence for second graders

Baker, Jesse Duane, Ed.D.
Western Michigan University, 1993
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Jesse D. Baker
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CHAPTER I

INTRODUCTION

The Purpose

How can we make students want to learn? Teachers often ask. The answer is, You can't. "One cannot control a person's behavior in such a way that he will become increasingly independent, free, self-motivated" (de Charms, 1971, p. 385). Teachers can not force children to learn, but they can influence their motivation to learn. Motivation becomes evident when students interact with elements in the classroom. Hunter (1976) asserted that teachers can organize the circumstances in the environment so that a child is encouraged to perform in a way that will heighten learning, a position supported by others (Drew, Olds, & Olds, 1974). The process is often complicated and not universally understood. "Based on the research to date, motivation remains an elusive and difficult concept to apply with accuracy and predictability in learning environments. Yet the teacher remains the single most important person to do this" (Wlodkowski, 1972, p. 26). Brophy (1987) provided the following insight:

Teachers work within certain restrictions. Schools are formal institutions that students are required to attend in order to learn a prescribed curriculum, and classrooms are public settings where performance is monitored by peers and graded by teachers. If teachers were recreation program directors, they could solve motivation problems merely by finding out what their clients like to do and arranging for them to do it. Instead, like supervisors in work settings, teachers must find ways to motivate their students voluntarily to try to do well what is required of them. (p. 41)
Seeing that a student is motivated is easy: the child is engaged in some activity (Hunter, 1967). The difficulty is knowing how a child became motivated and the reason behind the motivation. This dissertation examines the how and the why of motivation by examining the effects of two motivational factors on young children.

The study arranged the learning environment of second grade youngsters by providing two types of verbal feedback during the performance of a mathematical task. Hunter (1967) and Cummings (1980) endorsed these two methods of feedback—feeling tone and knowledge of results—as increasing student motivation. This study attempted to determine if there was a difference in the effect of: (a) the use of feeling tone statements, (b) the use of knowledge of results statements, or (c) the absence of any statement during the completion of a task. Two hypotheses were proposed: (1) A student’s attention to a task is influenced by what a teacher says during the completion of that task; and (2) accuracy on a task is influenced by what a teacher says during the completion of the task.

To test each hypothesis, three groups of second grade students were provided with (a) feedback in the form of verbal feeling tone statements, (b) feedback in the form of verbal knowledge of results statements, and (c) no feedback. The study examined the effects of informational, oral feedback (praise and compliments), not tangible rewards (candy, games, awards). This direction was selected for two reasons: (1) verbal statements have been shown to cause increased intrinsic motivation (Bandura, 1977; Deci, 1972, 1975; Deci & Ryan, 1980; Pallak, Customiris, Sroka & Pittman, 1982; Pittman, Boggiano & Ruble, 1983; Swann & Pittman,
1977; Zigler & Kanzer, 1962) and (2) elementary school personnel tend to emphasize stickers, stars, grades, and other external rewards to motivate students even though evidence exists that such extrinsic rewards decrease motivation (Boggiano & Ruble, 1979; Deci, 1971; Lepper & Greene, 1978; Lepper, Greene & Nisbett, 1973; Swann & Pittman, 1977).

The Significance

The importance of this study lies in understanding the effects of verbal feedback on accuracy and task completion. Elementary educators who stress extrinsic rewards as an end result to a task may in fact enhance task completion, but at the risk of diminished accuracy and lessened desire to conclude a task for motives other than the tangible reward. While the immediate assignment may be complete, there may be an accompanying reduction of a student’s intrinsic motivation to finish a task simply for the joy of the task. Likewise, the indiscriminate use of praise from teachers who are untrained in motivational theory can have harmful effects on students (Black, 1992). If education is to be considered a life-long process, educators must help students become intrinsically motivated to learn.

One of the primary objectives of education is to prepare the student for adult life. In order to do this, the educational process must promote learning that will transfer to situations beyond the classroom, beyond the school, beyond the strict control of the teacher. ... To be really effective, the educational process must provide much more and must have its major impact at the emotional and motivational level. What good has been achieved when a child has learned to manipulate fractions in a mechanical way to the point where he can do the problems on an achievement test, if at the same time he has been under such emotional stress that he has also learned to hate the use of numbers? (de Charms,
The use of verbal feedback may be one of the most readily available but most infrequently used techniques to help students succeed in school and become intrinsically motivated.

Motivation and the Educational Leader

Educators need to be versed in the effects and consequences of motivation and its function in order to be instructional leaders. Evaluation systems of teachers should differentiate between effective and ineffective use of praise and other motivational factors; administrators should set the example for school staff in the use of accomplished statements of encouragement (Black, 1992). Hunter (1986) cited as a weakness in the original effective instruction research done in Napa County, California, the “lack of monitoring and encouragement by the administration” (p. 178). Grossnickle and Thiel (1988) listed 12 reasons for focusing on student motivation. Two of these reasons pertained directly to school leaders: “By learning motivational skills, the educator is better able to assist the student to accomplish future goals and learn skills necessary to become a responsible, self-disciplined, and self-motivated learner; ... Teaching with the support of motivational skills is more effective, efficient” (p. 5). In the same publication these authors provided ways in which school principals facilitate a motivating school environment:

- Provide appropriate inservice training and staff development
- Encourage teachers to use student feedback in assessing motivational dynamics
- Identify and coordinate available resources of both the school and community
- Emphasize motivational attributes in the teacher evaluation process
• Relate the connection between motivation and discipline problems
• Share insights with members of other school staffs about effective motivational practices
• Evaluate teaching performance, which includes motivation-related expectations. (Grossnickle & Thiel, 1988, p. 46)

Deci and Ryan (1981) suggested that school administrators, and the community in general, need to be supporters of teachers' efforts to try new things, to respond to challenges, and to teach according to their preferred methods. They proposed that if the climate of the educational system were more informational and autonomy-oriented in nature, a teacher's motivation for teaching would be fostered. Teachers, in turn, would be better able to cultivate motivation in their students. "Motivation in the classroom is particularly significant because educators want to know why some youngsters lose their interest in learning after they enter school" (Frymier, 1974, p. 6). According to Swann and Pittman (1977), teachers and administrators should pay greater attention to the procedures used to shape children's behaviors while learning in school. The procedures in question are usually motivational in nature.

Introduction to Motivation

Definitions of Motivation

A precise description of motivation may not exist, but motivation is generally thought of as involving all those variables that arouse, sustain and direct behavior (Torrance & Strom, 1965). Students reveal motivation when they complete assignments or lessons (Brophy, 1986a). Hunter (1967) defined motivation as "a state of need or desire that activates the
person to do something that will satisfy that need or desire” (p. 4). “Motivation to learn is that which gives direction and intensity to human behavior in an educational context. Motivation to learn in school is that which gives direction and intensity to students' behavior in a school situation” (Frymier, 1974, p. 16). Other, similar definitions have been offered:

To motivate is to arouse and maintain goal-directed activity. 
To motivate is to move self and/or others to act. 
To motivate is to create general ideas of desirable future states which can be attained through selective systems and sets of actions. 
To motivate is to move self and/or others to take action toward a desirable future condition. 
To motivate is to give intention, a purpose or a goal toward which self and/or others will take action. (Allen, 1981, p. 5)

The behavior of students while learning and the teacher actions that manifest this behavior is the topic of discussion in this dissertation.

While usually considered as separate entities, motivation and learning are sometimes viewed as interdependent (Logan & Ferraro, 1978). Yet both carry multiple meanings and are one of the most often used educational terms (Allen, 1981). In reference to motivating students, Jackson (1968) lamented that “at present teachers in particular lack an effective set of descriptive terms for talking about what they do. As a result, they often must fall back on clichés and outworn slogans” (p. 176). This imprecision of terminology is in part a result of the intermingling of all areas of psychology in the study of motivation.

Deci and Ryan (1980) categorized the history of the psychological study of motivation into two schools of thought: the psychoanalytical theory of Freud (1917, 1949) and the behavioral associationist theory of
Hull (1943). These early concepts on motivation were based on studies of animals "motivated by deprivation of tissue needs. These had little application to the classroom, which is concerned with higher cognitive activities in students whose purely biological needs are usually satisfied" (Brophy, 1981b, p. 292). These approaches soon became inadequate in their explanations, resulting in motivational theories "independent of the primary, tissue-based drives" (Deci & Ryan, 1980, p. 40).

Motivation as a Teacher Responsibility

The concern over students paying attention in class is a recurring research theme. Jackson (1968) summarized early research results as reporting that most students were attending to their lessons. He contended, however, that many studies examined the physical attention that students gave to the instructor rather than the intellectual attention and that the amount of attention actually paid to learning was often less than met the eye of the observer. According to Stipek (1988), attention to task is more related to the actions of the teacher than to the intelligence of the learner. As teachers manage many aspects of instruction in the classroom, the use of teacher-controlled variables are assumed to affect student motivation to learn. Brophy and Good (1974) explored the consequences of teacher expectations on the achievement of students and concluded that teacher expectations affected student achievement indirectly by influencing the students' motivation to learn. Guskey (1985), in reference to motivating students for mastery learning, urged that youngsters be given information about their learning at regular intervals throughout the instructional process. When students receive feedback about how well
they are doing and when teachers manipulate that feedback, motivation is involved. Brophy (1986a) alleged that students reveal motivation to learn when they try, when they attend to lessons or assignments, when they strive to get the initial benefits, when they understand, and when they remember what they are supposed to learn. This is how teachers would know if their students were motivated.

The 1960's was a decade of study concerning motivation theory. Educators began to realize that their actions influenced what students did. "From the teacher's perspective much of the behavior he witnesses seems to be 'caused' not by some set of mysterious driving forces hidden within his student but by his own actions as a teacher. ... Many obvious and dramatic shifts in students' behavior are largely under his control" (Jackson, 1968, p. 172). Educators were reminded that motivation of students was a major part of their teaching role and that "if motivation doesn't exist, learning probably won't either" (Hunter, 1969, p. 6).

**Informational and Controlling Motivation**

Teachers may manipulate the internal motivation that students have by providing stimuli. Sometimes the stimulus is in the form of feedback about students' attempts. Though no one can directly cause a person to become motivated, teachers can influence a student's motivation by providing verbal statements about the student's efforts that are either informational or controlling (Deci & Ryan, 1981, 1985). Informational motivation occurs when students receive statements that allow them to know how well they are doing. Whereas tangible rewards that are offered in such a way as to be experienced by students as informational do
enhance intrinsic motivation, most often tangible rewards are used to control behavior. Controlling motivation is an attempt to manage another person's behavior or bring about a particular outcome. This usually takes the form of tangible rewards, which have the effect of causing a person to work for the reward and thus decreases any intrinsic motivation that was present.

Verbal praise statements or information about the accuracy of work maintains intrinsic motivation if the feedback is positive (Hecht & Strum, 1974; Stipek, 1988). Anderson, Manoogian, and Reznick (1976) found that with four and five year olds, positive feedback that led students to believe in their competency resulted in greater interest and persistence in an activity. In a 1975 report on motivation of college students, Deci reported that subjects who received verbal reinforcements showed an increase in intrinsic motivation relative to subjects who received no verbal rewards. Deci and Ryan (1985) later found that events such as choice and positive feedback that facilitate self-determined competence had an informational significance and found these events to enhance intrinsic motivation. Others have proposed as a solution for motivating students the recognition and rewarding of a variety of kinds of excellence (Torrance & Strom, 1965).

**Teacher Feedback**

Teacher feedback as a way of influencing student motivation has been examined in numerous other studies (Bardwell, 1981; Deci & Ryan, 1981; Maehr, 1976; Maehr & Stallings, 1972; Pallak, Costomiris, Sroka, & Pittman, 1982; Pittman & Pittman, 1980; Story & Sullivan, 1986). Swann
and Pittman (1977) discovered the same effect on elementary school students in general that Anderson, Manoogian, and Reznick (1976) found on kindergarten students: positive statements lead to increased motivation. None of these studies, however, differentiated between general, positive statements and specific statements about the accuracy of the task during production.

Hunter (1976, 1979a, 1979b, 1984, 1986) discussed teacher decisions that cause students to maintain attention to a learning task. She concurred that teachers govern the amount of attention students give to a task by the actions that teachers take and by the words that teachers say. Hunter thus agreed with earlier researchers that the amount and type of feedback an instructor gives to a pupil after the pupil attempts a task impacts the motivation for that task.

**Intrinsic and Extrinsic Motivation**

Rewards and types of feedback, as well as their effects on students, have been widely examined, often under the terms *intrinsic* and *extrinsic*. Deci and Ryan (1981) described three types of motivation: intrinsic, extrinsic, and amotivating. Intrinsic motivation was described as the way that young children learn, with exploration and questioning. With intrinsic motivation present, the reward for an activity was the activity itself. No external stimulus is needed. Extrinsic motivation was viewed as the learning behavior of older children, who work toward the reward, the outcome of the activity, and not the activity itself. Amotivating motivation was characterized by passive youngsters who appeared helpless. Learning for such children emerged slowly and painfully. The limitation
of intrinsic motivation to younger students and of extrinsic to older students was not accepted by all authors on the topic of motivation.

For Sanders (1961), intrinsic inducements were "usually more effective because they gave a sense of achievement (satisfying the esteem need). ... Extrinsic rewards which were related to the task only by arrangement of the person in authority made the goal itself seem less important than the goal or task because they symbolized approval, prestige, or recognition" (p. 13). Intrinsically stimulated behaviors were defined as "those behaviors that are motivated by the underlying need for competence and self-determination;" operationally they were labeled "those [behaviors] that are performed in the absence of any apparent external contingency" (Deci & Ryan, 1980, p. 42).

Brophy (1972) argued that feedback in the form of extrinsic rewards was not in the best interest of students or society. Our culture operates both in schools and in the work place on the principle that people are to some degree self motivated. Self motivation is akin to intrinsic motivation, where one does more than the minimum needed to achieve an extrinsic reward. de Charms (1983) added a rule for schools to follow: "Do not use rewards when they are experienced by the student as controlling or constraining" (p. 392). This advice was echoed by the research of Deci and Ryan (1980, 1981, 1985).

**Feeling Tone**

Hunter (1967) identified the teacher's use of feeling tone as one form of feedback that causes students to maintain focus. She divided feeling tone into three forms, each having its own effect on a learner:
pleasant feeling tone statements increase motivation to a high degree. Examples of pleasant feeling tone are: "You're doing fine," "That's great!" "Nice job," and other general statements that tell a person they are on the right track. Unpleasant feeling tone statements also increase motivation, but to a lesser degree. Statements such as "Get busy!" or "I told you once!" could be considered unpleasant. Hunter (1967) cited possible side effects to unpleasant feeling tone statements: While immediate motivation may occur, the unpalatable attitude displayed may impede future motivation to attempt or complete this, or a similar, task. As is implied by the name, the tone of the speaker is important when delivering unpleasant feeling tone statements. Neutral (or lacking) feeling tone has no effect on motivation. Neutral feeling tone does not acknowledge the effort that was put forth. Even when words are expressed, e.g., "Oh," "Yea," "Uh huh," they carry no connotation that would stimulate a student's desire to proceed.

All feeling tone statements lack specificity (Cummings, 1980; Hunter, 1967). The receiver of either a pleasant or unpleasant feeling tone statement knows that he or she is doing fine (or not doing fine), but does not know exactly why. Since the lack of any statement can be classified as a neutral feeling tone, those persons receiving no feedback at all do not even know how they are doing.

Knowledge of Results

Early in this century, Thorndike (1931) reported on the effects of knowledge of results and concluded that the efficiency of learning was related to the specificity of the information given. Trowbridge and Cason (1932) repeated Thorndike's experiment and obtained similar results.
Mace (1973b) explained this phenomenon as knowledge of results that provided information about the standard being sought.

Hunter (1967) and Cummings (1980) cited the teacher's use of knowledge of results as an additional way of influencing a student's desire to continue working on a task. By providing students with the answer to the question "How am I doing?" (whether asked or not), teachers are able to cause students to assert an effort to continue. Giving students knowledge of results usually brings about increased motivation and affects performance (Bandura, 1977; Deci, 1972, 1975; Deci & Ryan, 1980; Pallak, Costomiris, Sroka, & Pittman, 1982; Pittman, Boggiano, and Ruble, 1983; Prestwood, 1979; Swann & Pittman, 1977; Zigler & Kanzer, 1962). When students hear, "Great, you're capitalizing all the proper nouns" or "Good, you lined up the decimal points before you added," they are hearing knowledge of results statements. While past researchers have often used the terms knowledge of results and feedback interchangeably, this dissertation uses a definition for knowledge of results spawned by Cofer and Appley (1964): the provision of specific and immediate information on the quality or quantity of one's performance. In other words, the students know the exact reason for the compliment, recognition or praise that they experience shortly after their performance.

The key difference between these two forms of feedback—knowledge of results and feeling tone—is the specificity of the evaluator's statement. In providing students with feeling tone, the statements are general and do not indicate a reason for the praise given. Knowledge of results statements contain the precise reason that the praise or compliment was provided. The student knows what task or component of a task
Motivation as a Learner Responsibility

Achievement Motivation

Motivation and achievement have often been linked, with the expectation that a high degree of the former would positively affect the latter. Unlike studies of intrinsic motivation and of feedback, which examined the reactions of the learner to the behavior of a stimulus provider, achievement motivation attributes the presence or lack of motivation to the learner. The attempt to describe a person's desire to achieve is called *achievement motivation*. Two important assumptions of achievement motivation are: (1) achievement situations are settings which require skill and competence; and (2) achievement situations create a motive to approach success or a motive to avoid failure. Achievement motivation investigations examine the relationships between the difficulty levels of materials and the desire of individuals to achieve (Brophy & Evertson, 1976). The actual achievement of an individual is secondary to the desire to achieve.

Attribution Motivation

Attribution motivation is another explanation of motivation as a responsibility of the learner. Attribution motivation explains the lack of incentive as a result of poor effort, not a deficiency in ability. Dweck (1975) worked with elementary school children who attributed failure to lack of ability and did not persist in their efforts. Using verbal feedback,
he taught them to attribute failure to lack of effort. Children improved their performance and, at the same time, started to attribute failure to insufficient effort. Later experiments by Chapin and Dyck (1976) with children who were having reading difficulties showed that verbal feedback could teach youngsters to attribute failure to lack of effort rather than ability.

Questions for the Study

The questions for this study were: Is there a difference in the effect of pleasant feeling tone versus the effect of knowledge of results on the learner? Which, if either, of these two forms of feedback has the greater impact on a student's desire to continue with a task? Which, if either, has the greater impact on a student's accuracy in the accomplishment of a task?

This investigation accepted the past research on the beneficial effects that informational feedback statements have on learners and attempted to determine the effects of specific, positive statements. The investigation narrowed the scope of the benefits of motivational statements to determine the effect of two types of positive statements on 1) students' attention to task and 2) the accuracy of the work performed while the positive statements are provided.

Effects on Persistence on Task

The first research hypothesis investigated the possibility of a relationship between providing or withholding feedback to students during the performance of a task and the motivation of students to
continue that task. Providing students with feedback about their perfor-
man ce on a task during the performance of that task was expected to
cause them to continue the task more than if they had not received
feedback. This investigation served to replicate with the study's
population the findings of earlier researchers. Should the results of this
investigation have proved contrary to earlier findings, the results of the
second research hypothesis would have been suspect. Either the popula-
tion, the method, or both, could have been deemed questionable.

The second research hypothesis investigated a possible relationship
between the type of feedback students receive during the performance of a
task and the motivation of students to continue that task. The
expectation was that the more specific information students received
about the accuracy of their performance on a task, the more motivation
there would be to continue that task.

Effects on Accuracy

The third research hypothesis focused on a relationship between
providing or withholding feedback to students during the performance of a
task and the accuracy of the performance on that task. Providing
students with feedback about their performance on a task during the
performance of that task was expected to increase accuracy on the task.
Like the first research objective, this inquiry served to replicate with the
study's population the findings of earlier researchers. Should the results
of this inquiry have proved contrary to earlier findings, the results of the
fourth research hypothesis would have been suspect and further examina-
tion of the population, the method, or both, would have been required.
The fourth research hypothesis examined a relationship between the type of feedback students receive during the performance of a task and the accuracy of the performance on that task. This objective was designed to determine the accuracy of the statement: The more specific the information that students receive about the accuracy of their performance on a task during the performance of that task, the more accurate is the performance on the task.

Organization of the Dissertation

The dissertation has five chapters in all. An introduction to the question under study and a brief historical background was provided in Chapter I. In Chapter II, a review of pertinent literature in relation to this study is presented. Chapter III contains a description and rationale of the methods and materials used in the study. The design of the study is presented in this chapter. Chapter IV includes the presentation of the data collected, treated, and analyzed in order to make the conclusions of the study. A summary of the study and appropriate conclusions are provided in Chapter V.
CHAPTER II

REVIEW OF THE LITERATURE

Purpose of the Study

This study attempted to determine if there was a difference in the effect of: (a) the use of feeling tone statements, (b) the use of knowledge of results statements, or (c) the absence of any statement during the completion of a task. Two hypotheses were proposed: (1) A student's attention to a task is influenced by what a teacher says during the completion of that task; and (2) accuracy on a task is influenced by what a teacher says during the completion of the task.

Limits of the Review

Motivation is defined as both a drive and an incentive, and although drive and incentive are closely related—drive reflecting one's wants and incentive reflecting the expectation of satisfying them (Logan, 1971)—this review is limited to incentive studies because the variables under examination are considered verbal incentives. As a further limit, this study, and hence its literature review, examines only one aspect of incentive motivation: two forms of verbal feedback presented to students while performing a mathematical task. The feedback forms under study—knowledge of results and feeling tone—are the most important motivational concepts examined in this review of literature. Literature was also limited to studies with human subjects since motivation theory should be human centered rather than animal centered (Maslow, 1943)
and to studies on verbal feedback because the incentives used were presented orally.

Multiple Meanings of Motivation

While motivation is "primarily concerned with how behavior is activated and maintained" (Bandura, 1977, p. 160), the word motivation has been used to describe multiple concepts. To Olds (1955), motivation meant any one of three groups of physiological phenomena: needs, drives, or rewards. To others (Hull, 1943; Logan, 1971), motivation was viewed as having only two aspects: drive and incentive. Motivation has been seen to define an inner faculty as well as an exterior force: "Motivation to learn is in part a function of that which lies within the individual learner [intrinsic] and in part a function of what he experiences from his learning environment [extrinsic]. Because these two interact and affect one another, they are considered a single dimension, but it is undoubtedly a dimension with many aspects" (Frymier, 1974, p. 22).

Theorists explain motivation as the actions that are promoted by feedback, feedback being viewed as either a reward or as correctional information (Bardwell, 1981). The correctional-information role of feedback can likewise be viewed as having two modes: either to confirm existing knowledge or to provide a basis for modifying what is wrong (Phye, 1977).

The fundamental principle of feedback is that an environment that is highly responsive and adaptive to the behavior of the learner will facilitate learning. That is, the study of learning has indicated that feedback contingent upon the consequences of the student's response is a powerful force in guiding and maintaining learning. (Glaser & Cooley, 1973, p. 836)
Regardless of how one considers feedback, the result for the receiver is an incentive to continue—to continue either because what is known is correct and there is comfort in being correct, or to continue because there is new information that allows changing a previous error into a correct reply.

The idea of a reward is often associated with reinforcement theory, but reinforcement theory and incentive theory are not the same:

The critical difference between a reinforcement theory and an incentive theory is in the role ascribed to rewards and punishments. According to the former, there is a single learning process, the strength of which depends not only on the number of times the response has occurred in the presence of the stimulus but also on the consequences of that response. In contrast, incentive theory introduces a second process through which the parameters of reward and punishment effect excitatory potential. Where reinforcement theory assumes that the larger the rewards, the better the response is learned, incentive theory assumes that people learn to expect emotionally significant events that have previously followed a response and that this expectation motivates the performance of that response according to the value of the consequent events. (Logan, 1971, pp. 46-47)

While not rejecting the theoretical principles of reinforcement theory, incentive theory goes beyond reinforcement theory. Reporting on research of the 1960's, de Charms (1971) wrote of motivation theory in terms of a then-popular idea: different strokes for different folks.

Modern reinforcement theory forms the theoretical foundation for some of the most influential new techniques in education. ... Implicit in the theory, however, are some basic assumptions that are beginning to be questioned. The theory defines a reinforcer as anything that makes the desired response of the student more probable; that is, anything that produces learning, since learning is defined as increasing the appearance of the desired response. No distinctions are made between types of reinforcers, and it is implicitly assumed that all reinforcers have the same effect. (de Charms, 1971, p. 390)
de Charms provided an example: one child receives ice cream after each correct response and another child wears glasses so that he can see better. Ice cream and seeing better are the two reinforcers, but are they the same kind of reinforcer? "These two types are sometimes referred to as external and internal or extrinsic and intrinsic reinforcers. ... There is, however, some evidence that external and internal reinforcers have different effects on behavior" (de Charms, 1971, p. 390). According to incentive theory, behaviors occur continuously, with a person choosing responses appropriate to the circumstances. Incentive is the association of a stimulus with a response, so that when choices become available later, the choice selected will result in the expectation of the previous stimulus (Logan, 1971).

While there is a general acceptance of motivation as an educational influence, there is neither a uniform description nor unit of measurement. Simplistically, motivation theories attempt to explain human behavior and involve "variables that arouse, sustain, and direct behavior" (Torrance & Strom, 1965, p. 339). Psychologists and educators frequently use the word to describe the procedure that "(a) arouses and instigates behavior; (b) gives direction and purpose to behavior; (c) continues to allow behavior to persist; and (d) leads to choosing or preferring a particular behavior" (Wlodkowski, 1978a, p. 12). The measurement of motivation is described as the act which is performed from among alternative acts, with "the magnitude of response and the persistence behavior [as a] function of the strength of motivation to perform the act relative to the strength of motivation to perform competing acts" (Atkinson, 1958, pp. 324-325).

The following also have been used to explain motivation: the need for achievement, as in "I want to get an A in this course"; the need for
affiliation, as in "I want to be part of that group"; the need for incentives, as in "I want a raise"; habit, as in "I always take that route to work"; discrepancy, as in "How can I tell a lie to my best friend?"; and curiosity, as in "I wonder why that works" (Good & Brophy, 1986). Of these, it is in relation to achievement that motivation approximates the goal of valuing knowledge and of aiding the transition to intrinsic motivation to learn, for in terms of achievement, motivation is a disposition to value learning as a worthwhile and satisfying activity, as a striving for knowledge and mastery in learning situations (Brophy, 1986a). And it is in terms of incentives that this study examines motivational variables to assess the benefits of one over another.

Motivation and the Acquisition of Knowledge

The acquisition of knowledge and the promotion of learning is a basic purpose of schools (Jackson, 1968). Knowledge—the first of six levels in Bloom's (1953) cognitive framework—is preeminent. Only when the basic facts have been learned can a person (a) understand, (b) apply, (c) analyze, (d) synthesize, or (e) evaluate those facts. These five levels of cognition, along with knowledge, compose the six levels of thinking in Bloom's taxonomy of cognitive thought. Frymier (1974) provides a logic to the steps that instructors take to impel pupils from the initiatory acquisition of knowledge to the thirst for learning that academicians seek:

Because acquisition of knowledge precedes understanding, schools must help youngsters acquire knowledge. Helping children acquire information and knowledge is an educational objective that must be realized before those students can proceed to objectives such as understanding and behaving. In the same way, helping children acquire knowledge is hardly meaningful unless those children value...
knowledge first. Unless they believe in the importance and value of information and facts and knowledge, mere acquisition is pointless. This logic goes even further. Valuing knowledge is not possible unless youngsters have learned how to learn. That is, the skills of learning are not only means to more noble ends but purposes in their own right. Learning how to learn, however, is meaningless if students have not learned to want to learn. In other words, learning to want to learn is an educational objective. (pp. 15-16)

Arriving at a point where students want to learn, however, requires more than the mere presentation of data. Student attention is one indication that the presented facts are being received, but “the signs of overt attention are not always trustworthy indicators of the pupil's actual state of mind. ... All eyes on the teacher does not necessarily mean all thoughts are on the topic at hand” (Jackson, 1968, p. 109). Try as teachers may, gaining and maintaining attention in a classroom, even overt attention, is difficult. Jackson (1968) summarized the feelings of many educators: “It looks as though inattention, as an educational problem, is here to stay, although the teacher’s actions may increase or decrease its severity” [emphasis added] (p. 110).

Abundant references linking motivation and learning are present in the literature. Motivating conditions, for example, are said to energize and direct the activities of organisms and to define the consequences of responses of later performances (Melton, 1955). Factors have been isolated and identified that affect the degree of motivation present during learning (Cummings, 1980; Farrell, 1982; Hunter, 1967): concern or anxiety (how worried is one about the activity?); feeling tone (how does one feel about the learning?); interest (what catches one's attention?); success or level of difficulty (how much is already known and how much
has to be learned?); and knowledge of results (how immediate is the feedback one gets?).

That motivation influences academic achievement is normally accepted in the educational field. For one thing, there is a basic human need to feel that someone loves us, or at least cares about us, regardless of whatever shortcomings we might have. Such words as “Keep up the good work” or “You’re really on the ball” thus induce a motive to continue (Kolesnik, 1978, p. 151). Furthermore, motivation to learn in school gives direction and intensity to students’ behavior in the academic setting (Frymier, 1974). And, we recall, “it is important to remember that if motivation doesn’t exist, learning probably won’t either” (Hunter, 1969, p. 6).

Motivation in the Past Century

Anderson and Faust (1973) presented an overview of motivational studies during the last century. Around 1900, instinct was how psychologists, influenced by Darwin, referred to motivation. The presumption was that a person was born with this instinct. Beginning about 1920, denunciations on the concept of instinct began and words such as reflex and habit came into use. These words indicated that individuals had control over how they acted.

In the early 1930’s, Thorndike (1931) wrote that consequences which strengthened connections were called satisfiers, “a satisfier being defined as a state of affairs which the individual does nothing to avoid, often doing such things as attain and preserve it” (p. 36), and annoyers. Annoyers do not act on learning in general by weakening whatever connection they follow. If they do anything to learning they do it indirectly by informing the learner that such and such a response in such and such a situation brings
distress. ... Satisfiers seem to act more directly and generally and uniformly and subtly, but just what they do should be studied with much more care than anybody had yet devoted to it. (Thorndike, 1931, p. 46)

While these early names did not specify the motivational aspect of instinct, the notion of acquired or learned need did. Soon the concept was expanded to include such words as drive and motive. Murray (1938) was one of the first to explore satisfiers in the guise of a need concept. Murray defined need as a construct that stood for a force influencing one's perception and behavior in an attempt to change an unsatisfying situation. A list of recurring needs, he believed, would correspond to a list of motivational traits, noting that:

there appear to be but two points of difference between a need and a common motivational trait: (1) the former is a momentary process which may operate but once in a man's life, whereas the latter is a recurrent reaction pattern; and (2) the former is an internal process with a subjective correlate which may or may not manifest itself directly or overtly, whereas the latter is a demonstrable attribute from which an internal condition with no subjective correlate is inferred. (Murray, 1938, p. 713)

By the late 1940's, however, few psychologists believed that human behavior was a release from or an avoidance of unpleasant tensions (Good & Brophy, 1986; McClelland, et al., 1953).

Motivation in School

No where is there a place more demanding of attention or success than schools. Maintaining motivation to attend and to succeed has become an important issue in educational institutions. Magnifying the motivation of students to arrive at the highest possible achievement is
important to educators:

Although educators are concerned with individual differences in response to environmental events, the exigencies of education make it incumbent that they be more concerned with how environmental variables have a greater or lesser effect on all students regardless of individual differences. It is difficult, if not impossible at present, to create a specialized environment for each student. A theory of academic motivation must tell the educator how to maintain environments to obtain the greatest overall effects. Thus the question of concern to the educator is how do I manipulate the school environment so that I can maximize motivation in all students regardless of personality differences? (Maehr & Sjogren, 1971, p. 154)

How one attempts to accomplish this goal depends on the view of motivation that one takes. Relevant theories and consequent research on the control or manipulation of humans and the learning environment are a major portion of the rest of this chapter. The next section discusses the theory of achievement motivation and attribution theory, two explanations of motivation that place responsibility on the student. The section after that examines incentive motivation, which emphasizes the role of the teacher.

Motivation as a Student Responsibility

Although difficult to measure or evaluate, the intrinsic aspect of a student's learning is a critical element. "Satisfactions derived from actions may be far more important [than extrinsic rewards] and, since the satisfaction is contingent upon the person's own behavior, he is the only one who can control it. The teacher cannot award or withhold it, since it is the natural result of the student's action" (de Charms, 1971, p. 393). How humans arrive at a state of internal satisfaction is explained by (a)
the theory of achievement motivation and (b) attribution theory. The state of internal satisfaction is known as intrinsic motivation.

The Theory of Achievement Motivation

While some of the above descriptions of motivation may lead one to believe that motivation is the direct cause of all behavior, it is not. Motivation is merely the concept used to describe why humans act as they do (Wlodkowski, 1982). McClelland, Atkinson, Clark and Lowell (1953) introduced the concept of achievement motivation, theorizing that all motives are learned and develop as a result of repeated affective experiences that are connected with types of situations and varieties of behaviors. The situations involve standards of excellence, presumably imposed on a child by the culture or by parents as representatives of the culture. The behaviors involve either competition with the standards of excellence or attempts to meet them. If the behaviors result in the standards being successfully met, there is a positive effect and the behaviors will be repeated; if the behaviors fall short of the standards, a negative effect occurs and the behaviors will be avoided in the future.

Important to the understanding of achievement motivation is a recognition of what achievement motivation data reveal. Achievement motivation experiments attempt to explain the relationships between the difficulty level of a task and the motivation to achieve the task. Achievement motivation does not examine the relationship between the difficulty level and the accomplishment, or achievement, of the task. The theory of achievement motivation is concerned with the person’s desire to achieve, not with a person’s actual achievement on an assignment (Brophy
According to McClelland et al.'s (1953) early view, a person either had scant or abundant achievement motivation. In any case, the amount was constant. Stipek (1988) noted that not all theorists agreed with this view: some regarded achievement motivation as conscious beliefs and values, able to change throughout life. Hence, "an individual may have a strong motive to achieve in geography but not in algebra because of experiences in these particular classes" (Stipek, 1988, p. 9). If youngsters were thus not limited by the amount of motivation implanted by society or by their parents, a teacher could have considerable opportunity to maximize student motivation in school.

To understand the theory of achievement motivation, one needs to be cognizant of two basic aspects: the motive to achieve, considered an approach motive, and the motive to avoid, called an avoidance motive. McClelland et al. (1953) defined a motive as "the reintegration by a cue of a change in an effective situation" (p. 451). A cue that produces either a motive to achieve or a motive to avoid has the power to become a model of that situation and to serve as a motive in the future (Argyle & Robinson, 1962). Thus, a cue that provides a positive effect on a student can cause an approach motive. A student would thereafter be motivated to attempt similar situations. Similarly, negatively affecting cues produce avoidance motives and cause students to shy away from similar situations in the future.

Achievement motive was considered particularly important in situations where one was expected to do one's best. Such circumstances occur frequently in educational environments, with or without prompting.
According to Maehr and Sjogren (1971), achievement motivation is applicable only in situations where achievement is expected. Such situations occur when one considers oneself as responsible for the results of an uncertain outcome and when those results are measured against a standard of excellence that has already been established. Such situations are ones that require skill and competence. From these circumstances will come the motive either to approach success or to avoid failure. Approaching success generates pride, while arriving at failure produces shame (Stipek, 1988). However, Argyle and Robinson (1962) reviewed previous studies and determined that achievement motivation could be produced by rewards and punishment in childhood only under special conditions that were not usually encountered.

Another consideration is how the results of an effort will be used, since their use can affect the feeling of pride or shame. In two studies to determine the effects of internal and external evaluation on motivation (Maehr & Stallings, 1972), continued interest in difficult tasks resulted when subjects worked under internal conditions. The interest was lessened when subjects worked under external conditions. An internal condition was generated by suggesting to subjects that they complete the activity in the spirit of fun and interest and that the results would not be shown to anyone. An external condition was produced by telling subjects that the results would be given to the subject’s teacher. In subsequent tasks, students who had been exposed to internal evaluation conditions showed little interest in easy tasks and greater interest in tasks that were more difficult. Conversely, students who had been exposed to external evaluation conditions tended later to return to easier tasks in which
success had already been met and were reluctant to attempt a more difficult task that might result in failure.

To measure achievement motivation, McClelland et al. (1953) showed ambiguous pictures to subjects and asked for a written description of what was seen. The resulting imaginative stories were analyzed to determine if the subjects were achievement or failure oriented. Although there were no right or wrong answers, the interpretation of the writings revealed if success (or failure) was attributed to oneself or if success (or failure) was deemed beyond one's control. The rationale for this method centered on two ideas: (1) putting thoughts into words was such an automatic response that subjects would respond freely, and (2) in a fantasy situation such as the pictures presented, no response would be better than any other, but the words expressed would reveal the attitude of the subject toward achievement, success, and failure. The Thematic Apperception Test that McClelland et al. used measured a subject's need to achieve, defined as a "capacity to experience pride in accomplishment (Atkinson, 1964, p. 214). This score was used to determine the expected achievement level. For example, Wendt (1955) found that the higher the need-for-achievement score, the higher the score on an arithmetic task. Highly motivated subjects directed more attention and effort to a task than less motivated subjects. In other studies, subjects that had been found to have a high achievement orientation consistently showed a greater tendency to choose alternatives or to perform tasks that had an intermediate probability of success. "Perhaps the major prediction of [achievement] theory is that achievement-oriented subjects will be more motivated toward moderately difficult tasks than failure-threatened
students; in educational terms, achievement-oriented subjects will be more inclined toward challenge” (Maehr & Sjogren, 1971, p. 145). These are students who attribute their success to their own ability or effort, a concept important to the attribution theory of motivation.

Not everyone accepted the results of the Thematic Apperception Test and contradictions have been revealed:

Measuring achievement motivation directly by asking the subject or indirectly by content analysis of his stories tends to produce two different scores that signify different things as far as the rest of the subject's behavior is concerned. A consciously high desire for achievement tends to be associated with conformity, a high valuation on expert authority, and a low valuation on unsuccessful people. A need for achievement as measured indirectly through projective material tends to be associated with internalized standards of excellence that lead to superior performance of various sorts in task situations. (de Charms, Morrison, Reitman, & McClelland, 1955, p. 422)

de Charms et al. (1955) further added to the discussion of achievement motivation by differentiating between the need for achievement and the value of achievement. Subjects with a high value for achievement were not bothered by an “unsuccessful” setting. This was not so with subjects who had a high need for achievement. Subjects with a high need for achievement, de Charms et al. believed, described themselves as ambitious and achievement oriented for defensive reasons. These subjects had been under authoritarian pressure from their parents to be ambitious. The resulting motive was a fear of being unsuccessful and a disregard for those who were viewed as unsuccessful.

Stipek (1988) cited problems with Atkinson's model, saying that it resulted in only modest success for predicting behavior even in highly controlled laboratory circumstances:
The two major variables in the model, need for achievement and motive to avoid failure, are difficult to measure. Also, the incentive value of success (pride) and failure (shame) is fully determined by the probability of success. Consequently, if the probability of success on a puzzle and on a National Merit Test is the same, success on these two tasks is assumed to generate the same amount of pride. Intuitively, it seems that a greater amount of pride would be aroused in the latter than in the former situation, but the model does not differentiate tasks as a function of their importance to the performer. (pp. 77-78)

Still, Stipek concedes that Atkinson made a major contribution to the theory of achievement motivation by including expectation and emotions as factors that influence achievement behavior, thereby paving the way for later cognitive motivational theorists.

Attribution Theory Motivation

Attribution theory evolved from achievement theory and expands the ways in which individuals may explain their successes and their failures (Good & Brophy, 1986). The term locus of control was first introduced by Rotter (1954): those who perceive an external locus of control attribute their behavior to events beyond their control, e.g., luck, attitude of someone else, or fate; those with an internal locus of control sense that they are responsible for their successes or failures. Weiner (1984) developed three separate dimensions from Rotter's single internal-external locus of control dimension. Locus refers to the source of the cause, be it an internal characteristic or an external variable. Stability refers to the duration of the cause, as in ability (which is relatively stable over time) or luck (which often changes). Control refers to the amount of control exerted, contrasting great effort when one believes oneself to be in
control and little effort when luck or fate is held responsible.

Attribution theorists study how individuals themselves interpret a cause or outcome, not how other theorists interpret the cause. The guiding principle of attribution theory is that individuals search for understanding, seeking to discover why an event has occurred. Attribution theorists assume that individuals naturally seek to understand why events occur as they do—especially when the results are in doubt—and attribute results to either ability or effort (Stipek, 1988; Weiner, 1984). Students who are high in achievement motivation have an internal locus of control attitude. They (a) prefer situations in which the consequences of their actions can be ascribed to themselves; (b) attribute outcomes to their efforts; and (c) are sensitive and reactive to feedback that recognizes their efforts (Weiner, 1984). In other words, students who have developed personal responsibility and internal controls are more likely to set goals, evaluate their own performance, and establish self-standards that they want to meet. These are students who have a perception of internal locus of control that leads to increased motivation and academic achievement (Wlodkowski, 1982).

Attribution motivation is related to incentive motivation in its ability to generate future success following initial triumph. “Attribution theory proposes that changes in expectancy for success after attainment or nonattainment of a goal depend on the perceived constancy of the cause of the performance. For example, success with math that is attributed to math aptitude will likely result in higher expectations for future success in math than will success that is ascribed to a lucky guess or to help from other students” (Good & Brophy, 1986, p. 429-430). Thus, students with
an internal locus of control view feedback that emphasizes their effort and ability as an affirmation of their proficiency and would be likely to approach similar situations positively.

**Learned Helplessness**

Some learners believe that there is nothing they can do to avoid failure, a phenomenon called *learned helplessness* (Dweck & Reppucci, 1973; Stipek, 1988). When learned helplessness occurs, the actual event (whether a failure or not) is not important. The power lies in the perception of the event as a failure by the learner. “Two children may receive exactly the same number and sequence of success and failure trials, yet react quite differently as a function of whether they interpret the failure to mean that the situation is beyond or within their control” (Dweck, 1975, p. 675).

To overcome learned helplessness, subjects can be taught alternatives for the outcomes of their actions. Skinner (1968) advocated the need to generate behavior, not merely suppress the undesirable conduct. As examples, he pointed out that we do not strengthen good pronunciation by punishing bad, or cause logical thinking by berating the illogical. To get the desired results, we should teach methods to accomplish those results. One suggested remedy is a success-only procedure (Bigelow, 1972; Hart & Risley, 1968; Meacham & Wiesen, 1974), especially for youngsters who may be seen as having difficulty facing failure (Dweck, 1975). By eliminating any mention or thoughts of failure, the negative emotions of children are deterred. This in turn prevents adverse sentiments about the activity, sentiments that would limit instead of enhance learning.
Within a teacher’s capability is the power to use words and feedback in a way to direct a student’s attention on the relationship between effort and success:

Many students explain their success or failures on the basis of habitual ways that they have learned to view their behavior, rather than on the basis of the actual causal factors operating in the situation—such as saying, “I failed because I’m dumb,” rather than “I failed because I got frustrated and gave up quickly instead of persisting or getting help.” From an attribution theory perspective, the teacher’s major role is to help students develop the capacity for using feedback appropriately. (Good & Brophy, 1986, p. 431)

Dweck (1975) used verbal feedback to teach elementary students to attribute their failure in mathematics to a lack of persistence rather than to a lack of ability. The study showed an improvement in student performance as youngsters began to attribute failure to insufficient effort.

**Intrinsic Motivation**

Humans obtain the greatest satisfaction by succeeding at reaching a sought-after goal (de Charms, 1971). Such satisfaction is acquired when intrinsic motivation is present. Intrinsic motivation is usually defined as the “performance of activities for no apparent external reward” (Bandura, 1977, p. 108). The basic principle involved in having behaviors that are motivated for their own sake rather than for an extrinsic motivator is what de Charms (1984) called *personal causation*, doing something intentionally to produce a change. While intrinsic motivation is an internal state of satisfaction and therefore under the auspices of the learner, a more detailed discussion of intrinsic motivation will be undertaken in the section on motivation as a teacher’s responsibility.
Persistence: The Desire to Continue

One way to determine persistence is to measure the total time or total trials that a person works at a task before turning to an alternate activity. As Feather (1966c) noted, "persistence may be distinguished from the performance level or effort involved in an activity and from the direction which an activity takes, but it belongs with both of these as an important behavioral symptom of motivation" (p. 49). There is further proof that persistence is a factor of motivation:

McDougall (1908), in his discussion of intrinsic, listed persistence as one of the objective features of purposive behavior; Tolman (1932) ... considered persistence-until-ends-are-attained as a basic criterion for molar purposive behavior. ... Atkinson (1957) emphasized that a theory of motivation has as one of its important aims the conceptualization of persistence behavior. (Feather, 1966c, p. 50)

An examination of studies on persistence shows three distinct classes: (1) studies that signify persistence as a trait or uniformity in behavior, e.g., Will a subject who persists at one task also tend to persist at another?; (2) studies that examine the resistance to extinction, e.g., Will a subject perform a task without reinforcement after having been subjected to a reinforcement schedule?; and (3) studies that view persistence as a motivational phenomenon, ranging from ideas of a stable personality disposition (achievement motivation) to incentive values (extrinsic motivation).

Studies of perseverance exist both in isolation and as part of other theories. For example, increased perseverance was one of the findings in the theory of achievement motivation. Feather's (1966a, 1966b, 1966c)
research indicated that both achievement-oriented and failure-threatened subjects persisted on a task. Persistence is furthermore an ingredient in the theory of continuing motivation, defined as the “tendency to return and continue working on tasks away from the instructional context in which they were initially confronted” (Maehr, 1976, p. 443). This persistence is viewed as an ongoing interest rather than a continuation of an extrinsic reward.

There is basic learning research to suggest that partial reinforcement produces more persistence on a task than does continuous reinforcement. Chapin and Dyck (1976) reported an investigation in which the schedule of reinforcement and attribution retraining was varied independently to determine the relative contribution of each of these variables to persistence. The study involved children with reading difficulties and examined their continued responses in the face of successive failures when provided with (a) rewards for responding in similar contexts (partial reinforcement) and (b) training on taking responsibility for the outcomes of their behavior (attribution training). Since the variables were independent of each other, the study showed that partial reinforcement, unaffected by continuous reinforcement, resulted in more persistent, on-task behavior.

As discussed above, the motive to achieve success and to avoid failure is called achievement motivation, in which these two motivations summate to give positive achievement-related motivation (approach) for subjects in whom the motive to achieve success is stronger than the motive to avoid failure and to give a negative achievement-related motivation (avoidance) for subjects in whom the motive to avoid failure is
stronger than the motive to achieve success (Feather, 1966c). Persistence studies and studies of achievement theory often intermix, especially when a distinction between the motivation to perform the initial task and the motivation to perform the alternative task are both attributable to the same motivational components. Story and Sullivan (1986) found that students tended to select a similar activity later if they had initially performed well on the task or if they perceived that they had done well. Hence, by providing information that provided a positive perception of success, students may be induced to continue with the task.

Motivation as a Teacher Responsibility

This section examines the literature on experiments wherein teacher behaviors influenced student behaviors. It begins with a look at the different schools of psychologists and contains a review of studies on feedback, on the ways in which knowledge of results usage has been observed, and on recent discussions of feeling tone. This section concludes with a discussion of the literature on incentive motivation and its two aspects: intrinsic and extrinsic motivation.

Behavioral Influences

Diverse schools of psychologists have explained why people behave as they do under various conditions. Good and Brophy (1986) summarized the theories as follow:

Behaviorists feel that behavior is determined by reinforcement contingencies, so they seek to explain motivation by identifying the cues that elicit behavior and the reinforcement that sustains it. Cognitive psychologists believe that people decide what they want to achieve, and that their...
thought processes control behavior. Hence, cognitive theorists are most concerned with how people process information and interpret personal meanings in particular situations. Humanists also believe that people act on their environments and make choices about what to do, but they are more concerned with the general course of personal development, the actualization of potential, and the removal of obstacles to personal growth. (p. 403)

The distinctions among these different schools are not always clear. For example, according to cognitive evaluation theory, "all rewards and constraints have two functional aspects—a controlling aspect, which brings people's behavior under the control of the rewards or constraint, and an informational aspect, which provides people with information about their competence" (Deci, Nezlek, & Sheinman, 1981, p. 2). This view pales the line between behaviorists and cognitive psychologists. In the cognitive realm there also exists a theory of cognitive dissonance (Festinger, 1957) that explains the human need to establish internal harmony, consistency, and congruity among opinions, attitudes, knowledge and values. Dissonance exists when two psychologically inconsistent conditions, such as opinions, attitudes, or beliefs, occur simultaneously (Good & Brophy, 1986). When this tension develops, humans attempt to restore harmony by (a) changing one or more of the elements involved in dissonant relations; (b) adding new cognitive elements that are consonant with already existing cognition; or (c) decreasing the importance of the elements involved in the dissonant relations (Festinger, 1957).

Behavior analysis suggests that either an external or internal stimulus initiates behavior. One of the basic tenets of behavioral psychology is that humans act as they do to either gain a reward or to
avoid a punishment (Kolesnik, 1978). Good and Brophy (1986) believed that the resulting behaviors were determined by a stimulus-response relationship built through reinforcement. As humans grow, they acquire satisfaction for their needs. Behaviors that result in the acquisition of satisfying responses are reinforced and thus repeated.

**Effects of Feedback**

The provision of feedback is almost universally accepted as a method of increasing productive learning. Bardwell (1981) examined the conditional probability of a wrong response on a second test (given that the subject answered the same item incorrectly on the first test) after receiving feedback on the first test. The study found this probability to be higher for subjects receiving immediate feedback than for subjects receiving delayed feedback. This probability was explained as indicating that feedback provided correctional information. Another study, however, suggested that delaying feedback for one day produced greater retention than providing immediate feedback (Kippel, 1975).

Wlodkowski (1982) believed that “informational feedback appears to enhance student motivation because it (a) allows students to evaluate their progress, (b) maintains student effort toward realistic goals, (c) corrects student errors without delay, and (d) communicates direct encouragements from teachers” (p. 26). A synthesis of research on feedback usage results in the following guidelines for teachers to follow when attempting to motivate learners:

*Provide feedback frequently and efficiently. Some moderate delay may, in fact, allow students to forget incorrect responses, but excessive delay decreases student motivation and feedback loses its effectiveness.
• When applicable, make comments specific and suggest corrections. Students cannot correct mistakes unless they are informed concretely of their errors and, in most cases, are directed toward more appropriate responses.
• Avoid sarcasm and personal criticism. Without constructive alternatives, negative or critical remarks usually lower interest and increase student avoidance of further effort. (Grossnickle, 1989, p. 20)
• Allow students to revise their incorrect responses.
• Reinforce positive patterns of success. (Wlodkowski, 1982, p. 27)
• Dispense reinforcers as soon as possible after the desired performance occurs. (Allen, 1981, p. 21)

Providing informative feedback to students appears to have a facilitating effect on student motivation, allowing youngsters to (a) evaluate their progress, (b) enhance their effort toward a goal, and (c) correct errors without delay (Wlodkowski, 1982). A study by Page (1958), involving over 2000 subjects, showed that student awareness of progress served as an incentive toward increased effort. High school students were randomly assigned to one of three experimental groups. Each youngster was given a letter grade—A, B, C, D, or F—as appropriate for an objective test. The variable was the written comments assigned to each letter grade. The papers of one-third of the students were returned with no written teacher comments. The papers of another third were returned with natural and appropriate comments for the particular student. The papers of the other third were returned with prespecified but encouraging teacher comments, such as “Good work, keep at it” for all B papers and “Let’s raise this grade” for all F papers. On the next exam, students who had previously received teacher comments, both natural and specified, outperformed the students who received no comments.

The effects of feedback vary, however, according to grade levels.
Hoy, Moore, and Hauck (1973) found differences between second and fourth grade students. For second graders, positive feedback resulted in the best performance levels for both high- and low-IQ subjects and negative feedback led to the poorest performance levels.

Second graders may react mainly to the praise-reward value of a given evaluative feedback communication, where the reinforcement is supplied solely by the positive valence of the communication. With age and increased classroom experiences, students learn the informational value of evaluative feedback communications, which then serve as indicators of how much effort is required for success and whether success is likely in a given situation. This cue learning differs with IQ level of the student, and with his classroom experiences of success. Thus, by the time that students reach the fourth grade, very different patterns of response to evaluative feedback communications are formed depending at least partly on IQ and achievement levels of students involved. (Hoy, Moore, & Hauck, 1973, p. 13)

The data suggested that second graders responded originally to the reward value of verbal communication and only later in life learn to respond to the discriminative cue properties of such communications. Spilerman (1971) had earlier drawn the same conclusion: tangible rewards work best for younger learners while older youth react more to social rewards in the form of praise from an adult.

The concern of some educators, however, is that students will become so accustomed to rewards, praise, or other incentives that they will not perform in their absence. Indeed, if rewards are provided and then withdrawn, the motive to perform a task decreases (Skinner, 1965; Smith & Pittman, 1978). If rewards are provided for a task that had in the past been performed without rewards, the task loses its desirability (Condry, 1977; Deci, 1975; Lepper, Greene & Nisbett, 1973; Logan, 1971;
Praise can condition youngsters to depend on it, resulting in fear of its withdrawal and a decline in risk-taking behavior (Kamii, 1984; Rowe, 1974). Ineffective and indiscriminate praise can also cause students to have a low self esteem and to regard peers in a less favorable light (Meyer, 1979).

**Extinction**

A further consideration when examining the effects of feedback is one described by Hull (1952) as *extinction*. When feedback (or any stimulus) is removed after having been consistently provided, the behavior that had earned the reward will at first increase and will then begin to decline in frequency. This decline will continue until the once frequent behavior is extinct and no longer observed at all. In order to avoid extinguishing a desirable behavior, Cummings (1980) suggested a schedule that would periodically provide the stimulus that generated the desired behavior.

**Effects of Praise: Nonspecific Feeling Tone Statements**

The term feeling tone is not generally found in research studies. Both Hunter (1967) and Cummings (1980) used the term as a variable of motivation that is nonspecific, general. Both authors described three forms of feeling tone—pleasant, unpleasant, and neutral—and stated that pleasant feeling tone statements have the greatest impact on the motivation of students. The term most closely associated with the concept of pleasant feeling tone is praise. Brophy (1981b) defined praise as more than feeling tone, adding that praise statements express positive teacher
reactions and express a value statement about the student and the student's status among peers.

As the word implies, praise is positive. Of the two most commonly used incentives—praise and reproof—the preponderance of evidence indicates that praising a person for good work will be more effective than scolding an individual for poor work (Kolesnik, 1978). “Teachers have learned that a positive approach is more effective than a negative one. Praise, for example, is a simple but effective motivating device” (Sanders, 1961, p. 93).

However, Brophy (1981b) contended that praise was not a good motivational tool because it was so rarely and genuinely used: “Typically, ... praise is used infrequently, without contingency, specificity, or credibility. ... Much teacher praise is determined more by teachers' perceptions of student needs than by the quality of student conduct or performance” (p. 5). The praising of low-quality work or of incorrect answers further decreases the effectiveness of teacher praise (Brophy, 1981b; Kolesnik, 1978). “If praise is not contingent on high effort or good performance, it will not increase the likelihood of either. Students learn to discount indiscriminate teacher praise. If poor performance is just as likely to be praised as good performance, or if all students are praised regardless of their effort, students learn that praise is not based on anything they did” (Stipek, 1988, p. 30). Such a response to praise is a learned behavior. As noted earlier with feedback in general, the effect differs with the age group of the receiver. In a study by Meyer (1979), secondary and post secondary students saw praise after an easy task as implying low ability, while elementary students interpreted praise at face
value and saw it as an indication of high ability regardless of the difficulty of the task that earned it.

In addition to differing effects according to the age of the receiver, a student's economic background and ability may affect the way students react to praise:

First, low-SES and low-ability students experience failure frequently and thus are likely to be discouraged, perhaps even alienated, learners. Teacher praise and encouragement for academic progress is much more meaningful and motivating to them than it is for high-ability students accustomed to consistent success. Second, students in the early grades, especially those who are low in ability, may not clearly perceive the distinctions between praise that is or is not contingent, specific, or credible. To the extent that this is true, even noncontingent praise might have beneficial effects. Third, to the extent that low-ability students are less cognitively advanced than other students, they may retain an orientation toward pleasing adults and taking what adults say at face value longer, and thus may be responsive to teacher praise for an extra grade or two in school. (Brophy, 1981b, p. 16)

Praise also has another—negative—side: admonition or reproof. In the 1920's, Hurlock (1924, 1925) showed that reproof lacked the incentive of praise. In a study of fourth and fifth graders, Hurlock (1924, 1925) divided students into four groups: a praised group, a reproved group, an ignored group, and a control group. All except the control group were given mathematical tests in the same room. The praised group received praise before the whole class, while the reproved group were scolded for poor performance in front of their peers and the ignored group heard all comments but received no incentives themselves. Pretesting had allowed the groups to be equally divided by ability. Yet differences soon were found in their mathematics scores following treatment, with the praised
group gaining the greatest improvement, although increased accuracy was found in both the praised and the reproved groups. Both the ignored group and the control group (which had received no feedback at all) showed a decrease in accuracy during the experimental time.

Effects of Knowledge of Results

"Since the early work of E. L. Thorndike, it has been assumed that informative feedback in the form of knowledge of results facilitates performance" (Phye, 1977, p. 1). Hunter (1969) defined knowledge of results as specific and immediate feedback to a person's efforts. The more precise and specific, the more helpful it is. The term knowledge of results refers to providing the student with information (knowledge) about the adequacy (results) of his responses (Anderson & Faust, 1973). Hunter (1969) stated that "a person needs to know how he is doing, i.e., what he is doing correctly and therefore should continue, and what he is doing that needs to be changed or improved. The answer to the question, 'how am I doing' is known psychologically as knowledge of results and is essential for speedy and effective learning" (p. 102). Knowledge of results statements are present when the teacher's words:

• are delivered contingently
• specify the particulars of the accomplishment
• show spontaneity, variety, and other signs of credibility: suggest clear attention to the student's accomplishment
• provide information to students about their competence or the value of their accomplishments
• attribute success to effort and ability, implying that similar successes can be expected in the future
• focus students' attention on their own task-relevant behavior. (Brophy, 1981b, p. 298; Brophy, 1987, p. 47; O'Leary & O'Leary, 1977)
Knowledge of results is commonly thought to have motivational aspects (Cofer & Appley, 1964). When students are aware of their progress, they are more efficient than when they are ignorant of improvements, especially if the task has been previously done without specific feedback. Students are made aware of their advancement through the provision of feedback statements that are both immediate and specific. These two concepts—immediacy and specificity—are crucial to the understanding of knowledge of results.

**Immediacy**

Providing students with knowledge of results immediately (or as soon as logically makes sense) is an important aspect of this motivating variable. The greater the delay in the receipt of feedback, the weaker will be the resulting reaction; the sooner the feedback is received, the more useful it is (Hull, 1943, 1952; Skinner, 1968). “Immediacy of effects is undoubtedly important for young children who have difficulty linking outcomes to actions when a delay or other activities are interposed” (Bandura, 1977, p. 103). “Organisms tend to choose [the] alternative act which yields reinforcement with the lesser delay” (Hull, 1943, p. 151). Providing immediate feedback to students is also considered one of the instructional processes for mastery learning (Daines, 1982).

**Specificity**

Providing specific feedback is the second important aspect of knowledge of results statements. The effects on accuracy as a result of both immediate and specific feedback has been documented. Annett (1969)
reported on a 1935 study by Mace in which circular targets with a bullseye 1 mm in diameter and nine concentric rings 1 mm apart were fixed onto a wall at eye level. Subjects were to shoot at each of 150 targets in rapid succession. In one condition subjects received no feedback other than words to do their best. In another condition subjects were told their average error on the previous ten targets. Results showed that the introduction of specific and immediate knowledge of results provided a rapid improvement in performance.

Other experiments have shown similar results. In one study involving a series of mathematical drills with children in public schools under normal classroom conditions, students who knew their scores prior to attempting another drill made higher scores than students who did not know their scores (Brown, 1932). Trowbridge and Cason (1932) repeated an earlier line-drawing experiment with the addition of more detailed knowledge of results. Four groups of ten subjects each drew 100 lines of a specified length in one of four conditions. The first was a control group with no knowledge of results; the second heard the experimenter speak a nonsense syllable after each response; the third group was given right/wrong information; and the fourth group was provided with knowledge of results in deviations of an eighth of an inch from the target, such as “three-eighths too long.” The control and nonsense syllable groups did not show any indication of systematic learning, but both informed groups did. The group receiving detailed directional information learned more than the right/wrong group. Trowbridge and Carson (1932) concluded that the efficiency of learning was related to the specificity of the information given.
did significantly better on their final examination than comparable students who did not receive their quiz results until the next class meeting. Students in Angell's experiment used a punchboard to take the quizzes, punchboards that immediately provided knowledge about the accuracy of the selected answer. The study showed the following results:

• Differences between scores on the final exam were in favor of the experimental group that used the punchboard and received immediate knowledge of results.
• Students receiving immediate knowledge of test results made slightly more gain on the application of items in the final examination than on knowledge of facts items.
• Learning about errors as soon as they were made on the quizzes apparently made students feel somewhat more nervous than usual.
• The majority of students who used the punchboards signified a desire to use punchboards for most of their examinations despite the fact that they thought them less convenient than other methods of taking quizzes.
• Students using the punchboards, more so than students using IBM answer sheets, tended to look upon quizzes as opportunities for learning. (Angell, 1949, p. 394)

Specific feedback is also related to achievement and to intrinsic motivation. Anderson, Evertson and Brophy (1979) recommended that “when teachers use evaluative feedback, they should be specific with their students about the behaviors being emphasized” (p. 215) in order to promote task achievement. Specific feedback likewise cultivates the clear understanding of a task's criteria for success, thereby allowing self-evaluation on task performance (Csikszentmihalyi, 1978).

Summary

As early studies of motivation, these experiments supported the contention that knowledge of results acted as an incentive to produce
higher scores. Subjects who received knowledge of results, on the average, achieved better performance scores than those who acquired no knowledge of results. However, some of the effect may have been attributed to interest, attention, and the avoidance of boredom which knowledge of results can provide. A study by Prestwood and Weiss (1978) affirmed the following effects of knowledge of results:

Volunteer college students were assigned to one of six computer administered vocabulary tests, one half with immediate knowledge of results after responding to each item, and the other half without knowledge of results. The six tests were designed to be at one of three levels of difficulty and consisted either of 50 preselected items (conventional testing) or tailored on the basis of previous candidate responses (stradaptive testing). ... Questionnaire results indicated that, although the students perceived the differences in test difficulty, there were not shown to be any effects on mean student anxiety or motivation scores attributable to test difficulty alone. Students in general reacted very favorably to receiving immediate knowledge of results and its provision increased the mean level of reported motivation. (pp. 3-4)

"One major problem in the study of knowledge of results in teacher-constructed tests has been the failure to control for the possibility that the knowledge of results received on one test item may provide the examinee with information concerning the correct answers to succeeding items" (Betz & Weiss, 1976, p. 4). Yet in other studies (Gialluca & Weiss, 1980), feedback did not systematically increase total test scores, as would be expected if students were using results from previously administered items as clues for subsequent items. The Gialluca and Weiss experiments found no evidence that the effects of knowledge of results were cumulative over the continuous item sets within the test, but did determine that students who received immediate knowledge of results achieved uniformly higher subtest scores.
There are three purposes to knowledge of results: (1) providing students with reinforcement when work is satisfactory (Anderson & Faust, 1973); (2) providing students with corrective feedback when they make an error (Anderson & Faust, 1973; Bandura, 1977); and (3) setting or implying a goal (Annett, 1969). These three functions are included in the following options that teachers have when providing feedback, although only the last two options could be classified as knowledge of results.

• ignore the mistake; withhold reinforcement
• tell the student he is wrong
• tell the student he is wrong and furnish the correct answer
• tell the student he is wrong, furnish the correct answer, and explain why the correct answer is correct
• tell the student he is wrong and explain why he is wrong. (Anderson & Faust, 1973, p. 272)

Anderson and Faust (1973) cited studies that suggested it was more important to inform students of the right answer than to merely tell them that they are wrong: “Research indicates that knowledge of results is more effective when it contains information about what the correct response should be, rather than merely letting the student know he is wrong” (p. 293). Kolesnik (1978) advised that corrective feedback was “likely to be more effective when it informs the student about what the correct response should be instead of simply letting him know that he is wrong” (p. 213). Kolesnik, then, found benefit in looking at the correctness of the responses, a position later advocated by Allen (1981). Torrance and Strom (1965) recommended making the learner aware of what is good. That knowledge of results provides a standard by which one can judge performance is supported by Cofer and Appley (1964).
Incentive Motivation

When motivation is seen as “involving all those variables that arouse, sustain, and direct behavior” (Torrance & Strom, 1965, p. 339), a student who lacks motivation is viewed as one not sufficiently aroused or sustained to learn to the level of capability. As seen earlier, one method of increasing arousal and of sustaining interest is through the provision of feedback. In a study by Zigler and Kanzer (1962) which examined the effectiveness of two types of verbal reinforcers, one was found to be more effective for middle-class students and another was determined to be more effective with lower-class youngsters. Zigler and Kanzer classified their reinforcers as either praise or correctness feedback. The praise was general statements, similar to the definition of feeling tone used in this study. The correctness feedback contained the specificity and the immediacy that is linked to knowledge of results in the present study. The correlation of praise with the learning of lower economic students was again found in a Brophy and Evertson (1976) study. In this examination, “praise rarely correlated positively with student learning in high SES schools, although it correlated positively fairly often in low SES schools. ... Praise tended to correlate negatively with learning gains in high SES students and positively but very weakly with learning gains in low SES students” (pp. 89-90). Contrary results, with no interaction between praise versus correctness reinforcement and socioeconomic status, were found in a later study (Rosenhan & Greenwald, 1965). As yet there exists no conclusive evidence that one form of incentive has a greater effect on children from a particular social background.
Intrinsic Motivation

There is often not a clear distinction between intrinsic and extrinsic motivation. A person who works primarily for the money to survive may also enjoy the work (Kolesnik, 1978). The distinction is sometimes a matter of degree. Intrinsic motivation is defined as either an underlying need for a sense of competence and self-determination (Deci, 1975; Deci & Ryan, 1980) or as a sense of personal causation (de Charms, 1968). When there is no apparent external reward associated with a task, e.g., when the reward is the task itself, the task is generally considered intrinsically motivational (Deci & Porac, 1978). An intrinsic motivational orientation has two general aspects: (1) the selection of behaviors that are guided by motives such as curiosity and (2) the classification of behaviors, activities, and sources of stimulation as either relevant or irrelevant to the satisfaction of intrinsic motivation (Pittman, Boggiano, & Ruble, 1983). Brophy (1981b) believed that in order to have students academically engaged, they must develop intrinsic motivation, an interest that goes beyond the classroom. Included in intrinsic motivation is an enjoyment for learning and a pride in the accomplishment of learning tasks. The distinction between intrinsic and extrinsic motivation is widespread, although Avila and Purkey (1966) have argued that there is only one kind of motivation—internal—that is in force at all times whenever human beings engage in an activity.

Attribution theorists have shown that extrinsic rewards decrease intrinsic task motivation when intrinsic motivation was initially in place. When a subject was paid for doing a task or received an external reward for doing a task, the subject became less likely to do that same task again.
without the pay or the reward (Condry, 1977; Deci, 1971, 1972; Festinger, 1957; Harackiewicz, 1979; Harlow, 1953; Lepper & Greene, 1978). There were three arguments for this decline. The first posited that the degree of decline depended on the interest level of the activity for an individual: When the activity was interesting or stimulating, adding an external reward decreased task satisfaction; when the activity was either neutral or undesirable, adding an external reward increased task satisfaction (Calder & Staw, 1975). A second argument presumed that these results were caused by the dearth of information provided by the extrinsic reward (Pittman, Boggiano & Ruble, 1983). This second argument followed the following line of reasoning: extrinsic rewards could have been given (a) for merely engaging in an activity or (b) based upon a subject’s performance in the activity. When rewards were provided solely for activity engagement, interest fell; when rewards were provided based on performance, it did not (Boggiano & Ruble, 1979; Pallak, Costomiris, Sroka, & Pittman, 1982). Thus, extrinsic rewards that were contingent upon the demonstrated competence did not affect the intrinsic value of the activity. Stipek (1988) summarized the arguments as follows:

If the teacher makes recess (the reward) contingent upon a student’s finishing his math assignment, she is using the reward to control the student’s behavior; the reward contains no information about the student’s level of mastery. If the teacher makes an “A” contingent upon the student’s getting at least 80 percent of the math problems correct, the reward conveys information about the student’s mastery. According to Lepper (1981), rewards that serve only as incentive or social control function undermine intrinsic interest. Thus a person will only engage in the rewarded activity as long as the reward is expected, even if he or she was previously interested in the task without a reward being made contingent upon it. When rewards are made contingent upon a specific level of performance, and therefore, provide information regarding level of mastery, they are less likely to
undermine than when they are given for simply performing a task. (pp. 66-67)

The third argument addresses a person's sense and feelings of competence. Studies by Deci and Cascio (1972) and by Deci, Cascio, and Krusell (1973) supported the hypothesis that intrinsic motivation decreases when perceptions and beliefs of self-competence are diminished. They concluded that negative feedback, whether administered verbally by an evaluator or imposed on one's self through failure, created a decline in one's intrinsic motivation.

There are hence two psychological processes through which rewards or other situational factors can affect intrinsic motivation: through a change in the perceived locus of causality (de Charms, 1968); and through a change in perceived competence (Deci, Nezlek, & Sheinman, 1981). The change in the locus of causality results in the decrease of intrinsic motivation and an increased reliance on extrinsic motivation:

When people are intrinsically motivated for an activity, the perceived locus of causality is internal, and they feel self-determining. When they are extrinsically motivated, the perceived locus of causality is external, and they feel less self-determining. When people are rewarded for or constrained in doing an activity, the perceived locus of causality tends to become more external; when they do an activity in the absence of rewards and constraints, the perceived locus of causality tends to become more internal. (Deci, Nezlek, & Sheinman, 1981, p. 2)

Deci, Nezlek, and Sheinman (1981) cited this phenomenon as the cause of the decrease in intrinsic motivation that was observed following (a) the provision of monetary rewards; (b) the avoidance of punishment; (c) surveillance, and (d) deadlines. They contended that when a person's feeling of competence was enhanced, the intrinsic motivation was
increased. Success provided a feeling of competence and thus enhanced intrinsic motivation. The provision of positive feedback "raises the activity level of the organism at the time of its presentation, thereby producing increased learning which ... fixates the traces of the just-preceding-response" (Olds, 1955, p. 142). Put simply, intrinsic motivation increases following positive feedback. In the same view, negative feedback would result in a decreased feeling of competence and would lessen intrinsic motivation.

General verbal rewards were also shown by Swann and Pittman (1977) to increase intrinsic motivation in children. However, their study paired verbal rewards with tangible rewards, thus making it difficult to determine if the increased intrinsic motivation was a result of the verbal rewards, of the tangible rewards, or of some interaction between the two. Dollinger and Thelen (1978) compared the effects of tangible rewards and self-reward with the effects of verbal rewards, symbolic rewards, and control procedures. Their experiments concluded that while verbal rewards did not increase intrinsic motivation, verbal rewards did not decrease intrinsic motivation as had money (Anderson, Manoogian, & Reznick, 1976; Deci, 1971) and candy (Ross, 1975) when they had been used as rewards.

There are two limitations on the use of verbal rewards to enhance intrinsic motivation (Pittman, Boggiano & Ruble, 1983): "verbal rewards will not increase intrinsic interest when they are delivered in a controlling context or when they are delivered under close surveillance of performance. The combination of controlling verbal rewards and close surveillance ... produced a decrease in intrinsic interest" (p. 324). Other
findings have indicated that the use of verbal rewards which are not congruent with the behavior will result in less efficient problem solving than either a neutral, no-reward situation, or the use of rewards which are congruent with the problem-solving behavior (Lawlor, 1970).

There is an important distinction, as well as interaction, between intrinsic and extrinsic motivation (Wlodkowski, 1978a): Whereas the former refers to the pleasure or value associated with performing the activity, extrinsic motivation emphasizes the value placed on the culmination of the activity. In extrinsic motivation, the goal is more important than the performance. Furthermore, extrinsic rewards are insufficient to motivate students on a continual basis. They need the satisfaction that can be obtained only from intrinsic motivation (Allen, 1981).

**Extrinsic Motivation**

There are some activities that students would not be expected to select on their own volition. Jackson (1968) contemplated how one could intrinsically convince youngsters that they should remain quiet when they in fact wanted to talk. Learning multiplication tables or spelling words are likewise not high on most students' lists of desired activities. To motivate youngsters towards completing these activities, external motivation techniques need to be used (Pittman, Boggiano, & Ruble, 1983). Caution must be taken not to make a youngster dependent or focused upon the reward, however. "Extrinsic rewards which are related to the task only by arrangement of the person in authority make the goal itself seem less important than the goal or task because they symbolize
approval, prestige, or recognition. Because the reward is externally related to the activity involved, there is a tendency to take short cuts to the reward. "Cheating on examinations is a familiar example" (Sanders, 1961, p. 13).

Logan (1971) sited various forms that extrinsic motivation can take. Praise by parents or teachers reduces the fear of social disapproval and increases motivation to learn. Threats or restrictions on freedom can lead students to attempt an otherwise uninteresting task. Rewards in the form of money, tokens, or even report cards can be used to induce motivation.

There are cautions using extrinsic motivators (Logan, 1971). First, there is often difficulty in identifying a reward (verbal or tangible) that is truly needed, wanted, or desired by the subject. Second, there is a need to vary the amount of the reward according to the student's present level of proficiency. The first concern is simply one of determining what would be appropriate for each individual student. The second concern is more difficult: estimating the student's potential to provide the correct amount of reward according to the then-present proficiency level. As a further caution, attribution theorists discovered that extrinsic rewards decreased intrinsic task motivation when intrinsic motivation was initially in place. Once a subject was paid for doing a task or received a reward for doing a task, the subject was less likely to do that same task again without the pay or the reward (Condry, 1977; Deci, 1971, 1972; Festinger, 1957; Harackiewicz, 1979; Harlow, 1953; Lepper & Greene, 1978). Called the "over-justification" hypothesis (Lepper, Greene & Nisbett, 1973), the finding was that subject interest decreased when an unexpected reward was given following an activity of initial intrinsic interest to the subject.
These cautions do not imply an advised avoidance of extrinsic motivators, however. In studies resulting in the decrease in intrinsic motivation through the addition of an extrinsic motivator, the extrinsic motivator had been primarily a tangible extrinsic reward. The use of a verbal reward alone as an extrinsic motivator, or the use of verbal rewards along with a contingent physical reward, neutralized or eliminated the decline in intrinsic motivation (Anderson, Manoogian, & Reznick, 1976; Deci, 1971, 1972; Swann & Pittman, 1977). "When money was used as an external reward, intrinsic motivation tended to decrease, whereas when verbal reinforcement and positive feedback were used, intrinsic motivation tended to increase. Discrepant findings in the literature were reconciled using a ... theoretical framework which ... concentrated on the nature of the external rewards" (Deci, 1972, p. 105). Moreover, rewards are often a way to get people engaged in activities that they would not try under normal circumstances. In some instances, people may find that they enjoy the activity and hence become intrinsically motivated to subsequently participate in a similar endeavor (Condry, 1977; Deci, 1975; Lepper, Greene & Nisbett, 1973; Logan, 1971; Weiner & Mender, 1978).

In conclusion, there are four generalizations on the use of extrinsic rewards: (1) Extrinsic rewards that were salient and contingent upon performing an activity tended to decrease intrinsic motivation for doing interesting activities; (2) extrinsic rewards that were used to convey information about one's competency and self-determination (as opposed to being controllers of behavior) tended to enhance rather than undermine intrinsic motivation; (3) extrinsic rewards tended to impair performance on open-ended activities such as problem solving; (4) extrinsic rewards
tended to improve performance on routine, well-learned activities (Deci, 1978).

Relation of Literature to What was Examined

The preceding review of literature and the study examined a small section of academic incentive. Only a specific aspect of motivation—the giving of informational, oral feedback—was addressed. Other incentives, such as tangible rewards (candy, games, awards), were not investigated. The selection of oral versus written feedback as a topic of examination was made for two reasons: (1) verbal statements have been shown to cause increased intrinsic motivation (Pittman, Boggiano, & Ruble, 1983) and (2) elementary schools tend to emphasize stickers, stars, grades, and other tangible rewards as a means of instigating student performance when perhaps oral feedback that informs students of their ability may produce greater achievement. This chapter concludes with a discussion of how what was studied is related to the literature that has been reviewed.

Verbal Feedback

Viewing motivation as a means of inducing others to perform in a particular way was vital to this study. Two forms of verbal feedback—knowledge of results and feeling tone—were the motivational concepts examined. The study used only verbal knowledge of results statements and feeling tone statements as feedback since “there is some evidence that for elementary level students oral feedback may be more effective than written comments in affecting future performance” (Wlodkowski, 1982, p. 26). Feedback can provide either a reward or
correctional information (Bardwell, 1981). This study did not distinguish between these two provisions since either role has the possibility of producing increased motivation. As noted before, there are two purposes to correctional information feedback: to confirm existing knowledge or to modify a response (Phye, 1977). However, no distinction was made in this study between these purposes due to the potential motivational aspects of either forms of correctional information feedback.

This study examined incentive motivation as opposed to reinforcement theory. Logan's (1971) explanation of incentive theory—humans anticipate consequences that have followed previous responses and these consequences affect future performances—was used for the study. The study followed the position of the behavioral psychologists by examining the cues that students receive and the consequent behavior that follows those cues (Good & Brophy, 1986). Jackson's (1968) warning that student inattention was been and will remain a liability of education, juxtaposed with his urging that a teacher's actions can increase or decrease the severity of that inattention, serves as a challenge for present educators. The study's focal point: What teacher actions best augment (or diminish) a pupil's focus on a task?

Of the four human behaviors that motivation describes—arousing behaviors, directing behaviors, causing persistent behaviors, and selecting behaviors (Wlodkowski, 1978b)—this study of knowledge of results and feeling tone examined two: the arousal and the persistence of behaviors. Verbal feedback is predominant in elementary school settings. If verbal feedback could be shown to produce a striving for knowledge or a mastery in learning situations, educators need to recognize this effect.
Achievement Motivation

Achievement motivation, concerned with a desire to achieve, not actual achievement (Brophy & Evertson, 1976), was a further consideration in the direction of this study. Stipek's (1988) acknowledgment that youngsters could have varying amounts of motivation to achieve in different subjects corresponded to the purpose of this study since the hypotheses posited that teachers could influence students' behaviors. If every child had the same amount of achievement motivation for all subjects, the effect of the teacher's words would be negated by an internal student motivation beyond the teacher's control. When a youngster is not limited by the amount of potential motivation, a teacher could have considerable opportunity, and perhaps responsibility, to maximize that motivation in school.

de Charms et al. (1955) differentiated between the need for achievement and the value of achievement. They contended that both the need and the value could be taught. For the present study, achievement motivation is regarded as a learned behavior, for only as a learned behavior could it be controlled or manipulated. Without this ability, educators would not be able to impact either a learner or the learning environment. Achievement theory posits that one can teach and then measure the motivation to achieve in a situation involving skill and competence. Logically, skill and competence correlate highly to what educators expect of young learners in a school situation.
Economic Status

A further consideration, though rejected as meaningful, in selecting the type of feedback statements to use with the population in this study was the economic status of the community. A Zigler and Kanzer (1962) study examined the effects of praise and correctness feedback on students of varying economic backgrounds. The praise that was used was general statements, similar to the definition of feeling tone applied in this study. The correctness feedback contained the specificity and the immediacy that is linked to knowledge of results in the present study. On the basis of the results of the Zigler and Kanzer (1962) study—praise as a more effective reinforcer for lower-class children, and correctness feedback a more effective reinforcer for middle-class students—knowledge of results was hypothesized as having the greater effect. Contrary results, with no interaction between praise versus correctness reinforcement and socio-economic status, were found in a later study (Rosenhan & Greenwald, 1965). Although the subjects of the present study were not lower-class youngsters, their parents' incomes did not qualify as middle class, let alone high income. A lower middle-class setting with a middle-class value system would be the appropriate description. Because of this economic level, hypotheses posited that praise would not have the greatest effect on student learning for this group of youngsters and that specific feedback would.

Incentive Motivation: Extrinsic and Intrinsic

The interplay between extrinsic and intrinsic motivation is important to this study. Logan (1971) theorized that the method to produce
students who are intrinsically motivated could be through extrinsic motivation: if intrinsic interest is low, extrinsic methods may be a way to raise it. There are many types of extrinsic motivators. For the subjects under investigation, tangible rewards and threats were not employed; only verbal accolades were variables.

Students benefit more from knowing the right answer than from merely knowing if they were right or wrong (Anderson & Faust, 1973; Kolesnik, 1978; Torrance & Strom, 1965). The provision of knowledge of results addressed this benefit. The feedback method used in this study resembled what Brophy and Good (1969) called process feedback.

Process feedback occurs most frequently following errors, when the teacher explains the reasoning processes to be gone through to arrive at the correct answer or explains the erroneous processes followed by the child to arrive at the wrong answer. Process feedback may sometimes follow correct answers, as when the teacher elaborates on the response to verbalize the process knowledge it represents ("Yes, we know that we should use a capital letter since it is a proper name, and all proper names begin with capital letters.") ... Process feedback will usually require elaboration upon the answer to a question. (p. 26)

In this study students were informed about what they had done correctly by specifically mentioning the logic or the method used to arrive at the correct answers. When incorrect answers were found, the correct replies near or around the incorrect ones were brought to the student’s attention in an attempt to focus the subject on the reason for the positive response that the correct answers had earned. This method duplicated in a more limited respect Brophy and Good’s (1969) process feedback and served as a response to one of Anderson and Faust’s (1973) concerns: “There has been little research on more complicated forms of knowledge of results” (p. 273).
By supplying students with specific information about their correct performance, students were knowledgeable about how to arrive at the target expected by the teacher. "In incentive experiments, knowledge of results generally has two roles. First, as feedback, it is essential to the attainment of some target performance, and second, given no other statement of the goal, knowledge of results in certain forms can be taken as implying a goal" (Annett, 1969, p. 160). That knowledge of results provides a standard by which a subject can judge performance is supported by Cofer and Appley (1964). This study was an incentive experiment, with the knowledge of results that youngsters received serving as both feedback and as an implied goal.

**Persistence**

In the present study, students who chose not to persist with the task could be seen as doing so because their motive to avoid failure was greater than their motive to achieve. In this sense, achievement motivation was a factor both in the initial mathematical task and in the alternative choice of inactivity. Since the alternative activity in this study was to do nothing, the alternative could be regarded as an avoidance of failure. The initial activity of completing a mathematics test could be seen as an attempt to achieve success.

**Summary**

This chapter has reviewed the literature to provide a framework for the concept of motivation and the phenomena that have been shown to affect the amount of motivation an individual possesses. The word
motivation has been used to describe many concepts of human learning, including the methods used to meet human needs; the acknowledgment of human drives; and the provision of rewards following the accomplishment of a task. Motivation is generally considered an ingredient in the acquisition of learning, with greater motivation being associated with greater learning. Motivation is viewed as both a responsibility of the student and of the teacher. Achievement motivation and attribution theory describe principles that make the student accountable for the desire to achieve. When the motivational desire comes from within the individual, that desire is called intrinsic motivation.

A drive or force on an individual that comes from another person or thing is called extrinsic motivation and can be seen as the responsibility of the teacher. Providing feedback in the form of specific or non-specific words or statements is a way that teachers can affect student motivation. Feedback that is specific is called knowledge of results; non-specific feedback is known as praise or feeling tone statements. Which kind of feedback has a greater impact on the motivation of students to remain on task and on the accuracy of student responses is the major focus of this study.

Chapter III describes the methods and materials used in the study and provides the rationale for the design that was used. Chapter IV presents the data collected, treated, and analyzed in order to make the conclusions of the study. Chapter V summarizes the study and offers conclusions.
CHAPTER III
DESIGN AND METHODOLOGY

Introduction

This study examined the effect of: (a) the use of feeling tone statements, (b) the use of knowledge of results statements, or (c) the absence of any statement during the completion of a task to determine which, if any, had an impact on students' accuracy on a task or their persistence on a task. Two questions were proposed: (1) A student's attention to a task is influenced by what a teacher says during the completion of that task; and (2) accuracy on a task is influenced by what a teacher says during the completion of the task.

The previous chapter reviewed some of the abundant literature associated with motivational theories and related that literature to the study under investigation. This chapter expands the understanding of the study by providing the rationales used to: (a) select the population sample, and (b) collect the data. Included in this chapter are the hypotheses and the research methods used to select the sample population, collect the data, and complete the data analysis.

Selection of Sample

Population Sample

The population under study was the second grade student body of a small suburban school district. The total population of second graders in
the district was approximately 150, divided evenly between two schools. The student populations of these two schools were virtually the same (See Figure 1): Measured by the percentage of students receiving reduced or free lunch, the socioeconomic status of students are almost equal. Measured by the Michigan Education Assessment Program test results, the academic achievement of both schools was uniform. Less than one percent of either school was minority.

<table>
<thead>
<tr>
<th>Percentage of students receiving free lunch</th>
<th>School A</th>
<th>School B</th>
</tr>
</thead>
<tbody>
<tr>
<td>22%</td>
<td></td>
<td>20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of students who mastered essential reading skills based on the Michigan Education Assessment Program (MEAP)</th>
<th>School A</th>
<th>School B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990:</td>
<td>43.2%</td>
<td>40.4%</td>
</tr>
<tr>
<td>1991:</td>
<td>44.3%</td>
<td>35.8%</td>
</tr>
</tbody>
</table>

Figure 1. Free Lunch and MEAP Percentages, 1991-92.

Selection

Prior to the selection of students, permission to conduct the study was sought from three sources: the Human Subjects Institutional Review Board of Western Michigan University; the Board of Education; and the parents of the students. On November 27, 1991, WMU's Human Subjects Institutional Review Board granted permission to proceed (see Appendix A). On January 23, 1992, the Board of Education of the school district in which the study was conducted granted permission to proceed (see Appendix B). On February 20, 1992, a first class letter was sent via U.S. mail to a parent or guardian of all second grade students in the district (see...
example in Appendix C).

Thirty-six students received the treatments and were selected randomly from each school, 18 students per school. The random selection process was used because such a selection procedure is "unbiased in the sense that no member of the population has any more chance of being selected than any other member" (Kerlinger, 1986, p. 111). The names of the entire male second grade population of School A was placed into a box and the author selected nine names. Then the names of the entire female second grade population of School A was placed into a box and nine names were selected. This same procedure was used for School B. This procedure resulted in 36 randomly selected students stratified by gender and location. The stratification by gender was an attempt to eliminate the gender of students as a possible explanation of any results.

Each set of nine students' names were then placed into the box separately and again randomly drawn to form three groups of three: one group that received no feedback; one group that received pleasant feeling tone statements; and one group that received knowledge of results statements.

Graphically, the process is described in Figure 2. This resulted in a random selection, stratified by school and by gender, of six girls and six boys that received no feedback; six girls and six boys that received pleasant feeling tone statements; and six girls and six boys that received knowledge of results statements.

With the selection process used, the sample is very likely representative of the population and any findings from the data analysis could be applied to that population at large. Beyond this population, results could
further apply to other small, suburban districts with a lower middle class student population that is predominately non-minority.

<table>
<thead>
<tr>
<th>Total School A boys</th>
<th>Total School A girls</th>
<th>Total School B boys</th>
<th>Total School B girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼ select 9 boys</td>
<td>▼ select 9 girls</td>
<td>▼ select 9 boys</td>
<td>▼ select 9 girls</td>
</tr>
</tbody>
</table>

\( n \) = number of students to receive no feedback  
\[n\] = number of students to receive pleasant feeling tone statements  
\{n\} = number of students to receive knowledge of results statements

Figure 2. Sample Selection Process.

Data Collection

Group Division and Designation

Since each group was comprised of students located in two separate buildings, each group was divided for purposes of data collection. Group 1, which received no feedback, was comprised of students from Group 1a and Group 1b, with the a and b corresponding to School A and School B respectively. The other two groups were likewise made up of an a group and a b group for data collection. These groups were combined into the original three groups for data analysis. The groups and their designations are shown in Figure 3.

Each group had 12 students in each setting. In order to assure that the examiner provided every student in each group with the designated type of feedback on a regular and consistent basis during the accomplishment of the task, the number of students in each group was purposely
kept small. The number of students in each group was, however, large enough to show true differences if the differences were a result of the type of feedback that students received. Only true differences due to the type of feedback that students receive were sought.

| Group 1 = G₁ which was comprised of G₁a and G₁b (n) received no feedback |
| Group 2 = G₂ which was comprised of G₂a and G₂b [n] received pleasant feeling tone statements |
| Group 3 = G₃ which was comprised of G₃a and G₃b (n) received knowledge of results statements |

Figure 3. Groups and the Treatment Each Group Received.

**Procedures for Treatment Administration**

The same examiner was used with all six groups to avoid any examiner contamination. This person was a teacher that students in both schools had seen in the school, but not one they had ever had for a class. This teacher had been a fourth grade teacher at School B the year prior to the study and was a Chapter I teacher at School A the year the study was conducted. Having the teacher as a familiar face but not a classroom teacher of the sample was an attempt to eliminate two contaminants: (1) students would not react to previously learned behaviors or expectations from the examiner and (2) students would have no fear of an unknown person.

Before the task began, students were given complete directions. They were told only that they were to do their best. They were instructed not to talk or to ask any questions during the performance of the task.
Each student had sufficient supplies in order to minimize requests for materials. The examiner, nevertheless, carried extra materials in the event of a need.

To ensure that both boys and girls received approximately the same amount of either treatment, the tester made marks on a tally sheet, one mark for each statement. These tallies were a method of eliminating as a contaminant any belief that more boys or more girls received one type of feedback over another. Figure 4 shows a replica of a tally sheet.

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type of feedback:

Figure 4. Tally Sheet.

Hypotheses

The study attempted to answer the questions proposed by four hypotheses. Hypotheses 1 and 3 examined the effect of giving or withholding feedback on persistence and on accuracy. Hypothesis 1 stated: Students who receive oral feedback during their performance will complete more items than students who receive no feedback at all. Hypothesis 3 stated: Students who receive oral feedback during their performance will demonstrate greater accuracy than students who receive no feedback at all.
Hypotheses 2 and 4 attempted to find a difference in either persistence or accuracy on task between the effect of pleasant feeling tone statements and knowledge of results statements. Hypothesis 2 stated: Students who receive verbal knowledge of results statements during their performance will complete more items than students who receive oral pleasant feeling tone statements. Hypothesis 4 stated: Students who receive verbal knowledge of results statements during their performance will demonstrate greater accuracy than students who receive oral, pleasant feeling tone statements.

**Giving or Withholding Feedback**

Hypotheses 1 (see Figure 6) and 3 (see Figure 7) had two levels of one independent variable: the giving or withholding of feedback to students during the accomplishment of a task. Each of the three groups received one form of this variable. G₁ received no feedback at all during the completion of the task. G₂ received no written feedback but did receive oral pleasant feeling tone statements. G₃ received no written feedback but did receive specific knowledge of results statements. For Hypotheses 1 and 3, the efforts of G₂ and of G₃ were combined when the data were analyzed.

**Withholding Feedback**

While G₁a completed the task, the examiner walked around the room but remained silent at all times. If extra supplies were needed, the examiner provided them. If students asked a question or talked, the
examiner put her finger to her mouth to indicate that silence was expected. The examiner replicated these procedures with G1b.

**Giving Feedback**

While G2a completed the task, the examiner walked around the room and found students who were working. She commented with statements such as "Very good," "Nice work," "You're doing fine," and other general statements that indicated the child was doing a satisfactory job. A list of the comments expressed as feeling tone statements is provided in Figure 5. No mention of a specific item was made. Nor was any comment made about wrong items. The positive comments that were made were uttered soft enough so as to not disturb others, but loud enough so that others knew that positive expressions were being made. These same procedures were used with G2b.

<table>
<thead>
<tr>
<th>Good job</th>
<th>Nice work</th>
<th>Neat work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great</td>
<td>You are really working</td>
<td>Fine job</td>
</tr>
<tr>
<td>That looks great</td>
<td>You're doing fine</td>
<td>Superb</td>
</tr>
<tr>
<td>Keep up the good work</td>
<td>Fine</td>
<td>Wonderful</td>
</tr>
<tr>
<td>That looks fine</td>
<td>You're working hard</td>
<td>Super</td>
</tr>
<tr>
<td>My, that look's nice</td>
<td>Such a good worker</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

Figure 5. Feeling Tone Statements.

While G3a completed the task, the examiner walked around the room and also found students who were working. She commented with statements that identified specific items and indicated what was correct with those items. If an incorrect item was found, emphasis was drawn to what specifically was correct in the items surrounding the incorrect one.
The knowledge of results statements were given soft enough so as to not disturb others, but loud enough so that others knew that positive expressions were being made. These same procedures were used with G_{3b} in School B.

**Knowledge of Results or Feeling Tone**

Hypotheses 2 (see Figure 8) and 4 (see Figure 9) had two levels of an independent variable: (1) the giving of feeling tone statements during the accomplishment of a task or (2) the giving of knowledge of results statements during the accomplishment of a task. Each of the two groups received one form of this variable. G_2 received no written feedback but did receive oral pleasant feeling tone statements. G_3 likewise received no written feedback but did receive specific knowledge of results statements.

The procedures for Hypotheses 2 and 4 were similar to those outlined above for Hypotheses 1 and 3.

**Data Collection Procedures and Quality Indicators**

The dependent variable for Hypotheses 1 (see Figure 6) and 2 (see Figure 8) was persistence on task. Persistence on task was defined as the ability of the student to continue working during the assignment. This was determined at the end of the task by the number of items completed during the period. No adjustment to a score was made for correct or incorrect responses to specific test items.

The dependent variable for Hypotheses 3 (see Figure 7) and 4 (see Figure 9) was accuracy. Accuracy was defined as the correct answer to an
item. This was determined for each student by the number of correct responses. No adjustment to a score was made for incorrect responses.

The tasks were completion of mathematical sections of a second grade Stanford Achievement Test and of a fourth grade California Achievement Test.

Stanford Achievement Test

Each group of students was administered the 1989 edition of the Stanford Achievement Test: Mathematics Computation, Primary 1 Level, Form J, which was designed for grades 1.5 to 2.5 (.5 = January 16 - February 15) (Stanford Achievement Test, 1989). The test contained three subtests: concepts of numbers, mathematics computation, and mathematics application. Only the mathematics computation subtest was administered because only this subtest could be completed as an independent activity. The other mathematics subtests required the tester to read the questions, thereby requiring all students to work at the same pace, a factor that would have negated any results. The mathematics computation subtest contained 26 addition and subtraction items, including a few algebraic sentences, e.g., $4 + \_\_ = 9; \ 10 - \_\_ = 5$.

The Stanford Achievement Test underwent two separate standardization programs in order to obtain normative data and to establish reliability and validity. The National Item Analysis Program was used to determine the appropriateness of item types and objectives, the difficulty of items, the effectiveness of the foils, and the reaction of students and teachers to the clarity, format, and content of test materials. Selection of items for the final test was based on characteristics of individual items.
and articulation of subtests (Stanford Achievement Test, 1989). More than 1000 school districts across the country, including approximately 215,000 students, were involved. Approximately 30,000 kindergarten to grade 11 students were involved in developing the continuous score scale that permitted the interpretation of scores across levels of the test.

**California Achievement Test**

Each group of students was also administered the 1985 edition of the California Achievement Test: Mathematics Computation, Level 14, Form E, which was designed for grades 3.6 to 5.2 (Harris, 1986). This test contained two subtests: mathematics computation; and mathematics concepts and application. Only the mathematics computation subtest was administered because only this subtest could be completed as an independent activity. The subtest contained 50 items that measured the four basic mathematical operations: addition, subtraction, multiplication, and division. Content included whole numbers, decimals, fractions, and mathematical expressions.

The California Achievement Test was standardized by being administered to a national sample of approximately 300,000 public school students stratified by geographic region, community type, district size, and community characteristics. The standardization process allows the test to be free of cultural, gender or racial biases.

**Test Usage**

Neither the Stanford Achievement Test: Mathematics Computation nor the California Achievement Test: Mathematics Computation was
used to determine an achievement score. The purpose of the tests was simply to provide students with a task in order to receive the treatment. For young learners, an exercise in mathematics is less threatening than one involving reading. Experience has shown that students often continue with an exercise in mathematics without experiencing the frustration that occurs when they can not read the words on a page (Baker, 1990, 1991). The selection of a fourth grade test for grade two students, while appearing unusual, was an intentional means of measuring persistence. Previous experiments (Baker, 1990, 1991) with grade appropriate tests resulted in youngsters easily completing all items, an event that allowed an analysis of the variables on accuracy, but made a determination of their effect on persistence difficult to determine.

The use of a standardized grade two and grade four test ensured the validity and reliability of all test items. A battery of items independently selected and free of biases was available through these tests. The Stanford Achievement Test: Mathematics Computation and the California Achievement Test: Mathematics Computation provided both valid and reliable test results from which conclusions could be made.

Results of individual responses have not been and will not be published. Students' names did not appear on test booklets, thus making identification of a particular student and the corresponding responses nearly impossible. Only the type of treatment provided to students and the students' gender (for possible use in a later report) was indicated on the test booklets.
Data Analysis

Four operational hypotheses were tested:

1. The mean of the number of items completed by students who receive oral feedback will be greater than the mean of the number of items completed by students who receive no feedback.

2. The mean of the number of items completed by students who receive verbal knowledge of results statements will be greater than the mean of the number of items completed by students who receive oral, pleasant feeling tone statements.

3. The mean of the number of items completed correctly by students who receive oral feedback will be greater than the mean of the number of items completed correctly by students who receive no feedback.

4. The mean of the number of items completed correctly by students who receive verbal knowledge of results statements will be greater than the mean of the number of items completed correctly by students who receive oral, pleasant feeling tone statements.

<table>
<thead>
<tr>
<th>Hypothesis 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
</tr>
<tr>
<td>$n=36$</td>
</tr>
<tr>
<td>$\alpha = .10$</td>
</tr>
<tr>
<td>Levels of Independent Variable</td>
</tr>
<tr>
<td>$G_1$ No Feedback</td>
</tr>
<tr>
<td>$G_2$ and $G_3$ Verbal Feedback</td>
</tr>
<tr>
<td>Dependent Variable Persistence on task</td>
</tr>
<tr>
<td>$n=12$</td>
</tr>
<tr>
<td>$n=24$</td>
</tr>
</tbody>
</table>

Figure 6. Hypothesis 1.
For each hypothesis, the Students' $t$ distribution was the statistic used to compare the two independent means. The tests of Hypothesis 1 (see Figure 6), Hypothesis 3 (see Figure 7), Hypothesis 2 (see Figure 8), and Hypothesis 4 (see Figure 9), where two independent means are being compared, was made by attempting to reject the null hypothesis at the .10 alpha level through the use of the Student's $t$ distribution. Calculations were made by a Statistical Program for the Social Sciences (SPSS) program at Western Michigan University in accordance with SPSS procedures (Norusis, 1990).

<table>
<thead>
<tr>
<th>Total Population</th>
<th>$n=36$</th>
<th>$\alpha = .10$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels of Independent Variable</td>
<td>$G_1$ No Feedback</td>
<td>$G_2$ and $G_3$ Verbal Feedback</td>
</tr>
<tr>
<td>Dependent Variable Accuracy</td>
<td>$n=12$</td>
<td>$n=24$</td>
</tr>
</tbody>
</table>

Figure 7. Hypothesis 3.

<table>
<thead>
<tr>
<th>Total Population</th>
<th>$n=24$</th>
<th>$\alpha = .10$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels of Independent Variable</td>
<td>$G_2$ Pleasant Feeling Tone</td>
<td>$G_3$ Knowledge of Results</td>
</tr>
<tr>
<td>Dependent Variable Persistence on task</td>
<td>$n=12$</td>
<td>$n=12$</td>
</tr>
</tbody>
</table>

Figure 8. Hypothesis 2.
Summary

This study examined four hypotheses. The first two hypotheses attempted to answer the question: Do students attend to a task differently depending on the type of feedback they receive during the completion of a task?

Hypothesis 1 compared the effect on persistence of no feedback to the effect on persistence of pleasant feeling tone statements and knowledge of results statements combined. The presumption was that the mean of the number of items completed would be greater for students who received feedback than for those who did not receive feedback. Hypothesis 2 compared the effect on persistence of pleasant feeling tone statements to the effect on persistence of knowledge of results statements. The presumption was that the mean of the number of items completed would be greater for students who received knowledge of results statements than for those who received pleasant feeling tone statements.

The last 2 hypotheses attempted to answer the question: Do students perform more accurately on a task depending on the type of
feedback they receive during the completion of a task?

Hypothesis 3 compared the effect on accuracy of no feedback to the effect on accuracy of pleasant feeling tone statements and knowledge of results statements combined. The presumption was that the mean of the number of items completed correctly would be greater for students who received feedback than for those that did not receive feedback. Hypothesis 4 compared the effect on accuracy of pleasant feeling tone statements to the effect on accuracy of knowledge of results statements. The presumption was that the mean of the number of items completed correctly would be greater for students who received knowledge of results statements that for those that received pleasant feeling tone statements.

The sample population was 36 second grade students randomly selected from among approximately 150 youngsters in a small suburban school district. The students were divided into three groups: those that received no feedback; those that received pleasant feeling tone statements; and those that received knowledge of results statements. The same tester was used with all students as they completed the mathematics portions of the 1989 edition of the second grade Stanford Achievement Test and the 1985 edition of the fourth grade California Achievement Test. The analysis of data is presented in Figures 6, 7, 8, and 9 respectively.

Chapter IV contains a presentation of the data collected, treated, and analyzed in order to make the conclusions of the study. A summary of the study and appropriate conclusions are provided in Chapter V.
CHAPTER IV

ANALYSIS AND FINDINGS

Introduction

This study examined the effect of: (a) the use of feeling tone statements, (b) the use of knowledge of results statements, or (c) the absence of any statement during the completion of a task to determine which, if any, had an impact on students' accuracy on a task or their persistence on a task. Two questions were proposed: (1) A student's attention to a task is influenced by what a teacher says during the completion of that task; and (2) accuracy on a task is influenced by what a teacher says during the completion of the task.

In this chapter the research hypotheses that were stated in Chapter I are examined. These hypotheses were designed to answer four questions: (1) Is there a difference in the effect of feedback versus no feedback on a learner's motivation to complete a task? (2) Is there a difference in the effect of pleasant feeling tone versus the effect of knowledge of results on a learner's motivation to complete a task? (3) Is there a difference in the effect of feedback versus no feedback on a learner's accuracy in completing a task? (4) Is there a difference in the effect of pleasant feeling tone versus the effect of knowledge of results on a learner's accuracy in completing a task?
Hypothesis 1

The first hypothesis tested a relationship between providing or withholding feedback to students during the performance of a task and the motivation of students to continue that task. Providing students with feedback about their performance on a task during the performance of that task was expected to cause them to continue the task more than if they had not received feedback. *Students who receive oral feedback during their performance will complete more items than students who receive no feedback at all.*

Hypothesis 2

The second hypothesis examined a relationship between the type of feedback students receive during the performance of a task and the motivation of students to continue that task. The expectation was that the more specific information students received about the accuracy of their performance on a task, the more motivation there would be to continue that task. *Students who receive verbal knowledge of results statements during their performance will complete more items than students who receive oral, pleasant feeling tone statements.*

Hypothesis 3

Hypothesis 3 examined a relationship between providing or withholding feedback to students during the performance of a task and the accuracy of the performance on that task. Providing students with feedback about their performance on a task during the performance of that
task was expected to increase accuracy on the task. *Students who receive oral feedback during their performance will demonstrate greater accuracy than students who receive no feedback at all.*

**Hypothesis 4**

Hypothesis 4 examined a relationship between the type of feedback students receive during the performance of a task and the accuracy of the performance on that task. This hypothesis was designed to determine the accuracy of the statement: The more specific the information that students receive about the accuracy of their performance on a task during the performance of that task, the more accurate is the performance on the task. *Students who receive verbal knowledge of results statements during their performance will demonstrate greater accuracy than students who receive oral, pleasant feeling tone statements.* In this chapter the analysis of the collected data is discussed and the results are presented for each hypothesis.

The hypotheses were written directionally. Feedback was expected to produce more motivation to complete a task (persist) than was the lack of feedback. Knowledge of results statements were expected to produce more motivation to complete a task (persist) than were pleasant feeling tone statements. Feedback was expected to produce greater accuracy than was no feedback. And finally, knowledge of results statements were expected to produce greater accuracy than were pleasant feeling tone statements.

To answer each of these questions and determine the validity of the expectations, independent means for each hypothesis were tested with the
The pooled variance estimate results from each hypothesis testing were reported instead of the separate variance estimate because it was assumed that the population variances in the two groups were equal and the one-tailed probability for either the pooled variance estimate or the separate variance estimate resulted in the same conclusion to either accept or reject the null hypothesis in each case.

The two sections of this chapter are separated by the effects of the variables: (1) Effects on Persistence on Task and (2) Effects on Accuracy. Each of these sections is again divided: (a) feedback versus no feedback and (b) pleasant feeling tone statements versus knowledge of results statements. In Section 1, the effects on persistence on task is examined by looking at data analyses for hypothesis 1 and hypothesis 2. In Section 2, the effects on accuracy—hypothesis 3 and hypothesis 4—are examined.

Section 1: Effects on Persistence on Task

Feedback Versus No Feedback: Hypothesis 1

Hypothesis 1 stated: Students who receive oral feedback during their performance will complete more items than students who receive no feedback at all. The first hypothesis to be tested examined a directional relationship between (a) providing or withholding feedback to students during the performance of a task and (b) the motivation of students to continue that task. Providing students with feedback about their performance on a task during the performance of that task was expected to cause students to continue the task more than withholding feedback. The purpose of this hypothesis was to replicate with the study's sample the
findings of earlier researchers. The null hypothesis would be rejected if the mean of the number of items completed by students who received feedback was greater than the mean of the number of items completed by students who did not receive feedback.

**SAT Results**

The results of the independent variables for the first hypothesis, when used while students completed the Stanford Achievement Test, are shown in Table 1. The number of items completed is the dependent variable. The t-test is for independent samples of students who received one of two variables: (1) feedback in the form of either pleasant feeling tone statements or knowledge of results statements; or (2) no feedback at all. One group was made up of the 24 students who received either of the study's variables of feedback. This combined group included G₂, the 12 students who received pleasant feeling tone statements, G₃, the 12 students who received knowledge of results statements. The other group consisted of G₁, the 12 youngsters who completed the mathematical task with no feedback from the test proctor.

Comparing the means for each variable revealed that on the second grade Stanford Achievement Test students completed virtually the same number of items, regardless of the treatment. The mean for the feedback group (25.67) was hardly more than the mean for the no-feedback group (25.50). The one-tailed probability that these sample means would have occurred by chance if the null hypothesis were true was 0.30. If the mean of the population that received feedback (μ₁) was equal to the mean of the
population that received no feedback ($\mu_2$), the probability of finding a difference at least as large as the one in the sample would be 0.30. Since this is greater than the established alpha level of .10 ($\alpha=.10$), the null hypothesis cannot be rejected. Therefore, there is no evidence that for this population the provision of feedback produced greater persistence than the omission of feedback.

Table 1

t-test Values of Items Completed on the Second Grade SAT
With or Without Feedback

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>$n$</th>
<th>$M$</th>
<th>$SD$</th>
<th>$SE$</th>
<th>$t$</th>
<th>$df$</th>
<th>1-tail prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>24</td>
<td>25.67</td>
<td>0.70</td>
<td>0.14</td>
<td>0.54</td>
<td>34</td>
<td>0.30</td>
</tr>
<tr>
<td>No feedback</td>
<td>12</td>
<td>25.50</td>
<td>1.17</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** $\alpha=.10$

**CAT Results**

Hypothesis 1 received less support when second grade students were administered the fourth grade California Achievement Test. As with the SAT, students received: (a) either pleasant feeling tone statements or knowledge of results statements; or (b) no feedback at all. The groups were comprised of the same students as indicated in Table 1. On the California Achievement Test, the means were wide apart (feedback =
28.79, no feedback = 42.33), nearly a 14 point spread. The students who received no feedback completed an average of more problems than did students who received feedback, contrary to what was expected. Again, there is no evidence that for this population the provision of feedback produced greater persistence than the withholding of feedback.

Table 2

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>24</td>
<td>28.79</td>
<td>14.46</td>
</tr>
<tr>
<td>No feedback</td>
<td>12</td>
<td>42.33</td>
<td>10.65</td>
</tr>
</tbody>
</table>

*Results are in the opposite direction of what was expected.

Summary

In summary, the data showed that providing feedback did not produce greater motivation to persist than did withholding feedback. In fact, on the fourth grade CAT the feedback group mean was 14 points below the no-feedback group mean, opposite the direction from what was hypothesized.

The data in this first set of tables only examined test items for which an answer—any answer—was provided. Accuracy was not taken into consideration when examining persistence. Accuracy will be considered in the second section of this chapter when examining
hypotheses 3 and 4. The next part of Section 1 examines the effects of the two forms of feedback on persistence on task and determines if one feedback form had a greater effect than the other.

Feeling Tone Versus Knowledge of Results: Hypothesis 2

Hypothesis 2 stated: Students who receive verbal knowledge of results statements during their performance will complete more items than students who receive oral pleasant feeling tone statements. The second hypothesis proposed a directional relationship between the type of feedback students received during the performance of a task and the motivation of students to continue that task as a consequence of the feedback. The expectation: the more specific the information that students receive about the accuracy of their performance on a task, the more motivation there will be to continue that task. The validity of this expectation was determined by comparing the mean scores of the pleasant feeling tone group to the mean score of the knowledge of results group. The means were determined for the number of items completed by students. Operationally, the expectation was that the mean number of items completed by the knowledge of results group would be greater than the mean number of items completed by the pleasant feeling tone group.

SAT Results

As students worked on the second grade Stanford Achievement Test, they received feedback in the form of either: (a) pleasant feeling tone statements or (b) knowledge of results statements. Group 2 was comprised of the students who received pleasant feeling tone statements
during the completion of the task. Group 3 was composed of the students who received knowledge of results statements.

The mean for each variable (feeling tone = 25.50, knowledge of results = 25.83) showed essentially no difference in the number of items completed, regardless of the treatment provided (see Table 3). The one-tailed probability that the observed sample means would have occurred by chance if the null hypothesis were true was 0.13; therefore the null hypothesis of no difference between the means was not rejected at the .10 alpha level. There is no evidence that for this population the provision of knowledge of results statements produced greater persistence than did the provision of pleasant feeling tone statements.

Table 3

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>t</th>
<th>df</th>
<th>1-tail prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling Tone</td>
<td>12</td>
<td>25.50</td>
<td>0.91</td>
<td>0.26</td>
<td>-1.17</td>
<td>22</td>
<td>0.13</td>
</tr>
<tr>
<td>Knowledge of Results</td>
<td>12</td>
<td>25.83</td>
<td>0.39</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. $\alpha=0.10$

**CAT Results**

The second hypothesis likewise received no support from the evidence gathered as students completed the fourth grade California
Achievement Test while receiving: (a) pleasant feeling tone statements; or (b) knowledge of results statements. The groups were the same as in Table 3: Group 2 received pleasant feeling tone statements and Group 3 received knowledge of results statements while they worked on the CAT.

Table 4

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling Tone</td>
<td>12</td>
<td>36.58</td>
<td>15.32</td>
</tr>
<tr>
<td>Knowledge of Results</td>
<td>12</td>
<td>21.00</td>
<td>8.36</td>
</tr>
</tbody>
</table>

*Results are in the opposite direction of what was expected.

The difference between the number of items completed on the California Achievement Test when students received either pleasant feeling tone statements or knowledge of results statements is shown in Table 4 by the mean score for each variable (feeling tone = 36.58, knowledge of results = 21.00). The mean score for students receiving pleasant feeling tone statements was higher than the mean score for students who received knowledge of results statements. This was contrary to the premise of Hypothesis 2. Again, there is no evidence that for this population the provision of knowledge of results statements produced greater persistence than did the provision of pleasant feeling tone statements.
Summary

In summary, there is no evidence in support of Hypothesis 2. Students did not demonstrate greater persistence with a task due to knowledge of results statements than they did due to pleasant feeling tone statements. These data purported that students produced mean scores that could be considered different only by change and not as a result of the treatment on the second grade Stanford Achievement Test. On the fourth grade California Achievement Test, students completed more items when they received less specific feeling tone statements than when they heard the specific knowledge of results statements.

Section 2: Effects on Accuracy

Feedback Versus No Feedback: Hypothesis 3

Hypothesis 3 stated: Students who receive oral feedback during their performance will demonstrate greater accuracy than students who receive no feedback at all. Hypothesis 3 posited a directional relationship between (a) providing or withholding feedback to students during the performance of a task and (b) the accuracy of the performance on that task. Providing students with feedback about their performance on a task during the performance of that task was expected to increase accuracy on the task. To determine the validity of this statement, the mean score of students who received feedback was expected to be higher than the mean score of students who did not receive feedback when analyzed with the t-test. The significance of the difference between the mean scores, if found, would determine if the difference was due to the treatment or merely to
SAT Results

The results of the independent variables for the third hypothesis, when used while students completed the second grade Stanford Achievement Test, are shown in Table 5. The number of items completed correctly is the dependent variable. The t-test is for independent samples of students who received: (a) feedback in the form of either pleasant feeling tone statements or knowledge of results statements; or (b) no feedback at all. Groups 2 and 3 received feedback; Group 1 did not.

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>t</th>
<th>df</th>
<th>1-tail prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>24</td>
<td>24.00</td>
<td>1.79</td>
<td>0.37</td>
<td>4.01</td>
<td>34</td>
<td>0.00</td>
</tr>
<tr>
<td>No feedback</td>
<td>12</td>
<td>21.58</td>
<td>1.51</td>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* α=.10

The mean for feedback was larger than the mean for no feedback. The one-tailed probability that the observed sample means would have occurred by chance if the null hypothesis were true was 0.00; therefore, the null hypothesis was rejected at the alpha level of .10 and there is evidence that for this population the provision of feedback did produce
CAT Results

The results of analysis of the number of items completed correctly as students worked on the fourth grade California Achievement Test (see Table 6) were contrary to the results of the second grade test described above. The t-test is for independent samples of students who received (a) either pleasant feeling tone statements or knowledge of results statements; or (b) no feedback at all. The groups were comprised of the same students as discussed earlier.

Table 6
Mean Scores of Correct Items on the Fourth Grade CAT With or Without Feedback

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>24</td>
<td>7.46</td>
<td>4.19</td>
</tr>
<tr>
<td>No feedback</td>
<td>12</td>
<td>8.83</td>
<td>2.79</td>
</tr>
</tbody>
</table>

*Results are in the opposite direction of what was expected.

The means scores of the number of items completed on the California Achievement Test when students did or did not receive feedback show that students who received no feedback outperformed students who did receive feedback, contrary to the direction of Hypothesis 3. Therefore, this test showed no evidence that providing second grade
students with feedback on a task produces greater accuracy than not providing them with feedback.

**Summary**

In summary, the data demonstrated that when youngsters were provided with feedback on the second grade Stanford Achievement Test, they produced more accurate results than when feedback was omitted. However, when confronted with the fourth grade California Achievement Test, providing feedback did not increase accuracy over not providing feedback.

The next part of Section 2 examines the effects of the two forms of feedback on accuracy and determines if one feedback form produced more accurate responses than the other.

**Feeling Tone Versus Knowledge of Results: Hypothesis 4**

Hypothesis 4 stated: Students who receive verbal knowledge of results statements during their performance will demonstrate greater accuracy than students who receive oral, pleasant feeling tone statements. The last hypothesis examined a directional relationship between the type of feedback students received during the performance of a task and the accuracy of student performance on that task. The hypothesis was designed to determine the accuracy of the statement: The more specific the information that students receive about the accuracy of their performance on a task during the performance of that task, the more accurate is the performance on the task. The mean scores of students who received specific knowledge of results statements was compared to the
mean scores of students who received general, pleasant feeling tone statements, with the expectation that the mean of the knowledge of results group would be greater than the mean of the pleasant feeling tone group.

**SAT Results**

Hypothesis 4 was first tested using the second grade Stanford Achievement Test with an examination of the t-test values for the number of items completed correctly (Table 7). The t-test is for independent samples of students who received: (a) pleasant feeling tone statements or (b) knowledge of results statements. Group 2 was comprised of the students who received pleasant feeling tone statements and Group 3 was composed of the students who received knowledge of results statements.

### Table 7

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>t</th>
<th>df</th>
<th>1-tail prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling Tone</td>
<td>12</td>
<td>23.75</td>
<td>2.22</td>
<td>0.64</td>
<td>-0.67</td>
<td>22</td>
<td>0.26</td>
</tr>
<tr>
<td>Knowledge of Results</td>
<td>12</td>
<td>24.25</td>
<td>1.29</td>
<td>0.37</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** α=.10

There was a slight difference in the mean scores for the two groups (feeling tone = 23.75, knowledge of results = 24.25). The one-tailed proba-
bility that the observed sample means would have occurred by chance if
the null hypothesis were true was 0.26. This is larger than the esta-
blished alpha level of .10 (α=.10) and therefore the null hypothesis was
not rejected. The difference in means by providing pleasant feeling tone
statements or knowledge of results statements could have been merely by
chance and not as an explanation of the statements presented to the
students. There is no evidence that for this population providing
knowledge of results statements produced greater accuracy than providing
pleasant feeling tone statements.

**CAT Results**

Hypothesis 4 was next tested by analyzing the items completed
correctly as students worked on the fourth grade California Achievement
Test. The t-test in Table 8 is for independent samples of students who
received: (a) pleasant feeling tone statements or (b) knowledge of results
statements. Group 2 and Group 3 were comprised of these students,
respectively.

The means for the variables (feeling tone = 9.25, knowledge of
results = 5.67) show that students who received pleasant feeling tone
statements were more accurate than students who received knowledge of
results statements when they worked on the CAT. Therefore, there is no
evidence that providing knowledge of results statements produced greater
accuracy than would have been achieved by providing pleasant feeling
tone statements.
Table 8
Mean Scores of Correct Items on the Fourth Grade CAT With Two Forms of Feedback

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>n</th>
<th>M*</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling Tone</td>
<td>12</td>
<td>9.25</td>
<td>4.09</td>
</tr>
<tr>
<td>Knowledge of Results</td>
<td>12</td>
<td>5.67</td>
<td>3.60</td>
</tr>
</tbody>
</table>

*Results are in the opposite direction of what was expected.

Summary

In summary, the data showed no evidence that providing second grade students with specific knowledge of results statements produced greater accuracy than providing general, pleasant feeling tone statements. This was true for both the second grade Stanford Achievement Test and for the fourth grade California Achievement Test.

Summary of the Findings

The data revealed that students do not react the same when faced with standardized test at different grade levels. While all four hypotheses could not be accepted as they had been written, the means analysis of the second grade SAT results and the fourth grade CAT results for Hypothesis 3 prevents general statements about all four hypotheses.
Let us examine each test—the SAT and the CAT—in terms of the independent and dependent variables (See also Figure 10):

**Second Grade SAT**

**Persistence: Feedback Versus No Feedback**

There was no evidence that for this second grade population the provision of feedback provided more motivation to continue with a task than occurred without the feedback.

**Persistence: Knowledge of Results Versus Feeling Tone**

There was no evidence that for this second grade population the provision of knowledge of results statements provided more motivation to continue with a task than occurred with pleasant feeling tone statements.

**Accuracy: Feedback Versus No Feedback**

There was evidence that for this second grade population the provision of feedback produced greater accuracy than occurred without the feedback.

**Accuracy: Knowledge of Results Versus Feeling Tone**

There was no evidence that for this second grade population the provision of knowledge of results statements produced greater accuracy than occurred with pleasant feeling tone statements.
Fourth Grade CAT

**Persistence: Feedback Versus No Feedback**

There was no evidence that for this second grade population the provision of feedback provided more motivation to continue with a task than occurred without the feedback.

**Persistence: Knowledge of Results Versus Feeling Tone**

There was no evidence that for this second grade population the provision of knowledge of results statements provided more motivation to continue with a task than occurred with pleasant feeling tone statements.

**Accuracy: Feedback Versus No Feedback**

There was no evidence that for this second grade population the provision of feedback produced greater accuracy than occurred without the feedback.

**Accuracy: Knowledge of Results Versus Feeling Tone**

There was no evidence that for this second grade population the provision of knowledge of results statements produced greater accuracy than occurred with pleasant feeling tone statements.

Two hypotheses speculated that feedback would be more powerful than no feedback in motivating second grade students to (1) persist on a task and (2) be accurate in performing that task. Data did not show this to be true for either persistence or accuracy on the fourth grade CAT test. Data did not show this to be true on the second grade CAT test for
persistence but did show this to be true for accuracy. Figure 10 shows this graphically.

Two other hypotheses speculated that knowledge of results statements would be more powerful than pleasant feeling tone statements in motivating second grade students to (1) persist on a task and (2) be accurate in performing that task. Data did not show this to be true for either persistence or accuracy on either the CAT or the SAT.

<table>
<thead>
<tr>
<th>Dependent Motivational Factor</th>
<th>Independent Variables Compared</th>
<th>Second Grade SAT</th>
<th>Fourth Grade CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>persistence</td>
<td>feedback v no feedback</td>
<td>no evidence of difference</td>
<td>no evidence of difference</td>
</tr>
<tr>
<td>persistence</td>
<td>knowledge of results v feeling tone</td>
<td>no evidence of difference</td>
<td>no evidence of difference</td>
</tr>
<tr>
<td>accuracy</td>
<td>feedback v no feedback</td>
<td>evidence of difference</td>
<td>no evidence of difference</td>
</tr>
<tr>
<td>accuracy</td>
<td>knowledge of results v feeling tone</td>
<td>no evidence of difference</td>
<td>no evidence of difference</td>
</tr>
</tbody>
</table>

Figure 10. Comparison of Dependent and Independent Variables on Two Tests.

The next chapter summarizes the study, offers a rationale for these findings and recommends directions for educators and for future research.
CHAPTER V

SUMMARY AND AREAS FOR FUTURE RESEARCH

Introduction

The effectiveness of two types of verbal feedback on increasing accuracy and persistence was the major focus of this study. The study examined the effect of: (a) the use of feeling tone statements, (b) the use of knowledge of results statements, or (c) the absence of any statement during the completion of a task to determine which, if any, had an impact on students’ accuracy on a task or their persistence on a task. This final chapter contains a summary and areas for future study.

Summary

Literature Review

A review of the literature revealed no other studies that investigated specifically the relationship between the use of pleasant feeling tone statements and knowledge of results statements on accuracy or on persistence. These two motivational factors have been targeted by Hunter (1967) and Cummings (1980) as capable of causing students to focus on a task and to pay attention. While these two variables of motivation are closely related, there has been no study that examined the potential strength of one over the other to cause accuracy or persistence in task performance of young children. Studies on the effect of feedback (Condry, 1977; Deci, 1975; Lepper, Greene & Nisbett, 1973; Logan, 1971; Weiner & Mender, 1978) have substantiated the ability of feedback to
affect motivation in learners. This study attempted to determine what
effect the use of pleasant feeling tone statements and knowledge of results
statements—components of motivation—would have on students during
the performance of a task.

The Study

To measure the effects of pleasant feeling tone statements and
knowledge of results statements, each variable was presented verbally to
second grade students during the performance of a computational mathe­
matical task. Students performed two tasks: The 1989 edition of the
second grade Stanford Achievement Test: Mathematics Computation,
Primary 1 Level, Form J; and the 1985 edition of the fourth grade
California Achievement Test: Mathematics Computation, Level 14, Form
E. While students completed the tests, one third of them received no
feedback; one third received verbal pleasant feeling tone statements; and
one third received oral knowledge of results statements. The same tester
was used with all students. Students were randomly selected from the
second grade population of a small suburban school district, located in two
schools. Students were stratified by gender, resulting in equal numbers of
boys and girls. The students were then randomly assigned to one of the
three treatment groups, again with equal numbers of boys and girls in
each group.

The t-test between independent means was used to determine: (a)
the effect of feedback versus no feedback on accuracy; (b) the effect of
feedback versus no feedback on persistence; (c) the effect of pleasant
feeling tone versus knowledge of results on accuracy; and (d) the effect of
pleasant feeling tone versus knowledge of results on persistence.

Conclusions

The results of the tests showed evidence of an effect on accuracy, but no evidence of an effect on persistence.

Persistence

The results of the t-test indicated that, contrary to what was expected, there was no evidence that the provision of feedback produced more motivation to persist than occurred without the feedback. This result was obtained both with the second grade SAT and with the fourth grade CAT. Again contrary to expectations, the results from both tests showed no evidence that the provision of knowledge of results statements produced more motivation to persist than did the provision of feeling tone statements.

Accuracy

The results of the t-test showed evidence that the provision of feedback on the second grade SAT produced greater accuracy than occurred without feedback, but there was no such evidence on the fourth grade CAT. While the results showed no evidence that the provision of knowledge of results statements produced greater accuracy than did the provision of feeling tone statements on the fourth grade CAT, on the second grade SAT there was evidence that knowledge of results statements produced more accurate results than did feeling tone statements.
The major conclusions obtained from the analysis of the data of this study is that (a) second graders do not show a difference in persistence on a task when given specific information about their performance than they do when given general praise; and (b) second graders do produce more accurate results when they receive feedback than they do when they receive no feedback, but the specificity of that feedback might be unimportant to the outcome of either accuracy or persistence.

One of the most perplexing issues in education today is the challenge of motivating students to learn. Improved motivation could result in either improved accuracy or increased persistence on task. This problem in student motivation has resulted in a variety of behavioral modification techniques that emphasize tokens and other extrinsic, tangible rewards to cause children to do that which they may not initially desire to do. The purpose of this study was to examine the effects of verbal statements on producing increased persistence on a task and increased accuracy on a task without the use of a physical reward. If verbal statements could be proven effective, learning might be enhanced at no tangible cost. An increased intrinsic motivation within the learner may be the outcome.

The results of this study with second graders were in most cases contrary to the hypotheses. Much of the literature that was reviewed, thought conducted with elementary children, was completed with children beyond second grade. There is only a small body of research that has demonstrated the difference between the learning perceptions and styles of (a) early elementary and later elementary youngsters, and (b) middle class and lower economic students. This study focused on the effects of motivational factors with second grade students and demonstrated...
differences between the results with second grade students and the results that have been obtained from older pupils. Possible explanations for these differences are offered in the remainder of this chapter.

**Age as a Factor**

**Accuracy**

Children begin to make associations between what is said to them and how they perform early in their schooling. The affective associations that are formed in early childhood are apt to be strong and resistant to unlearning or to forgetting (McClelland, 1958). The techniques that cause such powerful associations, therefore, need to be clear for teachers and educational administrators. Furthermore, the differences in the associations made by students in early and in later elementary grades must be understood.

Yet teacher and administrative training does not usually note these differences. Indeed, the effective teaching techniques espoused by Hunter (1967, 1969, 1973, 1976, 1979b, 1984) and Cummings (1980) do not separate instructional procedures according to the age or to the developmental level of the learner. According to Brophy (1983), "essentially the same principles for effective teaching and learning apply across levels of schooling ranging from fourth grade through graduate school but ... many of these principles are inappropriate for the early grades" (p. 283). This study provides evidence that previous studies conducted with older elementary students may not provide the best methodology for early elementary children.
What constitutes an effective reinforcer and how youngsters perceive those reinforcers also change as a function of experience and age.

Studies find consistently that children's expectations for success at academic performance remain high, often unrealistically high, until about the second or third grade, and continue to decrease, on the average, throughout the elementary grades. ... Not until the end of the second grade [do] children's expected grades correlate fairly well with their actual performance. (Stipek, 1984, pp. 149-150)

Consequently, young children believe they will do well without specific information that would provide this information. "Younger children may attend more to social reinforcement—praise or criticism—than to objective, symbolic or normative feedback directly related to their performance" (Stipek, 1984, p. 153), while older children tend to be more responsive to performance reinforcers (Rosenhan & Greenwald, 1965).

With increasing age, material rewards are sought less as ends in themselves than as symbols of earned (achieved) status, prestige, and ego-enhancement. Remote goals become more salient as long-term ambitions displace the needs for immediate gratification as the temporal dimensions of the child's psychological world expand and as his frustration-tolerance increases. (Allen, 1981, p. 37)

As they grow older, children become more sensitive to a broader band of reinforcers—particularly to abstract reinforcers—without declining in their responsiveness to concrete ones (Rosenhan & Greenwald, 1965). As they grow older, children develop a sense of attributing the consequences of their behavior to themselves: they begin to see themselves as the reason for what happens (Condry, 1977). Without this sense of causation, younger children accept non-specific praise as affirmation of what they already believe—that they can be successful with anything presented to them. Young children are not affected by competence information.
The type of information that will most effectively sustain interest in children depends on the developmental level of the child. Early elementary children are primarily affected by information about meeting an absolute standard, not by social comparison information. Boggiano and Ruble (1979) drew this conclusion by determining that the overjustification effect did not occur for young children “when attaining a reward was made contingent upon meeting an absolute standard of performance. In contrast, social comparison information superseded the effect of the contingency of the reward on subsequent interest in the target task for the older children” (p. 1462).

Young children want to be “good.” They view feedback about accomplishment as a reflection of their behavior. In contrast, sixth graders discount “academically irrelevant information about conduct when assessing ability ... Second graders’ perceptions of their ability [decline] as a function of the amount of behavioral criticism ... received (Stipek, 1984, p. 160). Young children ignore past performance feedback that is inconsistent with their desire for a successful outcome. They hear what they want to hear in the simplest of terms. Simple praise may be the best technique to keep them on task.

**Persistence**

The reasons that children continue with a task can also be attributed to the developmental age. Maehr (1976) cited three parts to his emphasis on what he called *continuing motivation*. The first factor was the development of *self-as-a-cause* in the achieving situation.
Factors that reduce the individual's perception of his competence to achieve or that lead him to believe that he is not a cause of his behavior reduce [continuing motivation] in performing the task. ... A second factor to the causal role of self-regard is the individual's judged competence to perform a task, the subjective probability of success of the outcome. ... A third, and much less well-defined, facet of self-regard, which conceivably conditions [continuing motivation], is what might be termed self-identify. (Maehr, 1976, pp. 458-459)

When combined with Condry's (1977) findings on the development of the person as the cause for the behavior, there begins to emerge a reason for less than anticipated results when using knowledge of results statements.

Based on theories postulating that intrinsic interest stems from perception of competence and self-determination (Deci, 1975), several investigators have hypothesized that rewards conveying information regarding competence should sustain rather than undermine subsequent intrinsic interest (Lepper & Greene, 1978). If competence and self-determination are more developed as children become older, intrinsic motivation could be expected more in older students than in younger as a result of specific knowledge of results statements that convey specific information about competence. If more direct information about competence or incompetence were to be provided, subsequent levels of interest should vary directly with the type of information regarding competence that is presented (Boggiano & Ruble, 1979), in accordance with the age of the receiver of the information.

**Economic Background as a Factor**

Though dismissed as meaningful in the type of praise that was hypothesized to be most effective for this population, the economic back-
ground must be reexamined considering the results. As stated in Chapter 2, Rosenhan and Greenwald (1965) concluded that there was no interaction between the type of feedback provided and the socioeconomic status of the pupil. They did find, however, that middle-class second-grade children were more influenced by reinforcement of the person than they were by reinforcement of the performance. This could explain how, in providing specific knowledge of results statements to middle-class oriented second grade children, the results would show that the population was unaffected by the specificity of the statements and responded so strongly to the general praise.

Recommendation

The results of this study and the reviewed literature provide evidence that the educational community may need to consider abandoning the use of extrinsic rewards in favor of alternatives that raise intrinsic motivation or provide a balance in the use of extrinsic versus intrinsic motivation. That punishment and pain are detrimental to learning is well accepted, but the findings of the research reported here show that even verbal rewards can be the enemies of education. If we wish to encourage exploration and the self-knowledge and internalization that come from it, it would be wise to discover how this might be done without the use of strong extrinsic, task-irrelevant incentives to motivate students to engage in a task. In many classrooms teachers presume that students will produce if and only if external evaluation (grades, teacher, parent approval, etc.) is applied. They may be right—in the classroom. In a controlled environment, external pressure can increase both accuracy
and persistence for older students. Yet the Maehr and Stallings (1972) study suggested that such increases may occur at the price of negative effects on intrinsic motivation.

Maehr (1976) warned that the "use of extrinsic motivators, always common in education, but recently dignified by the adherence to behavior modification approaches, becomes problematic" (p. 453).

Clearly, the present literature seems far from sufficient to eliminate concerns that the use of overly powerful reward systems in applied settings may prove counterproductive outside of the setting in which rewards are made available. Broad assertions that deleterious effects of rewards do not occur in applied settings when empirically defined reinforcers are employed or following the use of long-term programs appear overstated on the basis of available data. (Lepper & Greene, 1978, p. 223)

Extrinsic rewards are often used in classrooms when other attempts at sustaining or maintaining expected behavior have failed. In less disruptive classrooms, increased intrinsic motivation could cause children to take a greater part in their own learning, to be better on creative problem solving, and to maintain or strengthen their natural curiosity (Deci, 1978).

O'Leary and O'Leary (1977) provided examples of how teachers can be taught procedures to increase intrinsic motivation in students and can then use those approaches to gain more effective behaviors from their pupils. In the process of increasing intrinsic behavior, extrinsic rewards can effectively be utilized. "The extrinsic reinforcers can [then] be withdrawn completely without a return to baseline level of disruptive behavior" (O'Leary & O'Leary, 1977, p. 340).
Areas for Future Research

This study examined the effects of two types of feedback on second grade students. There is an essential need to investigate the inconclusive results found on accuracy by the evidence from the second grade SAT and the fourth grade CAT before any deductions can be made. This study found contradictory evidence with the two tests. Why? What was the factor that caused these varying results?

There is a need to continue the concept proposed in this study with students in later elementary grades. Further research would determine the validity of the idea that older students respond differently to general and to specific feedback and determine if the effects on older students are different from the effects on younger children.

The standardized examinations used in this study were presumed to be suitable measures of accuracy and of persistence. There is a need to replicate this study with other types of tasks. Would teacher produced exams show the same results? Would non-examination tasks produce similar results?

The review of the literature for this study examined research on types of feedback without distinction on the competence level of students, on the interest level of students, or on the confidence level of students. Student competence, interest, or confidence could each or in combination affect the persistence or accuracy on any task. There is a need to replicate this study with subjects that have had their competence, interest, or confidence predetermined in order to decide what, if any, effect these variables may have on the verbal statements from a teacher.
There is some evidence in the literature that students respond differently to males than they do to females, and that this difference depends on the gender of the student. In this study, the one-tailed probability that the observed sample mean of 23.7 correct for males and 22.7 correct for females on the second grade SAT would have occurred by change if the null hypothesis were true was .08, a difference that would lead to a rejection of the null hypothesis at the alpha level of .10. However, the one-tailed probability for accuracy on the fourth grade CAT was greater than .10 and the one-tailed probability for persistence on both the SAT and the CAT was greater than .10 when results were examined by the gender of the test takers. There is, therefore, a need to further examine the data by gender and to replicate this study with a male test proctor to ascertain the effect, if any, on results when statements are provided by a male rather than a female.

At times the decision not to attribute results to the variables was made by differences of only a small margin. There is a need to replicate this study with a larger sample to approximate more closely the general population and to see if these differences reoccur.

This study was conducted on a one-time basis, using two similar, standardized instruments, rather than over a period of time with students completing multiple tasks. There is a need for a longitudinal study that would examine the effects of the variables on tasks of diverse interest and difficulty. Such a study could use assorted means of measurement that could shed more light on the effects of verbal feedback.

In conclusion, the results of this study have contributed to the field of motivation and learning for both accurate performance and persistence.
This study demonstrated that for second grade students the use of general praise of the pleasant feeling tone type is no less powerful, and in some instances more powerful, than more specific knowledge of results statements in causing students to be accurate and to persist.
Appendix A
HSIRB Form
Date: November 27, 1991
To: Jesse Baker
From: Mary Anne Bunda, Chair
Re: HSIRB Project Number: 91-11-20

This letter will serve as confirmation that your research protocol, "The effects of two motivational factors on second graders" has been approved under the exempt category of review by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

cc: Smidchens

Approval Termination: November 27, 1992

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Appendix B

Board of Education Minutes
Granting Study Permission
President Weighill called the meeting to order at 7:30 p.m.

Present: Members Bowden, Ahnert, Wood, Brandemihl, Weighill, Casser, Dunklee

Absent: None

Minutes of January 9, 1992, were approved as submitted.

142/91-92 Moved by Mr. Wood, Supported by Mrs. Brandemihl that general fund vouchers, 12515-12632 for $199,644.68 be approved for payment. Carried

The Board received a thank you card from the C.E.A. in regard to Board Member Appreciation Month.

Mrs. Cheryl Leach, Special Services Director, presented an overview of Section 504 of the Rehabilitation Act of 1973 for the Board, and the impact it could have for the district. Mrs. Leach will keep members updated in this area.

Mrs. Vickery, Adm. Asst. for Instruction, reported that building principals are availing themselves of their allocated Chapter 2 funds to send their building teams to the training program, SUCCESS, to help meet the requirements of PA 25.

143/91-92 Moved by Mrs. Ahnert, Supported by Mrs. Dunklee, that the Board approve the request by Mr. Jesse Baker, Botsford principal, to conduct a study titled, The Effects of Motivation Statements on the Attention to Task and Accuracy of Task for Grade 2 Students, for his doctoral dissertation, as presented. Carried

144/91-92 Moved by Mr. Wood, Supported by Mrs. Brandemihl, that the Board approve the request from the high school counseling office for Clarencaville to sponsor a PEP-fest, as presented, to be held at the high school. The date of the event to be yet be determined. Carried

145/91-92 Moved by Mr. Wood, Supported by Mr. Gasser, that the request from Dorvin Nursing Home to have access to the Clarencavilla Middle School in the event of an emergency be tabled until a later meeting at which time a proposal can be formally developed. Carried
Appendix C

Letter to Parents Explaining Study
February 20, 1992

Dear Second Grade Parents:

Some second grade children at both Grandview and Botsford Elementary Schools will soon be selected to help us learn more about what motivates students. We believe that the better schools understand how to keep youngsters focused on a task and paying attention, the better we can teach them. In order to see how students perform under different situations, we will give children arithmetic problems to solve in three different settings. The difference in the settings will be what a teacher says to students while they solve the problems.

Since we are not interested at this time in how well individual students perform, the boys and girls will not have their names on any papers. We will make no attempt to keep track of which students complete which papers. We will look at the overall, group performance. No scores for individual students will be available.

The information that we will collect will help us learn more about teaching youngsters and we hope that all second grade students will be eligible to participate, even though we will randomly select only 18 second grade youngsters from each school.

We recognize that parents are always interested in what children at school are doing and for this reason are informing you of the problem solving test that your youngster may be selected to take. We also know that some parents may have questions. Please call Mr. Jesse Baker, Botsford Elementary Principal, at 473-3911, to get answers to any questions you may have. If for any reason you should wish to withdraw your child from participation, please call Mr. Baker.

Sincerely,

Jesse D. Baker, Principal
Botsford Elementary

Ellen M. Davis, Principal
Grandview Elementary
Appendix D
Preparation of Examiner
The examiner was an experienced elementary teacher with over 20 years of classroom experience. She had received intensive training in an effective teaching program known as Instructional Theory into Practice (ITIP). This training was initially provided by the intermediate school district and was reinforce by observations and conferences with the building principal (and author) and by other district administrative personnel, all of whom had been trained in clinical supervision.

Prior to test administration for the study, the author observed the examiner as she provided feeling tone statements and knowledge of results statements to third through fifth grade youngsters. During this time the examiner practiced speaking in a neutral tone of voice while remaining pleasant in the delivery of both types of statements. She also practiced differentiating between the two types of statements so that when statements were provided during the study's testing situation, the utterances would be true to the variable in use.
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